CRYPTOZOOLOGY

INTERDISCIPLINARY JOURNAL OF THE INTERNATIONAL SOCIETY OF CRYPTOZOOLOGY

Vol. 11 1992

CONTENTS

ISSN 0736-7023 ALLEN PRESS, INC.

CRYPTOZOOLOGY

INTERDISCIPLINARY JOURNAL OF THE INTERNATIONAL SOCIETY OF CRYPTOZOOLOGY

SUBSCRIPTIONS: *Cryptozoology* is published annually by the International Society of Cryptozoology for its members and institutional subscribers. Single copies are US$18 (or £12) to individuals and US$27 (or £18) to institutions such as corporations, zoological parks and aquariums, or libraries. The journal may be obtained as part of membership for individuals, or part of a subscription for institutions (see back cover).

SUBMISSIONS: All manuscripts and editorial correspondence should be addressed to: J. Richard Greenwell, Editor, *Cryptozoology*, ISC Secretariat, P.O. Box 43070, Tucson, Arizona 85733, U.S.A. Manuscripts must conform to the appropriate style and format (see instructions on inside back cover). Articles will be refereed by at least two outside reviewers before publication acceptance.

REPRINTS: Authors may order reprints of their articles directly from the publisher, Allen Press, Inc., P.O. Box 368, Lawrence, Kansas 66044, U.S.A.

THIS PUBLICATION IS PRINTED ON ACID-FREE & RECYCLED PAPER.

(Published in April 1994)

VOL. 11 1992

Cryptozoology, 11, 1992, 1–37

CRYPTOPHIDION ANNAMENSE, A NEW GENUS AND SPECIES OF CRYPTOZOIC SNAKE FROM VIETNAM (REPTILIA: SERPENTES)

VAN WALLACH AND GWILYM S. JONES
Center for Vertebrate Studies, Department of Biology, Northeastern University
Boston, Massachusetts 02115, U.S.A.

ABSTRACT: The Vietnamese sharp-nosed snake, *Cryptophidion annamense*, is a new cryptozoic genus and species representing Category VI of Greenwell (1985). It is described from Quang Nam-Da Nang Province, central Vietnam, based upon three color slides taken of the type specimen in 1968. The holotype is presumed lost as we have not been able to trace its disposition. This snake exhibits several unusual features, such as a depressed snout with pointed rostrum, greatly reduced concave nasal shields separated from the rostral, large preorbital shield in place of a loreal and preocular, large temporal-like postoculars, a temporolabial shield, and a short tail. No snake is known with this unusual morphology from Southeast Asia, and no other genus of snakes in the world compares in all respects with this new taxon. Its relationships are therefore highly speculative. After comparison with all sharp-nosed burrowers and snakes sharing characteristics associated with a subterranean lifestyle, it is concluded that it shares the most similarities with *Myersophis* of the Philippines, *Lycophidion* of Africa, and *Emmochliophis* of Ecuador. Although probably a member of the Colubridae, the Atractaspididae, Elapidae, and Hydrophiidae cannot be excluded as possibilities.

INTRODUCTION

Cryptozoology is the science of hidden animals. Interestingly enough, the list of at least 110 cryptozoic species compiled from more than 20,000 references by Heuvelmans (1987) contains only terrestrial, aquatic and marine-inhabiting organisms, and, of those listed, nearly 75 percent are mammals, and more than 60 percent are terrestrial (Heuvelmans 1983, 1987). This is not surprising since large terrestrial animals are more readily visible to humans than smaller animals or those inhabiting aquatic or subterranean habitats. A number of cryptozoic serpents have been reported in the literature, but these are generally very large boids or pythonids. Heuvelmans (1987) mentioned one freshwater and five or six large terrestrial snakes from tropical regions around the world, while Dethier and Dethier-Sakamoto (1988) reported on a small terrestrial viperid, the *tzuchinoko*, from Japan.

The most likely place to find a cryptozoic serpent is in a cryptic habitat

like the underground environment. However, truly subterranean or fossorial species are the most difficult types of snakes to find and collect, and are the most poorly represented ecological group in museum collections. Southeast Asia in general, and Vietnam in particular, are geographic regions that remain relatively unexplored ophiologically. With the exception of Thailand, where the snake fauna is fairly well known and active research continues (Taylor 1965, Nutphand and Tumvipart 1982, Cox 1991), only a few works have appeared to supplement the classic study by Smith (1943) on India and Indochina, including Saint-Girons (1972), Kampuchea; Deuve (1970), Laos; and Campden-Main (1970), South Vietnam. The Annam highlands between 16°–19° N along the Laos-Vietnam border is an area where several new and unusual animal species have been recently discovered, such as a fish, a turtle, a monkey and an ungulate (Stone 1992, Dung et al. 1993).

During the Vietnam War, Senior Chief Petty Officer Calvin E. Snyder, USN, and Lt. Gwilym S. Jones, MSC, USNR, among others of the U.S. Naval Medical Research Unit No. 2, collected zoological specimens for eventual deposition in the Smithsonian Institution's National Museum of Natural History. Three poorly-focused photographic color slides taken of a snake collected west of Da Nang in 1968 are apparently the sole remaining evidence for the existence of a cryptozoic genus and species new to science. Attempts to trace the specimen at the National Museum of Natural History and other institutions with Asian collections have failed. As far as we can determine, the one and only known specimen is lost, apparently having never been deposited in a museum nor reported in the literature (Campden-Main 1970). Because of its uniqueness, it is felt that a description of the taxon is warranted in order to inform the scientific community of the existence of this snake, and in the hope that additional specimens may be collected—or perhaps discovered in a museum collection as misidentified material.

Since the original specimen cannot be located, and no additional specimens have been collected or reported in the 25 years since it was discovered, the taxon qualifies in a loose sense as being ethnoknown (Greenwell 1985). The native Vietnamese may be aware of the existence of this snake, but this cannot be verified or refuted at the present time. This serpent has certainly escaped the notice of the scientific community. Because the slides provide indisputable autoptical evidence documenting the existence of this ophidian, it is a cryptozoic taxon (Heuvelmans 1983, 1985). Since the type and only known specimen appears to be lost, it is cryptozoic in more than one sense of the word, and can best be classified under Category VI of Greenwell (1985), which contains "new taxa of known, extant forms for which no known organic evidence exists." It is worth noting that, while we cannot achieve the highest ideal of cryptozoology, "to describe an animal scientifically before it has been captured or collected" (Heuvelmans 1985), we are achieving a portion of that ideal by describing an animal for which there is no extant

organic evidence. The definition of cryptozoology by Heuvelmans (1985) can now be expanded to include unknown species of animals about which not only "some testimonial and circumstantial evidence is available" but also autoptical or material evidence.

The International Commission on Zoological Nomenclature (ICZN), in order to insure that the scientific name of every taxon is unique and distinct, has established a methodology for the naming of zoological taxa based upon a philosophy of stability and universality. The Code (ICZN 1985), utilizing the Principles of Binomial Nomenclature, Name-bearing Types, Coordination, Priority, Homonymy, and First Reviser, provides mandatory rules and advisory recommendations for the stabilization of zoological nomenclature. As illustrated by Article 61(a) of the Code, "each nominal taxon has, actually or potentially, its name-bearing type." Each family has a type genus, each genus has a type species, and every species has a type specimen (or type series). Although Recommendation 73A suggests that "an author who establishes a new nominal species-group taxon should clearly designate its holotype," it is not necessary to have a type specimen for the taxon to be named, and the lack of a type specimen in no way precludes a species' name from being valid. Article 73(a)(iv) of the Code, which treats the designation of an illustration of a specimen as the holotype as being equivalent to designation of the specimen illustrated, states that "the fact that the specimen cannot be traced does not of itself invalidate the designation."

It is not uncommon to have nominal or name-bearing species for which no types exist. Missing or lost types are usually connected with species described prior to 1850 whose types were either subsequently lost (or destroyed) or never preserved and deposited in a museum. At least 10 percent of all valid snake species are without their original type specimens today. Based upon a quick perusal of the approximately 2,700 extant snake species listed in a synopsis of living and extinct snake species (Wallach and Williams, in preparation), a conservative estimate of missing types is as follows: the types of 90 species are lost or destroyed; there are 30 species whose names are based solely on illustrations of the types; another 25 species have types that are lost and that now have neotypes designated; and there are 130 types listed as missing or unknown (hence possibly lost). This total of 275 missing or lost types does not include any of the types reportedly deposited in museums but which have not been searched for or located in recent times, many of which may be missing or lost.

The morphology of the head, venter and tail of this new snake strongly suggests that it is a burrowing form. Burrowing snakes have evolved different head shape profiles, both dorsally and laterally, in response to a secretive lifestyle, the two main types being blunt-headed and sharp-nosed. The lateral head profile in burrowers is often depressed in the region of the snout. The rostral shield at the tip of the snout may exhibit different shapes independently of the lateral head profile; it may be rounded, blunt, or pointed.

The following characters are associated with a secretive (subterranean or fossorial) lifestyle in snakes: (1) reduced head size with tapered head or snout; (2) loss of preorbital lateral head shields (loreal and/or preocular) with contact between prefrontal and supralabials; (3) reduction or loss of ocular shields; (4) loss of postorbital lateral head shields (one or more temporals) with contact between parietal and supralabials; (5) loss or fusion of dorsal head shields (internasals and/or prefrontals); (6) reduction in size of nasal shields; (7) separation of nasal or prenasal from rostral; (8) reduction in size of eyes; (9) reduction in number of supralabials to 4–6; (10) reduction in number of infralabials to 5–7; (11) reduction in number of longitudinal scale rows to 15 or fewer; (12) absence of posterior scale row reduction; (13) absence of keels or apical pits on dorsal scales; (14) reduction of overall size; (15) reduction of tail to less than 15 percent total length; and (16) reduction in number of subcaudals to less than 40 (Marx and Inger 1955, Inger and Marx 1965, Marx and Rabb 1972).

Materials and Methods

In attempting to determine the affinities of this snake, a search was made to identify the family and genus to which it belongs. As it is obviously a burrower, a comparison was made with all secretive snake genera—initially from Southeast Asia, but subsequently throughout the world—that exhibited any of the above characters, and especially a depressed head and laterally pointed rostrum. A total of 88 genera representing seven families were found to possess some or all of the above criteria: 27 genera of five families from Asia, 21 genera of three families from Africa and Madagascar, 14 genera of one family from Australia and the South Pacific, and 26 genera of two families from the New World. The search for this unknown snake's closest relative began with these 88 genera from seven families

Data on 26 characters that are recognizable from the slides of the holotype were compiled. Most are standard taxonomic characters such as head shields, segmental counts, and various proportions. A brief description of the characters listed in the tables follows. The taxonomic allocation is a code with each letter representing the family, subfamily, and tribe that the genus is considered to belong to, the Lampropeltini (CCLa) and Lycodontini (CCLy) requiring four letters for distinction. Meristic characters include the total number of ventrals (V), subcaudals (SC), supralabials (SL) and supralabials entering the orbit (SLO), infralabials (IL) and infralabials contacting the pregenials (IP), enlarged pairs of genials (G), preoculars (PR) and postoculars (PO), and primary (PT), secondary (ST) and tertiary (TT) temporals. Qualitative characters include whether the anal plate (A) is single or divided, the subcaudals (CT) are single or paired, the mental (M) contacts the pregenials, the nasal (N) is entire, semidivided or divided, the loreal (L) is present or absent, a temporolabial (TS) is present, the nasal (NN) is larger than the

nostril, the lateral shape of the rostral (RS) is rounded, blunt or pointed, the snout (LS) is depressed or not, and the color and/or pattern of the venter (VC).

Proportional ratios include the ventral proportion (VP), tail proportion (TP), eye proportion (EP), and snout-eye proportion (SE). Ventral proportion indicates whether the ventrals are narrower than the body, approximately equal to the body diameter, or greater than the body width. Tail proportion indicates what percentage of the total length the tail comprises. Eye shape in snakes is often not round, as the vertical diameter may be greater than or less than the horizontal diameter. Eye proportion is the vertical diameter of the eye divided by the depth of the head, measured from the frontal to the border of the upper lip. Snout-eye proportion is the snout length, measured from the snout tip to the anterior edge of the orbit, divided by the horizontal eye diameter, and indicates how many times the eye diameter is contained in the length of the snout.

The data utilized in this study were derived partly from the literature and partly from examination of specimens deposited in many museums, most notably the California Academy of Sciences (CAS), the Field Museum of Natural History (FMNH), and the Museum of Comparative Zoology (MCZ). Representatives of 85 of the 88 genera listed in the tables were examined by the senior author, the exceptions being *Emmochliophis, Pararhadinaea* and *Tetralepis*. Data summarized in the tables encompass, as much as possible, the entire range for a given genus, not merely the normal or modal values. Thus, occasional or rare values have been included to estimate the maximum possible extent of variation within a taxon, an important fact when comparing different organisms. General regional references relied upon for comparative data include Boulenger (1893, 1894, 1896), Bourret (1936), Broadley (1983), Cogger (1992), Cope (1900), Deraniyagala (1955), Deuve (1970), Ernst and Barbour (1989), Maki (1931), Pope (1935), Rooij (1917), Saint-Girons (1972), Smith (1943), Storr, Smith, and Johnstone (1986), Taylor (1965), Witte (1962), and Wright and Wright (1957).

Description

Due to its presumed cryptic habits and its geographic origin, this remarkable new taxon is named

Cryptophidion annamense, n. gen., n. sp.

Figs. 1–3

Holotype. The specimen, probably an adult female, which is the subject of three 35mm photographic color slides deposited in the slide collection of the MCZ Department of Herpetology, Harvard University. Since the holotype may or may not be extant, and is presently untraceable and presumed lost, we informally refer to the slides as iconotypes (Frizzell 1933).

The iconotypes include MCZ-K948 (Fig. 1a: lateral view of head), MCZ-K949 (Fig. 2a: lateral view of snout), and MCZ-K950 (Fig. 3: ventral view of body) respectively. None of the iconotypes are in perfect focus, but, fortunately, in K948 the posterior head is in focus while in K949 the snout region is in focus. A type slide is a name-bearing type that provides the objective standard of reference whereby the application of the name of a taxon can be determined. Furthermore, Article 72(c)(v) of the Code makes it clear that the holotype is the specimen upon which the slides are based, in this particular case the type having been lost before publication—rather than afterwards, as is true for approximately 10 percent of all snake species. As the new genus is monotypic, *C. annamense* automatically becomes the type species of *Cryptophidion.*

Type locality. West of Da Nang, Quang Nam-Da Nang Province, central Vietnam, ca. 16° N, 108° E. The type locality is presumably in the Annam Highlands. Collected in 1968 by an unknown collector, and preserved and photographed by Calvin E. Snyder.

Range. Central Vietnam. Known only from the iconotypes of the type specimen.

Etymology. The Greek *kryptos* (hidden or secret) refers to both the presumed subterranean existence of the snake and to its cryptozoic status with regard to the missing holotype. The Greek *ophidion* is a diminutive of *ophis* (snake or serpent). Thus, *Cryptophidion,* the gender of which is neuter, signifies a small hidden snake. The specific epithet *annamense* is derived from the name for the region of the type locality (Annam) up until the middle of the 20th century. *Cryptophidion annamense* is therefore the small hidden (literally and figuratively) central Vietnamese snake. It is proposed that the common name of *Cryptophidion annamense* be the Vietnamese sharp-nosed snake.

Diagnosis. Within Vietnam, *Cryptophidion* can be diagnosed solely by its pointed rostral in lateral view. *Cryptophidion* can be distinguished from all Asian snakes by the following suite of characters: depressed snout with laterally pointed rostral, eight supralabials, loreal absent, and undivided anal plate. *Cryptophidion* is separable from all other known snakes by the combination of depressed snout with laterally pointed rostral, enlarged preorbital shield, loreal absent, entire anal shield, and 172 ventrals.

Description. Although the iconotypes (MCZ-K948, K949, and K950) provide unequivocal evidence as to the uniqueness of *Cryptophidion,* a complete description cannot be provided at this time as the dorsum of the specimen is unknown, there being no photograph of the dorsal surface of the head or body. Characters that are presently unknown include the size and shape of the dorsal head shields, including possible fusion of shields, number of dorsal scale rows, presence or absence of apical pits and carination on costals, and dorsum coloration and/or pattern.

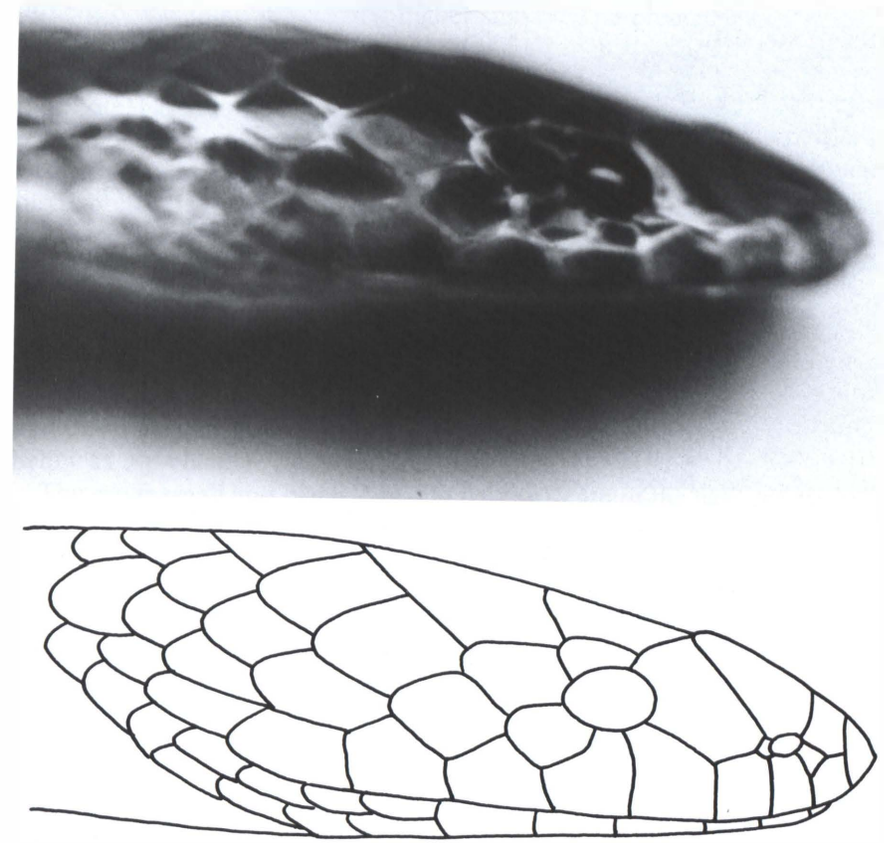

FIG. 1.—Lateral head of *Cryptophidion:* (a) slide MCZ-K948, (b) reconstructed outlines of head shields.

In lateral aspect, the snout is depressed with an obtusely pointed rostral that projects beyond the lower jaw (Fig. 1). Eight supralabials of approximately equal size border the upper lip: the three smallest are preocular supralabials (first to third), the two largest enter the orbit (fourth and fifth), and the three intermediate-sized are postocular supralabials (sixth to eighth). The superior borders of all supralabials have an inverted V-shaped aspect so that the shields above them are wedged between the upper portions of the labials. This zigzag pattern of all the labials is common in primitive

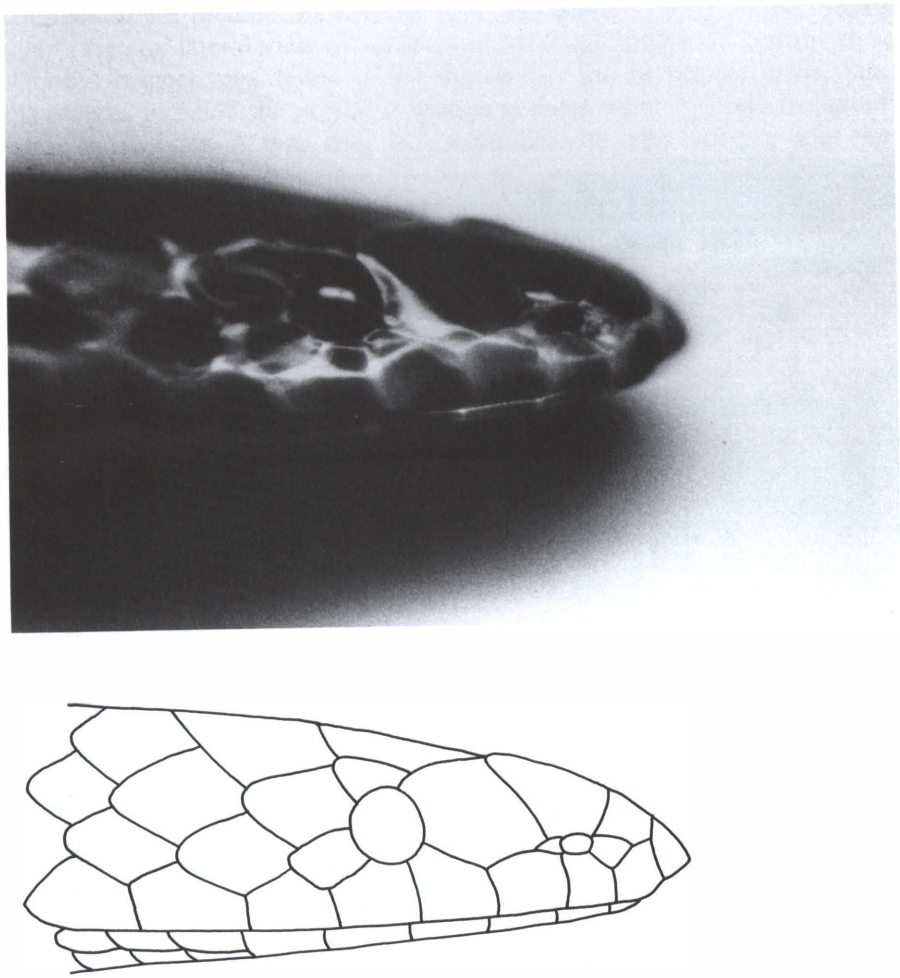

FIG. 2.—Lateral snout of *Cryptophidion:* (a) slide MCZ-K949, (b) reconstructed outlines of head shields.

snakes such as *Cylindrophis* and *Xenopeltis*; when occasionally present in higher snakes, it is usually only along the postocular supralabials.

The nasal shields are concave and greatly reduced in size (Fig. 2). A laterally directed oval nostril is situated medially in the nasal. The nasal is divided into a rectangular prenasal, equal to the nostril in size, and a tiny triangular postnasal, smaller than the nostril. A loreal shield (*sensu* Peters 1964) is absent, either lost or fused to the large quadrangular shield covering the dorsolateral region of the snout anterior to the orbit. This preorbital shield,

equal in length to half of the eye-snout distance, is in contact with the prefrontal and postnasal anteriorly, the frontal and supraocular posteriorly, and the third and fourth supralabials ventrally. Due to its position, the most likely homology of this shield is the preocular, although a preocular of such dimensions is unknown among higher snakes. The preocular of *Xenopeltis* and the prefrontal of *Cylindrophis* and the Uropeltidae resemble this shield in size and position. The likelihood of it corresponding to the loreal shield is remote, based upon its size and its curvature onto the dorsum of the head, but it could represent the fusion of an enlarged preocular and loreal. An even more remote possibility is that this shield represents a prefrontal or fused prefrontal-internasal that has been forced onto the lateral aspect of the snout as in *Xenocalamus,* possibly as a result of fusion with the preocular and/or loreal. However, two shields are clearly visible on the dorsum of the snout between this large shield and the rostral. They are interpreted as the prefrontal and internasal, but they could be fragmented shields as found in henophidians or even neomorphs. For purposes of discussion, since its homology is unknown, this enlarged shield will be termed a preorbital (based upon its position), but for comparative purposes it will be listed in the tables below as a preocular.

The eye is small and black, equal to 0.4 the depth of the head at the ocular level, with its diameter contained in the snout length 2.5 times. Although a pupil is not visible, it is assumed to be round based upon the supposed cryptozoic habits of the snake. The orbit is surrounded by six shields. In addition to the preorbital and the fourth and fifth supralabials, the shield bordering the eye dorsally appears to be a small supraocular. Only a faint indication of the medial longitudinal suture of that shield is discernible, so a remote possibility exists that a supraocular is absent and that an enlarged frontal borders the orbit. Two large shields, diamond-shaped with widths greater than depths and having rounded caudal apices, border the posterior edge of the orbit between the supraocular and supralabials; they are peculiar but, by definition, should be termed postoculars. Postoculars are normally deeper than wide, conform to the shape of the orbit, and are smaller than the eye. The superior shield, greater in size than the eye with a depth and width equal to that of the primary temporal, is larger than the inferior shield, which is approximately equal in size to the eye. Their size and configuration resemble the true temporals immediately posterior to them. In addition, they align anterodorsally-posteroventrally with the parallel axes of the true temporals. The V-shaped ventral margin of the lower shield is wedged between the fifth and sixth supralabials. Whether or not the latter shield should be termed a postocular or a subocular is equivocal, since the lower border of the orbit is at a level that bisects the shield in half (Peters 1964); for purposes of this study, it too will be referred to as a postocular.

The true temporals are large, diamond-shaped shields, arranged in oblique

rows extending anterodorsally to posteroventrally, with rounded apices with a formula of 1 + 2 + 3, resembling those of Lycophidion. The primary temporal is the most inferior, and its V-shaped ventral margin is wedged between the sixth and seventh supralabials, a condition in which the shield is termed the temporolabial scute in many elapids (McDowell 1967). It is excluded from contact with the parietal by the upper postocular, a rather unique condition as the anterior or upper primary temporal normally contacts the parietal in snakes. The uppermost secondary and posterior temporals are very large, second in size only to the preorbital. If the superior postocular is considered to be a true temporal, the temporal pattern would then be termed 2 + 2 + 3, with the upper primary temporal entering the orbit, and only a single (inferior) postocular being present. It is possible that the true postoculars have been lost and replaced by two additional temporals, in which case the temporal pattern would be 1 + 2 + 2 + 3. No indication of keels are visible on the two rows of post-temporal scales; they appear smooth and shiny like the temporals and supralabials.

The shields on the dorsum of the head are difficult to interpret in lateral view (Fig. 2). The rostral is clearly visible from above. The lateral aspects of two shields are visible on the dorsum of the snout between the rostral and preorbital, the suture between them intersecting the nostril at its anterior border. Based upon position, they would be called a cranial internasal and a caudal prefrontal, the latter more than twice the length of the former. Since the dorsal midline is not visible, it can only be speculated whether one or both of them are fused into a single transverse shield, a common occurrence in many burrowing snakes. The prefrontals may be fused into a single transverse shield as in *Trachischium* or *Opisthotropis,* the internasals may be fused together as in *Atretium* or *Limnophis,* or both the prefrontals and internasals may be fused into single longitudinal shields as in *Prosymna* or *Rhabdops.* A peculiarity of the prefrontal is that its posterior edge appears to be raised up from the surface of the head, perhaps an artifact of collecting or the result of previous damage. The frontal shield is just barely visible medial to the supraocular but neither its size nor shape can be determined. The lateral apex of what should be a large parietal shield is visible dorsal and medial to the upper postocular and the temporals.

In ventral view, the head is barely distinct from the neck, exhibiting a slight taper to a bluntly rounded snout, and the lower jaw is countersunk (Fig. 3). There appear to be eight infralabials; the first to sixth are visible in ventral view while the seventh and eight are discernible in lateral view. The first pair of infralabials is in contact on the midline, separating the triangular mental shield from the genials. The first four infralabials increase in size and length posteriorly, the fourth being the largest, the fifth slightly smaller than the fourth and second in size, the last three smallest in size and elongate in shape. The anterior genials are broad, wider than all of the infralabials,

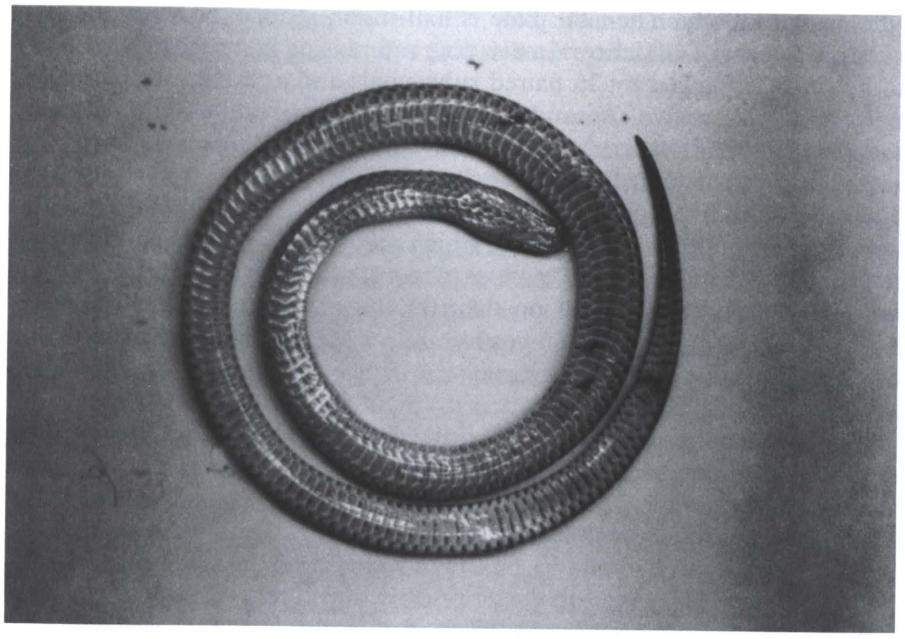

FIG. 3.—Ventral view of *Cryptophidion:* slide MCZ-K950.

and about 1.5 times as long as wide. On the ventral midline between the pregenials and the first preventral are two pairs of small scales (technically postgenials, but only 1/6 the size of the pregenials and 1/3 the size of the costal scales in row I), three times as long as broad with diverging posterior tips. An expandable mental groove appears to be lacking between the genials. A suture separating the pregenials is visible, but it does not extend caudally; the bases of the two oblique postgenials on the left cover the respective bases of the pair on the right and cross the midline. On each side of the midline between the genials, infralabials, and preventrals are three oblique rows of small elongated gulars. Each row consists of two to three scales only slightly larger than the four postgenials. Along the midline between the postgenials and the first ventral are five diamond-shaped preventrals, each of which is barely broader than long and slightly larger than the one preceding it.

There are 172 ventrals, an undivided anal plate, and 27 subcaudal on the ventral surface of *Cryptophidion* (Fig. 3). The ventrals are transverse with slightly convex posterior margins, distinctly narrower than the body diameter, and occupying about 2/3 of the venter width. Anteriorly, the ventral width/body diameter ratio is 0.67, at midbody it is 0.60, and posteriorly it is 0.70. Scales of row I are visible on either side of the ventrals for the entire length of the body, while scales of row II are barely visible along the right

side near midbody. The anal plate is half-moon shaped, nearly as deep as wide, and without evidence of a dividing suture. The first subcaudal appears to be single, followed by 26 paired subcaudals and a terminal spine nearly as long as the last two subcaudals. The tail is approximately 11 percent of the total length. It tapers sharply from the vent to the tip, suggesting the gender of the type to be female. The length of the specimen is unknown, but based upon body proportions it appears to be a small snake less than 300 mm long. Only the scales of row I, which are often smooth even in keeled-scaled snakes, and the midbody scales of row II are visible in Fig. 3. However, no trace of keels are present on them or the post-temporals of the head. Additionally, the ventrolateral costals appear smooth, glossy and probably irridescent, characteristics universally present in burrowing snakes, so it is assumed that the dorsal scutellation is smooth.

The head appears to be dark plumbeus or black in color, most of the shields exhibiting narrow, silver posterior margins. The venter appears immaculate bluish-gray. The anterior base of each of the subcaudals has a black border whose proportional size increases towards the tail tip such that the last few subcaudals are almost entirely black. Scales in row I also possess similar black bases, covering the anterior ⅓ of the scale near the neck, and about ⅔ of the scale near the tail. The visible portion of the scales in row II indicates that they are uniformly dark, suggesting a uniformly dark plumbeus or black dorsum, like the head.

Discussion

The following characteristics are positively correlated with a burrowing habitat in snakes: narrow head, depressed snout, pointed rostral, countersunk lower jaw, reduced nasals, nasal separated from rostral, reduced eyes, fusion or loss of lateral and dorsal head shields, reduction in number of labials, reduction in number of longitudinal scale rows, absence of scale row reduction, short tail with reduced number of subcaudals, narrow ventrals, absence of keels on dorsal scales, and reduction in overall size. Since *Cryptophidion* possesses most of these characters, there is little doubt that it is a specialized fossorial snake.

Among the colubroids of the world, *Cryptophidion* is unique in possession of the enormous preorbital shield. Several genera (*Dendrolycus, Cryptolycus* and *Lycophidion* of Africa and *Lycodon* of Asia) exhibit a dorsoventrally enlarged preocular that extends onto the dorsum of the head and may contact the frontal, but in no case is the shield enlarged anteriorly to cover half the snout as in *Cryptophidion.* The homology of this shield is uncertain, although it is remarkably similar to the prefrontal of *Cylindrophis* and the Uropeltidae, and to the shield termed the preocular in *Xenopeltis.* It occupies the position of the prefrontal in *Xenocalamus.* The nasals of *Cryptophidion* are also peculiar. Most snakes, whether fossorial or not, exhibit nasal shields that

are considerably larger than the nostrils, and concave nasals are commonly found only in arboreal snakes, the sole secretive exception being *Achalinus* from eastern Asia.

Cryptophidion is a perplexing snake as it combines several generalized characters in conjunction with the specialized features mentioned above. Neither the large temporal shields nor the high number of supralabials are characteristic of a fossorial snake. Underwood and Kochva (1993) pointed out that the primitive supralabial pattern for pythonids, *Xenopeltis, Loxocemus,* and atractaspids is 3 : 2 : 3, exactly as found in *Cryptophidion.* Typically in burrowers, the supralabials are reduced in number to 4–6 by fusion with their neighbors. Also, the temporals are usually fused into a single elongate shield or they are lost, resulting in contact of one or more supralabials with the parietal. Neither of these trends is apparent in *Cryptophidion*; the posterior head scutellation remains generalized as in a terrestrial form.

Rabb and Marx (1973) analyzed the ecology and geography of more than 500 species of colubroid snakes, and showed that fossorial snakes form the greatest percentage of snakes in any region of the world; 33 percent of the total ophiofauna consists of burrowers in Africa, while 28 percent are fossorial in the Orient. They also determined that terrestrial snakes are the most primitive, with aquatic, arboreal and subterrestrial snakes being intermediate, and fossorial snakes the most derived.

Inger and Marx (1965) hypothesized three radiations that occurred among tropical Old World colubroids, one in India and Southeast Asia, one in Malaysia and Indonesia, and one in Africa. The natricine tribe Aspidurini of India, Southeast Asia, and the Philippines probably resulted from one radiation and includes *Aspidura, Blythia, Haplocercus, Myersophis, Oxyrhabdium, Rhabdops, Tetralepis, Trachischium,* and *Xylophis* (Inger and Marx 1965, Wallach 1988). A second burrowing radiation probably resulted in the colubrine subfamily Calamariinae of Malaysia and Indonesia and includes *Brachyorrhos, Calamaria, Calamorhabdium, Collorhabdium, Elapoidis, Etheridgeum, Macrocalamus, Oreocalamus,* and *Pseudorabdion.*

The Atractaspididae, a recently recognized family containing the aparallactines plus *Atractaspis,* probably originated from a third radiation of burrowers in Africa. It includes *Amblyodipsas, Aparallactus, Atractaspis, Brachyophis, Chilorhinophis, Elapotinus, Hypoptophis, Macrelaps, Micrelaps, Poecilopholis, Polemon,* and *Xenocalamus* of Africa plus *Pararhadinaea* of Madagascar (Witte and Laurent 1947, Laurent 1950, Wallach 1991, Underwood and Kochva 1993). Although Inger and Marx (1965) included *Prosymna* (as *Stenorhabdium*) in the aparallactine radiation of Africa, it is not related to the atractaspids and represents an independent fossorial line. Another radiation of burrowers in Africa occurred among the Elapidae, members of which include *Elapsoidea, Homoroselaps, Paranaja,* and *Walterinnesia.*

At least two fossorial radiations have occurred among the terrestrial proteroglyphs or oxyuranids of Australia. One radiation consists of snakes possessing single anal plates and subcaudals, and it is here named the tribe Rhinoplocephalini (Division B, section III, clade 8 of Wallach 1985). It includes *Elapognathus, Rhinoplocephalus* and *Suta* as defined by Hutchison (1990). The other radiation, the tribe Vermicellini (Division C, clades 10–11 of Wallach 1985), exhibits divided anal shields and paired subcaudals, and includes *Cacophis, Furina, Simoselaps* and *Vermicella* (*sensu* Hutchison 1990). A third radiation took place in the southwestern Pacific region. The Parapistocalamini includes *Aspidomorphus, Loveridgelaops, Micropechis, Ogmodon, Parapistocalamus, Salomonelaps,* and *Toxicocalamus.*

In the New World, a number of sharp-nosed burrowing radiations took place. One is exemplified by the xenodontine *Enulius,* whose precise relationships are unknown. Another radiation resulted in the xenodontine tribe Elapomorphini and includes two genera, *Elapomorphus* and *Apostolepis,* the latter containing some sharp-nosed species similar to *Cryptophidion.* A third and very successful radiation among the colubrine tribe Sonorini has produced the sharp-nosed genera *Chilomeniscus, Conopsis, Ficimia, Geagras, Gyalopion, Pseudoficimia,* and *Toluca.*

Family allocation. Determining the family to which *Cryptophidion* belongs represents, at this time, an insurmountable challenge. A dorsal view of the head and body might have provided the necessary evidence to determine the correct family. With the present evidence, we must examine a number of different higher and lower families. We recognize 19 families in the Serpentes (Table 1), divided into the Scolecophidia and Alethinophidia (Underwood 1967, 1979, McDowell 1987, Smith et al. 1977, Dowling and Duellman 1978, Kluge 1991, 1993, Zug 1993). Clearly, the new taxon in no way resembles the scolecophidians, so the Anomalepididae, Typhlopidae, and Leptotyphlopidae are eliminated as possibilities.

The Alethinophidia is composed of the Henophidia, with four superfamilies (Anilioidea, Booidea, Tropidophioidea and Bolyerioidea), and the Caenophidia with two (Acrochordoidea and Colubroidea) (McDowell 1975). Only the Anilioidea and Booidea have representatives that share even a remote resemblance to the new taxon, so the Tropidophiidae and Bolyeriidae are excluded from consideration. The anilioids now are represented by four families (Anomochilidae, Aniliidae, Cylindrophiidae and Uropeltidae) (Cundall, Wallach, and Rossman, in press); neither the Anomochilidae nor Aniliidae share any similarity to the new taxon, and are thus ruled out. Two genera of anilioids, *Cylindrophis* (Cylindophiidae) and *Platyplectrurus* (Uropeltidae), exhibit certain features in common with *Cryptophidion.* Of the four families in the Booidea (Xenopeltidae, Loxocemidae, Pythonidae and Boidae), the latter three can be excluded from consideration; only *Xenopeltis* displays a superficial resemblance to the new genus. All three henophidian genera can be eliminated on the basis of their barely differentiated ventrals,

TABLE 1.—Classification of the Serpentes (with number of genera, species in each family).

Infraorder Scolecophidia—Blind and worm snakes
- Superfamily Typhlopoidea—Blind snakes
  - Family Anomalepididae—Primitive blind snakes (4, 15)
  - Family Typhlopidae—Derived blind snakes (3, 215)
- Superfamily Leptotyphlopoidea—Worm snakes
  - Family Leptotyphlopidae—Worm snakes (2, 80)

Infraorder Alethinophidia—Typical snakes
- Parvorder Henophidia—Primitive snakes
  - Superfamily Anilioidea—Protoboids
    - Family Anomochilidae—Asian false blind snakes (1, 2)
    - Family Aniliidae—South American false coral snakes (1, 1)
    - Family Cylindropiidae—Asian pipe snakes (1, 8)
    - Family Uropeltidae—Indian and Sri Lankan shieldtails (9, 46)
  - Superfamily Booidea—Pythonies and boids
    - Family Xenopeltidae—Asian sunbeam snake (1, 2)
    - Family Loxocemidae—Mexican python (1, 1)
    - Family Pythonidae—Old World pythons (8, 24)
    - Family Boidae—Neotropical and Malagasy boas (9, 42)
  - Superfamily Tropidophioidea—Procolubroid boas
    - Family Tropidophiidae—Neotropical dwarf boas (4, 21)
  - Superfamily Bolyerioidea—Splitjawed boas
    - Family Bolyeriidae—Round Island boas (2, 2)
- Parvorder Caenophidia—Spectacled snakes
  - Superfamily Acrochordoidea—Wartsnakes and filesnakes
    - Family Acrochordidae—Asian wartsnakes and filesnakes (1, 3)
  - Superfamily Colubroidea—Advanced snakes
    - Family Viperidae—Cosmopolitan Vipers (32, 230)
    - Family Atractaspididae—African side-stabbing snakes (14, 66)
    - Family Elapidae—Afroasian and American palatine erectors (19, 121)
    - Family Hydrophiidae—Australasian palatine draggers (44, 206)
    - Family Colubridae—Cosmopolitan colubrids (287, 1676)

which are about twice the width of scales in row I in *Cylindrophis* and *Platyplectrurus,* three times the costal width in *Xenopeltis.* Also, the tails of *Cylindrophis* and *Platyplectrurus* are very short, have few subcaudals, and lack a sharp terminus, while *Xenopeltis* possesses a divided anal plate. Therefore, all henophidian families are excluded from consideration.

Among the Caenophidia, the Acrochordidae exhibits no similarity to the new taxon, nor to any other living snake, so it is eliminated from further consideration. The colubroids consist of five families (Viperidae, Atractaspididae, Elapidae, Hydrophiidae and Colubridae) with the Colubridae containing more than 60 percent of all known snake species. The new taxon is obviously not related to either the Viperidae or the marine Hydrophiidae (Hydrophiinae), so they are excluded. Therefore, all snakes are eliminated from consideration except secretive or fossorial members of the following four colubroid families: the Atractaspididae (solenoglyphous Atractaspidi-

nae and opisthoglyphous Aparallactinae) of Africa and extreme southwestern Asia, the proteroglyphous Elapidae of Asia, Africa and America, the terrestrial proteroglyphous Hydrophiidae (Oxyuraninae) of Australia and the South Pacific, and the cosmopolitan aglyphous and opisthoglyphous Colubridae.

Unfortunately, there is no external character that allows discrimination between the Atractaspididae, Elapidae, Oxyuraninae, and Colubridae. While the majority of Colubridae possess a loreal shield and its absence characterizes the Atractaspididae, Elapidae and Hydrophiidae, it is with the minority of colubrid taxa that have lost the loreal (due to burrowing habits) that the new taxon probably has its affinity. The only recognizable "external" feature that can separate these families is the dentition type, examination of which requires opening of the mouth, an impossibility in this case since the type specimen is missing. Thus, even though the new species has the gestalt of a colubrid, the possibility exists that it could be an atractaspid, elapid, or oxyuranid if its dentition is opisthoglyphous or proteroglyphous.

The presence of a temporolabial shield allies *Cryptophidion* with the Oxyuraninae. Of the 16 applicable characters of *Cryptophidion* analyzed by Marx and Rabb (1965), only five were considered derived for colubroids: nasal-rostral separation, nasal concavity, absence of loreal, small eye size, and reduced number of subcaudals. The latter three are present in all four families under consideration. Nasal-rostral separation is found only in the Atractaspididae (*Brachyophis, Hypoptophis, Polemon*) and *Colubridae* (*Ficimia, Stenorrhina*), while the concave nasal is present only in the Colubridae. These data suggest that *Cryptophidion* belongs in the Colubridae.

Generic relationships. In searching for the most closely related genus (or sister group) to *Cryptophidion,* the logical first comparison is with other sharp-nosed taxa. The following sharp-nosed genera are among those listed in Tables 2–5: one Indo-Malayan genus (*Calamorhabdium*), four African genera (*Amblyodipsas, Brachyophis, Hypoptophis* and *Xenocalamus*), one Australian genus (*Simoselaps*), one Fiji Island genus (*Ogmodon*), one South American genus (*Apostolepis*), one Central American genus (*Enulius*), and seven Mexican genera (*Chilomeniscus, Conopsis, Ficimia, Geagras, Gyalopion, Pseudoficimia* and *Toluca*). However, inspection of the tables reveals that they all differ from *Cryptophidion* in at least several characters, some of generic weight and others of specific importance. Also, the search need not be limited to sharp-nosed burrowers as some genera are polymorphic with respect to snout profile, so the nearest relative of *Cryptophidion* could lack a sharp rostrum. Among the genera listed in the tables, *Calliophis* and *Pseudorabdion* of Asia, *Amblyodipsas, Atractaspis, Elapsoidea* and *Micrelaps* of Africa, and *Apostolepis* of South America contain species with variable profiles.

Some of the Aspidurini of Asia possess depressed snouts, but none of them show the development of a sharp rostrum as in *Cryptophidion. Cryptophidion* exhibits similarities to *Myersophis* of the Philippines in its small size, lateral head shape with a depressed snout, divided nasal, postnasal smaller than nostril, two supralabials entering the orbit, reduced eye, similar eye-snout ratio, countersunk lower jaw, four narrow infralabials contacting anterior pair of broad genials, narrow ventrals, nearly identical ventral and subcaudal counts, single anal and paired subcaudals, short sharply-pointed tail, smooth and and glossy scales, and dark venter. It differs from *Myersophis* in its broader snout, greater number of supralabials and infralabials, separation of prenasal from rostral, absence of loreal, presence of enlarged preorbital, two large postoculars, single primary temporal with absence of parietal-labial contact, two secondary temporals, absence of temporolabial, mental separated from pregenials by first infralabials, and absence of light supralabial borders (Taylor 1963, Leviton 1983).

The geographically nearest sharp-nosed burrower, *Calamorhabdium* of the Calamariinae, differs from *Cryptophidion,* in absence of snout depression, ventral count, supralabials and infralabials, mental contacting pregenials, single nasal in contact with rostral, absence of preocular, single postocular, absence of temporals, and ventral coloration (Table 2). *Macrocalamus* of Malaysia resembles *Cryptophidion* in many respects but it differs in ventral count, infralabial number, enlarged postgenials, nasal shield, temporolabial shield, rostral shape, and ventral coloration.

Among the Atractaspididae (Table 3), only *Brachyophis, Hypoptophis, Xenocalamus,* and some species of *Amblyodipsas* exhibit the sharply-pointed snout as found in *Cryptophidion.* However, they differ from *Cryptophidion* in the following characters. *Amblyodipsas* and *Xenocalamus* have a divided anal, fewer supralabials and infralabials, nasal in contact with rostral, no preocular, and no anterior temporal, no temporolabial, and a light venter. *Brachyophis* has fewer ventrals and subcaudals, fewer supralabials, enlarged postgenials, entire nasal, absence of temporals and temporolabial, smaller eye and greater eye-snout ratio. *Hypoptophis* has fewer ventrals, greater number of single subcaudals, fewer supralabials, enlarged postgenials, and no temporolabial. Among the Elapidae, *Walterinnesia* most closely resembles *Cryptophidion,* but differs in snout profile, number of ventrals and subcaudals, nasal in contact with rostral, nostril larger than nasal, number of supralabials, absence of temporolabial, enlarged postgenials, divided anal, and light venter.

Cryptophidion closely resembles the African *Lycophidion* of the Colubridae. Both genera share a head barely distinct from the neck, similar cephalic profile with depressed snout and pointed rostrum in lateral view and tapered head with a blunt snout in ventral view, eight supralabials with fourth and fifth entering orbit, divided nasal, single preocular (preorbital) extending

TABLE 2.—Comparison of *Cryptophidion* with Asian genera of Cylindrophiidae, Uropeltidae, Xenopeltidae, Elapidae and Colubridae.[1,2]

Genus	TA	V	VP	A	SC	CT	TP	SL	SLO	IL	IP
Cryptophidion	?C	172	1	1	27	2	0.11	8	4+5	8	4
Achalinus	CXX	132–191	2	1	39–98	1	0.09–0.32	6–7	4+5/5+6	5–7	3
Aspidura	CNA	101–159	1	1	11–39	3	0.06–0.18	5–6	3/4	6–8	4–5
Blythia	CNA	127–155	?	2	18–32	2	0.11–0.13	5–6	3+4	6	4
Brachyorrhos	CC	146–182	2	3	20–46	3	0.11–0.13	6–7	3/4/3+4	7	4
Calamaria	CC	119–304	2	1	6–44	2	0.03–0.15	4–6	2+3/3+4	4–6	2–3
Calamorhabdium	CC	125–140	1	1	10–31	2	0.05–0.11	5	3+4	6	3
Calliophis	EEC	174–320	1	2	15–44	3	0.04–0.18	6–7	3+4	6–8	3–5
Collorhabdium	CC	144–165	?	1	22–32	2	0.10–0.15	5	3+4	5	3–4
Cylindrophis	Cy	176–254	0	3	4–10	3	0.02–0.04	6	3+4	5–8	3
Elapoidis	CC	146–163	?	1	70–91	2	0.25–0.26	6	3+4	7	3–4
Etheridgeum	CNA	114	1	2	15+	2	?	7	3+4	8	3
Haplocercus	CNA	174–217	3	1	37–56	1	0.14–0.16	6–7	4	7	4
Lycodon	CCLy	128–256	3	3	34–208	3	0.15–0.33	7–10	3–5/4+5/4–6	8–11	3–5
Macrocalamus	CC	109–147	?	1	17–32	2	0.10–0.11	7–8	4+5	6–7	4
Maticora	EEM	197–306	1	1	15–52	2	0.06–0.12	6	3+4	5–7	3–4
Myersophis	CC	175–179	1	1	28–29	2	0.09–0.10	6	3+4	7	4
Oreocalamus	CC	125–132	2	1	20–32	2	0.10–0.14	7–8	3+4/4+5	7	4
Oxyrhabdium	CC	154–191	2	1	33–70	2	0.15–0.30	6–9	4+5/5+6	6–7	4–5
Plagiopholis	CNP	107–142	3	1	16–31	3	0.11–0.13	5–6	3/3+4	6	3
Platyplectrurus	U	158–175	0	2	8–16	2	0.03–0.07	4	3	5	0
Pseudorabdion	CC	113–166	2	1	11–60	2	0.05–0.24	5–6	3+4	6–7	3–5
Rabdion	CC	137–160	2	1	21–34	2	0.11–0.17	5–6	3+4	6	3
Rhabdops	CNA	186–217	3	2	56–77	2	0.15–0.22	5–6	0/3	6–8	4
Tetralepis	CC	187–201	?	2	43–56	2	0.14	4	3	5	4
Trachischium	CNA	113–165	2	3	26–44	2	0.11–0.16	6	3+4	5–6	4
Xylophis	CNA	108–147	2	1	14–38	2	0.06–0.14	4–5	2+3/3+4	6–7	4
Xenopeltis	X	152–196	0	2	16–32	2	0.07–0.14	7–8	4/4+5	6–9	3

Footnotes follow Table 5.

TABLE 2.—Continued.

Genus	M	G	N	L	PR	PO	PT	ST	TT	TS	NN	RS	LS	EP	SE	VC
Cryptophidion	1	1	2	0	1	2	1	2	3	1	2	3	1	0.4	2.5	1
Achalinus	1	5	7	1	0	0	1–2	2	2–4	0	3	1	1	0.32–0.40	1.9–3.1	8
Aspidura	1	4	5	0	0–1	2	1	1–2	0–1	0	2	2	1	0.27–0.46	2.3–3.3	2
Blythia	?	1	2	0	0	1	1	2	0	0	2	1	2	0.45	2.2	1
Brachyorrhos	1	1	7	0	0–1	2	1–2	2–3	0	0	2	2	1	0.35	2.8	2
Calamaria	3	2	1	0	1	1	0	0	1	0	2	2	2	0.23–0.50	1.7–4.0	2
Calamorhabdium	2	2	1	0	0	1	0	0	0	0	2	3	2	0.35	3.0	12
Calliophis	3	2	2	0	1	2	1–2	1–2	1–2	0	1	4	2	0.18–0.54	1.7–4.6	13
Collorhabdium	1	1	1	0	1	1	0	1	0	0	2	2	1	0.32–0.55	2.5–2.7	2
Cylindrophis	1	1	1	0	0	1	1	2	3	0	1	2	2	0.10–0.35	2.2–5.5	7
Elapoidis	?	2	2	1	0	1	0–1	2	2–3	0	1	2	2	0.28	3.6	2
Etheridgeum	1	2	2	0	1	2	0	1	0	0	1	2	2	0.36	1.8	2
Haplocercus	1	1	2	0	1	2	1	2	0	0	1	1	2	0.42–0.44	2.6–3.0	2
Lycodon	1	2	7	1–2	0–1	2–3	1–3	2–3	2–4	0	1	2	1	0.45–0.62	1.7–2.9	2
Macrocalamus	1	2	1	0–1	1	1	1	2	0	0	1	2	1	0.44–0.55	2.1–2.9	14
Maticora	1	2	1	0	1	2	1	2	0	0	1	1	2	0.25–0.40	2.3–3.5	4
Myersophis	2	1	2	1	0	1	0	1	3	0	2	2	1	0.35	3.1	1
Oreocalamus	?	2	1	1	1	1–2	1	2	0	0	?	2	1	0.51	2.0	2
Oxyrhabdium	1	1	2	1	0	1–2	1–2	2	3	0	2	2	1	0.40–0.53	2.2–3.3	2
Plagiopholis	1	2	6	0–1	1	2	1	1–2	0	0	1	1	2	0.43–0.52	1.8–2.2	2
Platyplectrurus	1	0	1	0	0	1	1	1	0	0	1	2	1	0.33	2.7	2
Pseudorabdion	2	2	4	0–1	0–1	0–1	0	1	0	0	1	4	1	0.33–0.50	2.0–5.6	2
Rabdion	1	2	1	1	0	1	0	1	0	0	2	2	2	0.35	2.8	2
Rhabdops	2	2	4	1	1–2	2–3	1	1	0	0	1	2	2	0.35–0.38	2.3–3.7	2
Tetralepis	?	2	1	1	1	2	1	1–2	2	0	1	2	2	0.30–0.40	2.0	5
Trachischium	1	2	6	1	1	1–2	1	1–2	0	0	1	1	2	0.28–0.38	2.2–2.6	2
Xylophis	2	1	5	1	0	1–2	1	2	0	0	2	2	1	0.23–0.35	2.4–3.3	1
Xenopeltis	1	1	5	0	1	2	1	1–2	3	0	3	2	1	0.18–0.33	3.3–6.4	2

TABLE 3.—Comparison of *Cryptophidion* with African and Malagasy genera of Atractaspididae, Elapidae and Colubridae.[1,2]

Genus	TA	V	VP	A	SC	CT	TP	SL	SLO	IL	IP
Cryptophidion	? C	172	1	1	27	2	0.11	8	4+5	8	4
Amblyodipsas	AAp	127–219	1	2	15–41	2	0.06–0.15	4–7	2+3/3+4	5–7	3–4
Aparallactus	AAp	108–191	2	1	20–65	3	0.12–0.23	6–7	2+3/3+4	6–7	3–4
Atractaspis	AAt	178–370	2	3	18–37	3	0.04–0.09	5–7	3+4/4	5–10	3–4
Brachyophis	AAp	103–123	1	3	8–14	3	0.03–0.08	7	4/4+5	8–9	3–4
Chamaelycus	CLL	176–193	2	1	38–43	2	0.11–0.13	6–7	3+4/3–5	7–8	4–5
Chilorhinophis	AAp	216–375	1	2	18–31	2	0.04–0.11	4–5	3	5–6	3–4
Cryptolycus	CLL	151–193	2	1	20–56	2	0.08–0.13	6–8	3+4/3–5	5–7	4–5
Elapotinus	AAp	163–175	2	2	35–36	2	0.13–0.14	7	3+4	8	4
Elapsoidea	EBB	131–181	2	1	13–33	2	0.07–0.11	7	3+4	6–7	3–4
Homoroselaps	EEB	160–240	1	2	22–43	2	0.08–0.15	6–7	3+4/4+5	6–7	3–4
Hypoptophis	AAp	101–118	2	1	31–45	1	0.15–0.23	7	3+4	7–8	4
Lycophidion	CLL	132–221	3	1	22–58	2	0.08–0.17	8	3+4/3–5/4+5	7–8	3–5
Macrelaps	AAp	158–172	2	1	35–52	1	0.12–0.18	7	3+4	7–9	3–4
Micrelaps	AAp	171–275	1	2	16–33	2	0.05–0.11	7–8	3+4	6–7	3–4
Paranaja	EBB	150–175	2	1	30–38	2	0.12–0.15	6–8	3+4	8	4
Pararhadinaea	AAp	147–187	1	2	32–41	2	0.11–0.18	7	3+4	8–9	3–4
Poecilopholis	AAp	166–178	?	2	23–31	2	0.11	4–5	3	5	3
Polemon	AAp	163–297	2	3	11–29	3	0.03–0.10	6–7	3/3+4	6–7	3–4
Prosymna	CC	107–208	2	1	15–57	2	0.07–0.18	5–6	3+4	7–9	3
Walterinnesia	EBB	180–200	3	2	40–53	3	0.11–0.15	7	3+4	8	4
Xenocalamus	AAp	183–296	1	2	20–37	2	0.04–0.11	5–6	2+3/3+4	5–7	3–4

Footnotes follow Table 5.

TABLE 3.—Continued.

Genus	M	G	N	L	PR	PO	PT	ST	TT	TS	NN	RS	LS	EP	SE	VC
Cryptophidion	1	1	2	0	1	2	1	2	3	1	2	3	1	0.4	2.5	1
Amblyodipsas	1	1	7	0	0	0–1	0	1	0	0	1	5	3	0.14–0.25	3.8–6.0	2
Aparallactus	1	3	7	0	1	1–2	0–1	1–2	0	0	1	1	2	0.30–0.48	1.9–4.0	2
Atractaspis	3	1	2	0	1	1–2	1–4	1–4	0–4	1	1	5	3	0.18–0.35	2.3-4.8	1
Brachyophis	1	2	1	0	1–2	1–2	0	0	0	0	2	3	1	0.20–0.27	4.0–5.0	9
Chamaelycus	1	5	2	1	0–1	1–2	1	2	3	0	1	2	2	0.5	2.3–2.4	4
Chilorhinophis	1	1	1	0	0–1	1	0	1	0	0	1	1	2	0.29–0.41	2.6–3.1	2
Cryptolycus	1	2	1	1	1	2	1	2	3	0	1	2	1	0.44	2.8	1
Elapotinus	1	2	4	0	1	1	1	2	0	0	1	1	2	0.23	4.0	2
Elapsoidea	1	2	2	0	1	2	1	2	0	0	1	5	2	0.40–0.46	1.7–2.6	2
Homoroselaps	1	2	1	0	1	1	0–1	1–2	2	0	1	1	2	0.32	2.4	2
Hypoptophis	1	2	3	0	1	2	1	1	0	0	1	3	1	0.27–0.35	3.0–4.0	1
Lycophidion	1	2	7	1	1	1–2	1	1–2	3	0	3	3	1	0.40–0.60	2.0–2.9	1
Macrelaps	1	1	6	0	0	1	0–1	1–2	2–3	0	1	2	3	0.18–0.20	3.8–4.5	1
Micrelaps	1	2	4	0	0	1	0–1	1–2	2–3	0	1	4	3	0.22–0.32	2.8–3.6	2
Paranaja	1	2	2	0	1	2–3	1–2	1–3	0	0	1	2	2	0.5	1.6	2
Pararhadinaea	1	2	5	0	1	1–2	1	2	3	0	1	1	2	0.30–0.50	1.9–2.3	1
Poecilopholis	1	2	1	0	1	2	1	1	0	0	1	1	?	?	?	4
Polemon	1	3	7	0	1	1–2	0–1	1	0–1	0	1	1	2	0.21–0.33	2.3–3.8	2
Prosymna	1	3	3	1	1–2	1–3	1–2	2	3	0	1	3	1	0.43–0.53	2.0–3.0	2
Walterinnesia	1	2	2	0	1–2	2	2–3	3	0	0	1	2	2	0.33	3.3	2
Xenocalamus	1	1	2	0	0	0–2	0	1	0	0	1	3	1	0.11–0.27	4.0–7.6	2

TABLE 4.—Comparison of *Cryptophidion* with Australian and South Pacific genera of Hydrophiidae (Oxyuraninae).[1,2]

Genus	TA	V	VP	A	SC	CT	TP	SL	SLO	IL	IP	M
Cryptophidion	?C	172	1	1	27	2	0.11	8	4+5	8	4	1
Aspidomorphus	HOP	138–185	3	2	19–41	2	0.10–0.14	6	3+4	7	3–4	1
Cacophis	HOV	140–200	3	2	25–52	2	0.10–0.15	6	3+4	6–7	4	1
Elapognathus	HOR	116–130	3	1	50–70	1	0.21–0.36	6	3+4	6	3–4	1
Furina	HOV	160–240	3	2	30–70	2	0.13–0.27	6–7	3+4	6–7	3–4	1
Loveridgelaps	HOP	193–222	3	1	25–38	3	0.09–0.10	7	3+4	7	4	1
Micropechis	HOP	178–223	3	2	37–55	2	0.12–0.14	6	3+4	7	3–4	1
Ogmodon	HOP	134–152	3	2	27–38	2	0.12–0.14	5–6	2–4/3+4	5–7	3	1
Parapistocalamus	HOP	159–169	3	3	31–35	2	0.11	6	3+4	6–7	3	3
Rhinoplocephalus	HOR	138–210	3	1	20–79	1	0.12–0.27	6–7	3+4	6–7	3–4	1
Salomonelaps	HOP	158–179	3	2	40–56	3	0.15–0.16	7	3+4	7	4	1
Simoselaps	HOV	104–235	3	2	14–40	2	0.06–0.15	5–6	3+4	6–7	3	1
Suta	HOR	125–213	3	1	18–42	1	0.09–0.19	6	3+4	6–7	3–4	1
Toxicocalamus	HOP	171–330	3	3	16–59	3	0.04–0.16	4–6	2+3/3+4	6	3–4	1
Vermicella	HOV	180–320	3	2	12–30	2	0.04–0.07	5–6	3/3+4	6–7	3	1

Footnotes follow Table 5.

TABLE 4.—Continued.

Genus	G	N	L	PR	PO	PT	ST	TT	TS	NN	RS	LS	EP	SE	VC
Cryptophidion	1	2	0	1	2	1	2	3	1	2	3	1	0.4	2.5	1
Aspidomorphus	2	2	0	1	2	2	2	3	1	1	2	2	0.46–0.60	1.6–2.4	2
Cacophis	2	7	0	1	2	1	1–2	0	1	1	2	2	0.33–0.45	2.2–2.8	1
Elapognathus	2	1	0	1	2	2	2	3	1	1	2	2	0.51–0.70	1.4	9
Furina	2	7	0	1	2	2–3	2–3	0–3	1	1	2	1	0.32–0.52	1.9–3.6	2
Loveridgelaps	2	5	0	1	1–2	1	2	0	1	1	2	2	0.43	2.2	4
Micropechis	2	2	0	1	2	2	2	0	1	1	2	2	0.42	2.2	2
Ogmodon	2	2	0	0–1	1	0	1	2	0	1	2	3	0.40	2.5–2.6	2
Parapistocalamus	2	7	0	0–1	1	1	1–2	0	0	1	2	2	0.25–0.39	2.4–3.8	2
Rhinoplocephalus	2	1	0	1	1–3	1–2	1–2	2–3	1	1	2	2	0.33–0.60	2.0–2.8	2
Salomonelaps	2	2	0	1	2	1	2	0	1	1	2	2	0.37–0.48	1.8–2.7	2
Simoselaps	2	4	0	1	1–2	0–1	1–3	0–2	1	1	3	1	0.18–0.47	1.9–6.0	2
Suta	2	1	0	1	1–2	1–2	1–3	2–3	1	1	2	2	0.35–0.55	1.4–2.5	2
Toxicocalamus	2	5	0	0–1	0–2	0–1	1–2	0	0	1	1	2	0.41–0.50	2.6–4.0	2
Vermicella	2	1	0	0–1	2	1	1	2	0	1	2	2	0.25–0.33	3.0–5.2	4

TABLE 5.—Comparison of *Cryptophidion* with American genera of Elapidae and Colubridae.[1,2]

Genus	TA	V	VP	A	SC	CT	TP	SL	SLO	IL	IP
Cryptophidion	? C	172	1	1	27	2	0.11	8	4+5	8	4
Adelphicos	CXG	113–148	1	2	19–51	2	0.09–0.22	6–8	3+4	6–7	4–5
Apostolepis	CXA	226–265	2	2	24–45	2	0.06–0.15	6–7	2+3	7–8	4–5
Atractus	CXG	130–213	2	1	9–67	2	0.04–0.26	5–8	2+3/3+4/4+5	5–9	3–5
Carphophis	CXH	106–150	2	2	21–41	2	0.08–0.21	5	3+4	5–6	4
Chersodromus	CXN	122–138	3	1	36–42	2	0.17–0.23	6–7	3+4	7–8	4–5
Chilomensicus	CCS	103–132	3	2	22–33	2	0.09–0.14	7	3+4	7–9	3–5
Conopsis	CCS	118–145	3	2	22–41	2	0.14–0.20	5–7	2+3/3+4	5–8	4
Elapomorphus	CXA	128–266	2	2	20–47	2	0.06–0.17	6	2+3+4	6–8	3–5
Emmochliophis	CXN	136–140	?	1	91–97	2	0.35	8	4+5	8	4
Enulius	CX	129–216	3	2	82–121	2	0.33–0.39	5–8	2+3/3+4	6–8	3–4
Farancia	CXH	155–208	3	3	31–55	2	0.08–0.20	6–8	3+4	7–10	4–5
Ficimia	CCS	126–157	2	2	26–44	2	0.13–0.19	5–8	3+4	5–8	3
Geagras	CCS	113–124	3	2	25–33	2	0.11–0.13	5	3	6	4
Geophis	CXG	115–185	2	1	19–66	2	0.07–0.22	4–7	3/3+4	5–8	3–4
Gyalopion	CCS	116–140	2	3	20–37	2	0.10–0.18	6–7	3+4	6–9	3–4
Leptomicrurus	EEM	212–379	2	2	12–30	2	0.04–0.08	6–7	2+3/3+4	6–7	3–4
Micruroides	EEM	205–245	3	2	19–31	2	0.06–0.08	7	3+4	6–7	3
Micrurus	EEM	156–329	3	2	15–62	2	0.07–0.16	7	3+4	6–7	4
Ninia	CXN	123–164	3	1	34–106	2	0.15–0.33	5–7	3+4+5	5–7	4–5
Pseudoficimia	CCS	141–163	3	2	34–52	2	0.14–0.20	7	3+4	7	3–4
Stenorrhina	CXS	136–182	3	2	31–48	2	0.12–0.19	7–9	3+4	7–8	3
Stilosoma	CCLa	223–277	2	1	33–48	2	0.07–0.14	6	3+4	5–8	3–4
Tantilla	CCS	103–197	1	2	21–92	2	0.16–0.36	5–8	3+4	5–8	3–5
Tantillita	CCS	103–125	2	2	28–56	2	0.17–0.30	6–7	3+4	6	4
Toluca	CCS	111–141	2	2	23–45	2	0.14–0.20	7	3+4	6–7	3–4
Virginia	CNT	109–139	3	2	25–50	2	0.12–0.24	5–6	3+4	5–7	4

Footnotes immediately follow this table.

TABLE 5.—Continued.

Genus	M	G	N	L	PR	PO	PT	ST	TT	TS	NN	RS	LS	EP	SE	VC
Cryptophidion	1	1	2	0	1	2	1	2	3	1	2	3	1	0.4	2.5	1
Adelphicos	1	1	2	1	0–1	2	1	1	1–3	0	1	2	2	0.27	2.7	2
Apostolepis	1	2	1	0–1	0	2	0	0–1	0–1	1	1	5	2	0.29–0.37	2.8–4.4	2
Atractus	1	1	2	0–1	0–1	1–2	0–2	1–2	2–4	0	1	2	2	0.26–0.46	1.6–3.1	15
Carphophis	1	1	1	1	0	1	1	1–2	0	0	1	2	1	0.32–0.33	2.1–2.6	2
Chersodromus	2	1	6	1	0	1–2	0–1	1–2	3	0	1	1	2	0.33	4.0	10
Chilomensicus	1	1	6	0	1	1–2	1	1	0	0	1	3	1	0.30–0.50	3.0–4.0	2
Conopsis	1	1	1	0–1	1	2	1	1–2	2–3	0	1	3	1	0.29–0.50	2.1–2.7	2
Elapomorphus	1	2	1	0	1	1–2	0–1	1	2	0	1	2	2	0.28–0.40	2.8–4.0	10
Emmochliophis	1	2	2	0	1	1–2	1	2	3	0	2	2	1	0.27–0.36	3.2–4.2	2
Enulius	1	1	2	1	0	2	0–1	1–2	1–2	0	?	3	2	0.3–0.5	2.5–2.7	2
Farancia	1	3	1	1	0	2	1–2	2	0	0	1	1	2	0.39–0.43	1.8–2.2	11
Ficimia	1	1	6	0	1	1–2	1	2	0	0	1	3	1	0.32–0.40	2.5–4.0	2
Geagras	1	2	2	0	1	1	1	2	0	0	1	3	1	0.25–0.29	3.8–6.0	2
Geophis	1	1	2	1	0–1	0–2	0–1	1–2	2	0	1	2	2	0.20–0.47	2.1–5.4	2
Gyalopion	1	1	3	0–1	1	1–2	1	2	0	0	1	3	1	0.42–0.50	2.2–2.5	2
Leptomicrurus	2	2	6	0	1	2	0–1	1	2	0	1	2	2	0.18–0.28	3.3–4.8	4
Micruroides	1	1	5	0	1	1–2	1	2	3	0	1	1	2	0.25–0.31	2.0–3.5	4
Micrurus	1	2	2	0	1	2	0–1	1–2	2	0	1	2	2	0.25–0.27	2.6–3.8	4
Ninia	1	2	6	1	0	2	1	1–2	2	0	1	2	2	0.29–0.51	1.9–2.7	16
Pseudoficimia	1	3	3	0	1	2	1	2	3	0	1	3	1	0.40–0.43	2.0–2.9	2
Stenorrhina	1	1	7	0–1	1	2	1–2	1–3	3	0	1	2	2	0.32–0.50	2.0–2.7	2
Stilosoma	1	2	1	0	0–1	2	0	1	1–2	0	1	2	1	0.33–0.38	2.5–3.3	7
Tantilla	1	2	2	0	0–1	1–2	1	1–2	0	0	1	2	2	0.41–0.60	1.7–3.1	2
Tantillita	1	3	1	0	1	2	0–1	1	0	0	1	2	2	0.43–0.56	1.8–2.4	2
Toluca	1	1	1	0–1	1	2	1	1–3	3	0	1	3	1	0.38–0.50	1.7–2.6	2
Virginia	1	2	2	1	0	1–3	0–1	1–2	0	0	?	2	1	0.44–0.70	1.4–2.0	2

[1] Key to abbreviations in Tables 2–5: A = anal plate (1: entire, 2: divided, 3: variable), CT = subcaudal type (1: single, 2: paired, 3: variable), EP = eye proportion (vertical eye diameter/head depth), G = number of pairs of enlarged genials (1: 1, 2: 2, 3: 3, 4: 1–2, 5: 2–3), IL = number of infralabials, IP = number of infralabials contacting pregenials, L = loreal (0: absent, 1: present), LS = lateral snout profile (1: depressed, 2: not depressed, 3: variable), M = mental contacting pregenials (1: no, 2: yes, 3: variable), N = nasal (1: entire, 2: divided, 3: semidivided, 4: 1+½, 5: 1+2, 6: ½+2, 7: 1+½+2), NN = nasal larger than nostril (1: yes, 2: no, 3: variable), PO = number of postoculars, PR = number of preoculars, PT = number of primary (or anterior) temporals, RS = lateral rostral shape (1: rounded, 2: blunt, 3: pointed, 4: 1+2, 5: 2+3), SC = total subcaudals, SE = snout–eye proportion (snout length/horizontal eye diameter), SL = number of supralabials, SLO = supralabials entering orbit, ST = number of secondary (or posterior) temporals, TA = taxonomic allocation (AAp: Atractaspididae: Aparallactinae, AAt: Atractaspididae: Atractaspidinae, C: Colubridae, Cy: Cylindrophiidae, CC: Colubridae: Calamariinae, CCLa: Colubridae: Colubrinae: Lampropeltini, CCLy: Colubridae: Colubrinae: Lycodontini, CCS: Colubridae: Colubrinae: Sonorini, CLL: Colubridae: Lycophidinae: Lycophidini, CNA: Colubridae: Natricinae: Aspidurini, CNP: Colubridae: Natricinae: Pseudoxenodontini, CNT: Colubridae: Natricinae: Thamnophiini, CX: Colubridae: Xenodontinae, CXE: Colubridae: Xenodontinae: Elapomorphini, CXG: Colubridae: Xenodontinae: Geophiini, CXH: Colubridae: Xenodontinae: Heterodontini, CXN: Colubridae: Xenoderminae: Nothopsini, CXX: Colubridae: Xenoderminae: Xenodermini, EBB: Elapidae: Bungarinae: Bungarini, EEC: Elapidae: Elapinae: Calliophiini, EEM: Elapidae: Elapinae: Maticorini, HOP: Hydrophiidae: Oxyuraninae: Parapistocalamini, HOR: Hydrophiidae: Oxyuraninae: Rhinoplocephalini, HOV: Hydrophiidae: Oxyuraninae: Vermicellini, U: Uropeltidae, X: Xenopeltidae), TP = tail proportion (tail length/total length), TS = temporolabial shield (0: absent, 1: present), TT = number of tertiary temporals, V = total ventrals, VC = color of venter (1: light, 2: dark, 3: striped, 4: crossbarred or ringed, 5: spotted, 6: checkered, 7: blotched, 8: 1+2, 9: 1+4, 10: 1+5, 11: 4+5, 12: 4+6, 13: 5+7, 14: 1+3+6, 15: 1+4+5, 16: 4+5+7), VP = ventral proportion (ventral width/body width, 0: <0.5, 1: 0.5–1.0, 2: ≈1.0, 3: >1.0).

[2] Literature sources for Tables 2–5: *Achalinus* (Maki 1931, Bourret 1935, Pope 1935, Deuve 1970, Ota and Toyama 1989); *Adelphicos* (Smith 1942, Campbell and Ford 1982); *Amblyodipsas* (Witte and Laurent 1947, Broadley 1971b); *Aparallactus* (Loveridge 1944, Witte and Laurent 1947); *Apostolepis* (Strauch 1884, Lema 1978, 1993); *Aspidomorphus* (Brongersma 1934, McDowell 1967); *Aspidura* (Deraniyagala 1955, Smith 1943, Gans and Fetcho 1982); *Atractaspis* (Laurent 1945, 1950, Broadley 1991); *Atractus* (Savage 1960, Hoogmoed 1980, Dixon and Soini 1986); *Blythia* (Smith 1943); *Brachyophis* (Witte and Laurent 1947, Lanza 1966); *Brachyorrhos* (Rooij 1917); *Cacophis* (Hoser 1989, Cogger 1992); *Calamaria* (Inger and Marx 1965); *Calamorhabdium* (Rooij 1917, Ahl 1933); *Calliophis* (Maki 1931, Smith 1943, Leviton 1964); *Carphophis* (Clark 1970); *Chamaelycus* (Witte 1963); *Chersodromus* (Boulenger 1893, Taylor 1949); *Chilomeniscus* (Banta and Leviton 1963); *Chilorhinophis* (Witte and Laurent 1947, Loveridge 1958); *Collorhabdium* (Smedley 1932, Tweedie 1983); *Conopsis* (Taylor and Smith 1942b, Tanner 1961); *Cryptolycus* (Broadley 1968); *Cylindrophis* (Rooij 1917, Wall 1921, Mertens 1930, Mahendra 1936, Smith 1943, McDowell 1975); *Elapognathus* (Storr et al. 1986, Gow 1989, Cogger 1992); *Elapoidis* (Rooij 1917, Capocaccia 1976); *Elapomorphus* (Strauch 1884, Lema 1979, 1984); *Elapotinus* (Witte and Laurent 1947); *Elapsoidea* (Loveridge 1944, Broadley 1971a); *Emmochliophis* (Boulenger 1898, Fritts and Smith 1969, Hillis 1990); *Enulius* (Taylor 1951); *Etheridgeum* (Wallach 1988); *Farancia* (Mitchell 1982, Ernst and Barbour 1989); *Ficimia* (Smith and Taylor 1941, Hardy 1975b, 1990); *Furina* (Storr et al. 1986, Gow 1989, Hoser 1989, Cogger 1992); *Geagras* (Wilson and Meyer 1981, Wilson 1987b); *Geophis* (Downs 1967); *Gyalopion* (Hardy 1975a, 1976); *Haplocercus* (Wall 1921, Smith 1943, Deraniyagala 1955); *Homoroselaps* (Broadley 1983); *Hypoptophis* (Witte and Laurent 1947, Witte 1953); *Leptomicrurus* (Hoge and Romano 1966, Roze and Bernal-Carlo 1987); *Loveridgelaps* (McDowell 1970, McCoy 1980); *Lycodon* (Rooij 1917, Wall 1921, Smith 1943, Leviton 1965); *Lycophidion* (Laurent 1968, Broadley 1992, Broadley and Hughes 1993); *Macrelaps* (Witte and Laurent 1947, Broadley 1983); *Macrocalamus* (Boulenger 1912, Lim 1964, Grandison 1972, Tweedie 1983); *Maticora* (Taylor 1922, Bourret 1936, Brongersma 1948, Leviton 1964); *Micrelaps* (Witte and Laurent 1947, Pitman 1974); *Micropechis* (McDowell 1970); *Micruroides* (Wright and Wright 1957, Roze 1974, Campbell and Lamar 1989, Ernst 1992); *Micrurus* (Roze 1967, Campbell and Lamar 1989); *Myersophis* (Taylor 1963, Leviton 1983); *Ninia* (Burger and Werler 1954, Taylor 1954, Savage and Lahanas 1991); *Ogmodon* (McDowell 1969, 1970, Gorham 1970); *Oreocalamus* (Smith 1931, Tweedie 1983); *Oxyrhabdium* (Taylor 1922, Leviton 1965); *Paranaja* (Loveridge 1944, Laurent 1956); *Parapistocalamus* (Williams and Parker 1964, McDowell 1969, McCoy 1980); *Pararhadinaea* (Guibé 1959, Domergue 1984); *Plagiopholis* (Pope 1935, Smith 1943, Deuve 1970); *Platyplectrurus* (Smith 1943); *Poecilopholis* (Boulenger 1903); *Polemon* (Witte and Laurent 1947); *Prosymna* (Loveridge 1958, Broadley 1980); *Pseudoficimia* (Taylor and Smith 1942a, Hardy 1972, 1973); *Pseudorabdion* (Rooij 1917, Leviton and Brown 1959, Inger and Leviton 1966); *Rabdion* (Rooij 1917); *Rhabdops* (Pope 1935, Smith 1943); *Rhinoplocephalus* (Hoser 1989, Cogger 1992); *Salomonelaps* (McDowell 1970, McCoy 1980); *Simoselaps* (Storr 1968, Hoser 1989, Cogger 1992); *Stenorrhina* (Taylor 1941, 1951, Wilson and Meyer 1985); *Stilosoma* (Highton 1976, Ernst and Barbour 1989); *Suta* (Storr et al. 1986, Hoser 1989, Cogger 1992); *Tantilla* (Wilson and Mena 1980, Wilson and Meyer 1981, Wilson 1982, 1987a); *Tantillita* (Smith 1940); *Tetralepis* (Rooij 1917); *Toluca* (Taylor and Smith 1942b); *Toxicocalamus* (McDowell 1969); *Trachischium* (Smith 1943); *Vermicella* (Storr 1968, Gow 1989, Hoser 1989, Cogger 1992); *Virginia* (Blanchard 1923, Rossman and Wallach 1991); *Walterinnesia* (Marx 1953, Gasperetti 1988); *Xenocalamus* (Witte and Laurent 1947, Broadley 1971b); *Xenopeltis* (Mahendra 1938, Smith 1943, Hu et al. 1980, Leviton 1983); and *Xylophis* (Smith 1943).

onto dorsum of head, small eye, similar eye-snout ratio, two postoculars, temporal formula of 1 + 2 + 3, similar shape and arrangement of temporals, countersunk lower jaw, mental separated from pregenials by first infralabials, eight infralabials with first four contacting pregenials, similar ventral and subcaudal counts, single anal and paired subcaudals, short sharply-pointed tail, smooth glossy body scales, dark ventral coloration, and small body size. However, *Cryptophidion* differs from *Lycophidion* in prenasal separated from rostral, postnasal smaller than nostril, absence of the loreal, size of the preorbital, temporolabial shield, pregenials broader than infralabials, two pairs of greatly reduced postgenials, narrow ventrals, and absence of light wavy stripes on the head (Laurent 1968, Broadley 1992).

Among the Oxyuraninae (Table 4), *Simoselaps* is the most derived genus for a fossorial life and shares the depressed snout and pointed rostral with *Cryptophidion*. However, it differs from *Cryptophidion* in fewer supralabials and infralabials, nasal in contact with rostral, enlarged postgenials, and a divided anal. Within the Pacific region, only *Ogmodon* of the Parapistocalamini possesses a pointed rostrum as in *Cryptophidion*, but it is different from *Cryptophidion* in its nasal contacting rostral, fewer supralabials and infralabials, single small postocular, lack of anterior temporal, enlarged postgenials, divided anal, and light venter. *Cryptophidion* most closely resembles *Loveridgelaps* but differs in fewer ventrals, rostral shape, separation of nasal from rostral, greater number of supralabials and infralabials, reduced postgenials, and ventral coloration.

In the New World, a number of sharp-nosed burrowing radiations took place (Table 5). The xenodontine *Enulius* differs from *Cryptophidion* in its nasal contacting the rostral, presence of loreal, absence of preocular, divided anal, long tail with more than 80 subcaudals, and a light venter. *Apostolepis* of the Elapomorphini differs from *Cryptophidion* in number of supralabials, nasal in contact with rostral, absence of preocular, absence of anterior temporal and temporolabial, enlarged postgenials, divided anal, and ventral coloration. *Chilomeniscus, Conopsis, Ficimia, Geagras, Gyalopion, Pseudoficimia* and *Toluca* differ from *Cryptophidion* in the nasal contacting the rostral, fewer supralabials with third and fourth in orbit, divided anal plate, fewer ventrals, and light venter.

Within the New World, *Cryptophidion* most closely resembles *Atractus occipitoalbus* and *Emmochliophis* of Ecuador. *Cryptophidion* differs from *Atractus occipitoalbus* in depression of snout, laterally pointed rostrum, absence of a loreal, large postoculars, and small gulars. *Emmochliophis* differs from *Cryptophidion* in a blunt rostral, nasal in contact with rostral, fused prefrontals in contact with supralabials, superior borders of supralabials parallel to lip, low ventral count, very long tail with high number of subcaudals, enlarged postgenials, and ventral coloration.

Conclusion

Taxonomic characters that are not definitely known for *Cryptophidion* include the family allocation (presumed to be Colubridae), number of longitudinal scale rows (presumed to be about 15), posterior scale row reduction (presumed to be absent), carination of costals (presumed keelless), apical pits on costals (presumed absent), shape of pupil (presumed round), mental groove (presumed absent), dorsal coloration and pattern (presumed uniformly dark without pattern), total length (presumed to be less than 300 mm), and the shape and number of the dorsal head shields (presumed to possess the typical colubroid complement of nine shields, possibly with prefrontals or internasals fused).

A comparison of the data known for *Cryptophidion* with similar data for all possible snake genera reveals that not only is it unlike any Southeast Asian snake but it also does not appear to be closely related to any other known genus. Within Southeast Asia, it is unique in the presence of a sharply-pointed lateral head profile, due to the depressed snout and pointed rostral shield. Also peculiar and of uncertain homology are the two large diamond-shaped postoculars, shields that may in fact be temporals. Other unusual features of *Cryptophidion* are the concavity and extreme reduction in size of the nasal shields, the prenasal separated from the rostral, and a single pair of enlarged genials.

Cryptophidion combines several generalized features of a terrestrial snake (8 supralabials with a 3:2:3 pattern, and large diamond-shaped primary, secondary and tertiary temporals of equal size) with certain derived features characteristic of burrowing forms (pointed snout, narrow head, countersunk lower jaw, small eye, reduced nasals, separation of nasal from rostral, absence of loreal, enlarged pregenials, narrow ventrals, short tail, low subcaudal count, and smooth shiny scales) in addition to a unique feature (enlarged preorbital). It is a mysterious and perplexing animal, and private collectors and curators are urged to examine their Vietnamese material in search of the missing type or additional specimens. Until the type is rediscovered or another specimen is found and examined in detail, a complete description of the species and interpretation of its relationships must remain highly speculative.

It is concluded that the affinities of *Cryptophidion* are unknown at the present time. It is not closely related to any genus in Southeast Asia. Within the rest of the world, it is most similar to *Myersophis* of the Philippines, *Lycophidion* of Africa, and *Emmochliophis* of Ecuador.

The status of *Cryptophidion* in its native environment is unknown. Since it appears to be a fossorial taxon, it is not surprising that it has gone unnoticed by the scientific community until now. It may very well be abundant in the localities where it lives, but most likely it has a restricted distribution, and it may be endemic to central Vietnam and adjacent Laos. The fact that

other specimens have not been reported suggests that it may be a highland endemic, as lowland areas have been explored in greater detail than the highlands. The discovery of this unusual species with so many peculiar characteristics has raised more questions than it has answered, and additional specimens are badly needed in order to fully describe the organism and to understand its relationship to other snakes. Quite possibly it is the sole living relict of a previously abundant Southeast Asian line of burrowers. Biologists, conservationists, and amateur snake enthusiasts are urged to be on the lookout for any small burrowing snake with a pointed nose that fits the description of *Cryptophidion*. The photographic slides of *Cryptophidion* provide only a tantalizing taste of a main course hopefully yet to come.

Acknowledgements

The senior author wishes to thank the curators and staff of the numerous museums and librairies that have been visited to collect data and literature on snakes. Prominent among these are J. P. Rosado and E. E. Williams (Museum of Comparative Zoology, Harvard University, Cambridge), H. Marx, R. F. Inger, H. K. Voris and A. Resetar (Field Museum of Natural History, Chicago), and A. E. Leviton, R. C. Drewes and J. V. Vindum (California Academy of Sciences, San Francisco). The above three institutions provided financial support for study in the form of a Mayr Grant, Dee Fellowship, and Visiting Scholor grants respectively, for which the senior author is very grateful. Also worthy of acknowledgement are all of the domestic and foreign curators who have loaned specimens for examination over the past 20 years. Special thanks go to R. Coombs for producing the final line drawings of *Cryptophidion*, and for proofreading the manuscript. We also thank J. R. Greenwell for editorial advice, and A. M. Bauer, J. D. Lazell, Jr., and G. R. Zug for suggestions and criticisms that greatly improved this paper.

References Cited

Ahl, Ernst
1933 Ergebnisse der Celebes-und Halmaheira-Expedition Heinrich 1930–32. 1. Reptilien und Amphibien. *Mitteilungen aus dem Zoologischen Museum in Berlin,* Vol. 19: 577–583.

Banta, Benjamin H., and Alan E. Leviton
1963 Remarks on the Colubrid Genus *Chilomeniscus* (Serpentes: Colubridae). *Proceedings of the California Academy of Sciences,* Ser. 4, Vol. 31 (11): 309–327.

Blanchard, Frank N.
1923 The Snakes of the Genus Virginia. *Papers of the Michigan Academy of Sciences, Arts and Letters,* Vol. 3: 343–365.

Bogert, Charles M.
1940 Herpetological Results of the Vernay Angola Expedition. *Bulletin of the American Museum of Natural History,* Vol. 77 (1): 1–107.

Boulenger, George A.
1893 *Catalogue of Snakes in the Collection of the British Museum (Natural History).* Vol. I. London: British Museum (Natural History).
1894 *Catalogue of Snakes in the Collection of the British Museum (Natural History).* Vol. II. London: British Museum (Natural History).
1896 *Catalogue of Snakes in the Collection of the British Museum (Natural History).* Vol. III. London: British Museum (Natural History).
1898 An Account of the Reptiles and Batrachians Collected by Mr. W. F. H. Rosenberg in Western Ecuador. *Proceedings of the Zoological Society of London,* 1898: 107–126.
1903 Descriptions of New Snakes in the Collection of the British Museum. *Annals and Magazine of Natural History,* Ser. 7, Vol. 12 (69): 350–354.
1912 *A Vertebrate Fauna of the Malay Peninsula from the Isthmus of Kra to Singapore, Including the Adjacent Islands.* London: Taylor and Francis.

Bourret, René
1935 Notes Herpétologiques sur l'Indochine Française. VIII. Sur les *Achalinus* d'Indochine. *Bulletin Général de l'Instruction Publique,* 1935 (5, janvier): 101–104.
1936 *Les Serpents de l'Indochine. Tome II. Catalogue Systématique Descriptif.* Toulouse: Henri Basuyau.

Broadley, Donald G.
1968 The African Wolf Snakes (Serpentes, Colubridae): A New Genus and Species from Mozambique. *Arnoldia, Rhodesia,* Vol. 4 (10): 1–5.
1971a A Revision of the African Snake Genus *Elapsoidea* Bocage (Elapidae). *Occasional Papers of the National Museums of Rhodesia,* Ser. B, Vol. 4 (32): 577–626.
1971b A Revision of the African Snake Genera *Amblyodipsas* and *Xenocalamus. Occasional Papers of the National Museums of Rhodesia,* Ser. B, Vol. 4 (33): 629–697.
1980 A Revision of the African Snake Genus *Prosymna* Gray (Colubridae). *Occasional Papers of the National Museums and Monuments,* Ser. B, Vol. 6 (7): 483–556.
1983 *FitzSimons' Snakes of Southern Africa.* Johannesburg: Delta Books.
1991 A Review of the Southern African Stiletto Snakes of the Genus *Atractaspis* A. Smith (Serpentes: Atractaspididae). *Arnoldia, Zimbabwe,* Vol. 9 (36): 495–517.
1992 The Taxonomy and Zoogeography of the Genus *Lycophidion* (Serpentes: Colubridae). *Journal of the Herpetological Association of Africa,* Vol. 40: 30–36.

Broadley, Donald G., and Barry Hughes
1993 A Review of the Genus *Lycophidion* (Serpentes: Colubridae) in Northeastern Africa. *Herpetological Journal,* Vol. 3: 8–18.

Brongersma, L. D.
1934 Contributions to Indo-Australian Herpetology. *Zoologische Mededelingen,* Vol. 17: 161–251.
1948 Notes on *Maticora bivirgata* (Boie) and on *Bungarus flaviceps* Reinh. *Zoologische Mededelingen,* Vol. 30 (1): 1–29.

Burger, W. Leslie, and John E. Werler
1954 The Subspecies of the Ring-Necked Coffee Snake, *Ninia diademata* and a Short Biological and Taxonomic Account of the Genus. *University of Kansas Science Bulletin,* Vol. 36, Pt. 2 (10): 643–672.

Campbell, Jonathan A., and William W. Lamar
1989 *The Venomous Reptiles of Latin America.* Ithaca: Comstock Publishing.

Campbell, Jonathan A., and Linda S. Ford
1982 Phylogenetic Relationships of the Colubrid Snakes of the Genus *Adelphicos* in the Highlands of Middle America. *Occasional Papers of the Museum of Natural History, University of Kansas,* Vol. 100: 1–22.

Campden-Main, Simon M.
1970 *A Field Guide to the Snakes of South Vietnam.* Washington: U.S. National Museum.

Capocaccia, Lilia

1976 Contributo allo Studio dei Serpenti dell'Isola di Giava. *Annali del Museo Civico di Storia Naturali di Genova,* Vol. 81: 51–95.

Clark, Donald R., Jr.
1970 Ecological Study of the Worm Snake *Carphophis vermis* (Kennicott). *University of Kansas Publications, Museum of Natural History,* Vol. 19 (2): 85–194.

Cogger, Harold G.
1992 *Reptiles and Amphibians of Australia.* 5th ed. Ithaca: Cornell University Press.

Cope, Edward D.
1900 The Crocodilians, Lizards and Snakes of North America. *Annual Report of the Board of Regents of the Smithsonian Institution* (1898): 155–1294.

Cox, Merel J.
1991 *The Snakes of Thailand and their Husbandry.* Malabar: Robert E. Krieger.

Deraniyagala, P. E. P.
1955 *A Colored Atlas of Some Vertebrates from Ceylon. Volume 3. Serpentoid Reptilia.* Colombo: Colombo National Museum.

Dethier, Michel, and Ayako Dethier-Sakamoto
1987 The *tzuchinoko,* an Unidentified Snake from Japan. *Cryptozoology,* Vol. 6: 40–48.

Deuve, J.
1970 Serpents du Laos. *Mémoire du l'Office de la Recherche Scientifique et Technique Outre-Mer,* Vol. 39: 1–251.

Dixon, James R., and Pekka Soini
1986 *The Reptiles of the Upper Amazon Basin, Iquitos Region, Peru. Part I: Lizards and Amphisbaenians. Part II: Crocodilians, Turtles and Snakes.* Milwaukee: Milwaukee Public Museum.

Domergue, Charles A.
1984 Notes sur les Serpents de la Région Malgache. IV. Le genre *Pararhadinaea* Boettger, 1898. Descriptions d'une Espèce et d'une Sous-Espèce Nouvelles. *Bulletin du Muséum National d'Histoire Naturelle,* Sér. 4, Sect. A, Vol. 6 (1): 149–157.

Dowling, Herndon G., and William E. Duellman
1978 *Systematic Herpetology: A Synopsis of Families and Higher Categories.* New York: Herpetological Information and Search Service.

Downs, Floyd L.
1967 Intrageneric Relationships among Colubrid Snakes of the Genus *Geophis* Wagler. *Miscellaneous Publications, Museum of Zoology, University of Michigan,* Vol. 131: 1–193.

Dung, Vu Van, Pham Mong Giao, Nguyen Ngoc Chinh, Do Tuoc, Peter Arctander, and John MacKinnon
1993 A New Species of Living Bovid from Vietnam. *Nature,* Vol. 363 (6428): 443–445.

Ernst, Carl H.
1992 *Venomous Reptiles of North America.* Washington: Smithsonian Institution Press.

Ernst, Carl H., and Roger W. Barbour
1989 *Snakes of Eastern North America.* Fairfax: George Mason University Press.

Fritts, Thomas H., and Hobart M. Smith
1969 A New Genus and Species of Snake from Western Ecuador. *Transactions of the Kansas Academy of Science,* Vol. 72 (1): 60–66.

Frizzell, Donald L.
1933 Terminology of Types. *American Midland Naturalist,* Vol. 14 (6): 637–668.

Gans, Carl, and Joseph R. Fetcho
1982 The Sri Lankan Genus *Aspidura* (Serpentes, Reptilia, Colubridae). *Annals of Carnegie Museum,* Vol. 51 (14): 271–316.

Gasperetti, John
1988 Snakes of Arabia. *In*: W. Büttiker and F. Krupp (eds.). *Fauna of Saudi Arabia.* Vol. 9. Riyadh: National Commission for Wildlife Conservation and Development.

Gorham, Stanley W.
1970 The Rare Fiji Snake *Ogmodon vitianus* Peters. *Agricultural Journal* (Fiji), Vol. 32: 49–51.
Gow, Graeme F.
1989 *Graeme Gow's Complete Guide to Australian Snakes.* North Ryde: Angus & Robertson.
Grandison, Alice G. C.
1972 The Gunong Benom Expedition, 1967 (5). Reptiles and Amphibians of Gunong Benom with a Description of a New Species of *Macrocalamus. Bulletin of the British Museum (Natural History), Zoology,* Vol. 23 (4): 43–101.
Greenwell, J. Richard
1985 A Classificatory System for Cryptozoology. *Cryptozoology,* Vol. 4: 1–14.
Guibé, Jean-Claude
1959 Les Serpents de Madagascar. *Mémoires de l'Institut Scientifique de Madagascar, Biologie Animale* (1958), Sér. A, Vol. 12: 189–260.
Hardy, Laurence M.
1972 A Systematic Revision of the Genus *Pseudoficimia* (Serpentes: Colubridae). *Journal of Herpetology,* Vol. 6 (1): 53–69.
1973 Reptilia: Squamata: Serpentes: Colubridae: *Pseudoficimia. Catalogue of American Amphibians and Reptiles* (pp. 146.1–146.2).
1975a A Systematic Revision of the Colubrid Snake Genus *Gyalopion. Journal of Herpetology,* Vol. 9 (1): 107–132.
1975b A Systematic Revision of the Colubrid Snake Genus *Ficimia. Journal of Herpetology,* Vol. 9 (2): 133–168.
1976 Reptilia: Squamata: Serpentes: Colubridae: *Gyalopion. Catalogue of American Amphibians and Reptiles* (pp. 182.1–182.4).
1990 Reptilia: Squamata: Serpentes: Colubridae: *Ficimia. Catalogue of American Amphibians and Reptiles* (pp. 471.1–471.5).
Heuvelmans, Bernard
1982 What is Cryptozoology? *Cryptozoology,* Vol. 1: 1–12.
1984 The Birth and Early History of Cryptozoology. *Cryptozoology,* Vol. 3: 1–30.
1986 Annotated Checklist of Apparently Unknown Animals with which Cryptozoology is Concerned. *Cryptozoology,* Vol. 5: 1–26.
Highton, Richard
1976 Reptilia: Squamata: Serpentes: Colubridae: *Stilosoma. Catalogue of American Amphibians and Reptiles* (pp. 183.1–183.2).
Hillis, David M.
1990 A New Species of Xenodontine Colubrid Snake of the Genus *Synophis* from Ecuador and the Phylogeny of the Genera *Synophis* and *Emmochliophis. Occasional Papers of the Museum of Natural History, University of Kansas,* Vol. 135: 1–9.
Hoge, Alphonse R., and Sylvia A. R. W. D. L. Romano
1966 *Leptomicrurus* in Brasil [Serpentes—Elapidae]. *Memórias do Instituto Butantan* (1965), Vol. 32: 1–8.
Hoogmoed, Marinus S.
1980 Notes on the Herpetofauna of Surinam VII. Revision of the Genus *Atractus* in Surinam, with the Resurrection of Two Species (Colubridae, Reptilia). *Zoologische Verhandelingen,* Vol. 175: 1–47.
Hoser, Raymond T.
1989 Australian Reptiles and Frogs. Sydney: Pierson.
Hu, Bu-Ching, Mai-Hua Huang, Zhan-Tai Xie, Er-Mi Zhao, Yao-Ming Jiang, and Chin-Yuan Huang
1980 *Atlas of the Snakes of China.* Shanghai: Science and Technology Press. (In Chinese.)
Hutchinson, Mark N.

1990 The Generic Classification of the Australian Terrestrial Elapid Snakes. *Memoirs of the Queensland Museum,* Vol. 29 (2): 397–405.
Inger, Robert F., and Alan E. Leviton
1966 The Taxonomic Status of Bornean Snakes of the Genus *Pseudorabdion* Jan and of the Nominal Genus *Idiopholis* Mocquard. *Proceedings of the California Academy of Sciences,* Vol. 34 (4): 307–314.
Inger, Robert F., and Hymen Marx
1965 The Systematics and Evolution of the Oriental Colubrid Snakes of the Genus *Calamaria. Fieldiana, Zoology,* Vol. 49: 1–304.
International Commission on Zoological Nomenclature
1985 *International Code of Zoological Nomenclature, Adopted by the XX General Assembly of the International Union of Biological Sciences.* 3rd edition. London: International Trust for Zoological Nomenclature.
Kluge, Arnold G.
1991 Boine Snake Phylogeny and Research Cycles. *Miscellaneous Publications, Museum of Zoology, University of Michigan,* Vol. 178: 1–58.
1993 *Aspidites* and the Phylogeny of Pythonine Snakes. *Records of the Australian Museum,* Suppl. 19: 1–77.
Lanza, Benedetto
1966 Il Genere *Brachyophis* e Descrizione di una Nuova Forma (Reptilia, Serpentes, Colubridae). *Monitore Zoologico Italiano,* Vol. 74 (1–3): 30–48.
Laurent, Raymond F.
1945 Contribution à la Connaissance du Genre *Atractaspis* Smith. *Revue de Zoologie et Botanie Africaine,* Vol. 38 (3–4): 312–343.
1950 Revision du Genre *Atractaspis.* A. Smith. *Mémoires du Institut Royal des Sciences Naturelles de Belgique,* Sér. 2, Vol. 38: 1–49.
1956 Contribution à l'Herpétologie de la Région des Grands Lacs de l'Afrique Centrale. I. Généralités. II. Chéloniens. III. Ophidiens. *Annales du Musée Royal du Congo Belge, Sciences Zoologiques,* Sér. 8°, Vol. 48: 1–390.
1968 A Re-Examination of the Snake Genus *Lycophidion* Duméril and Bibron. *Bulletin of the Museum of Comparative Zoology,* Vol. 136 (12): 461–482.
Lema, Thales de
1978 Novas Espécies de Opistoglifontes do Gênero *Apostolepis* Cope 1861 do Paraguai (Ophidia: Colubridae). *Comunicações do Museu de Ciências da Pontifícia Universidade Católica do Rio Grande do Sul,* Vol. 18–19: 1–49.
1979 *Elapomorphus punctatus,* Nova Espécie de Colubridae para a Argentina (Ophidia). *Revista Brasileira de Biologia,* Vol. 39 (4): 835–853.
1984 Sobre o Gênero *Elapomorphus* Wiegmann, 1843 (Serpentes, Colubridae, Elapomorphinae). *Iheringia, Zoologia,* Vol. 64: 53–86.
1993 Polimorfismo em *Apostolepis dimidiata* (Jan, 1862) com a Invalidação de *Apostolepis villaricae* Lema, 1978 e *Apostolepis barrioi* Lema, 1978 (Serpentes: Colubridae: Xenodontinae: Elapomorphini). *Acta Biologica Leopoldensia,* Vol. 15 (1): 35–52.
Leviton, Alan E.
1964 Contributions to a Review of Philippine Snakes, III. The Genera *Maticora* and *Calliophis. Philippine Journal of Science* (1963), Vol. 92 (4): 523–550.
1965 Contributions to a Review of Philippine Snakes, VI. The Snakes of the Genus *Oxyrhabdium. Philippine Journal of Science* (1964), Vol. 93 (3): 407–422.
1983 Contribution to a Review of Philippine Snakes, XIV. The Snakes of the Genera *Xenopeltis, Zaocys, Psammodynastes* and *Myersophis. Philippine Journal of Science,* Vol. 112 (3–4): 195–223.
Leviton, Alan E., and Walter C. Brown
1959 A Review of the Snakes of the Genus *Pseudorabdion* with Remarks on the Status of

the Genera *Agrophis* and *Typhlogeophis* (Serpentes: Colubridae). *Proceedings of the California Academy of Sciences,* Vol. 29 (14): 475–508.

Lim, Boo Liat
1964 *Macrocalamus tweediei,* a New Species of Reed Snake from Malaya. *Bulletin of the National Museum, Singapore* (1963), Vol. 32: 99–102.

Loveridge, Arthur
1944 Further Revisions of African Snake Genera. *Bulletin of the Museum of Comparative Zoology,* Vol. 95 (2): 121–247.
1958 Revision of Five African Snake Genera. *Bulletin of the Museum of Comparative Zoology,* Vol. 119 (1): 1–198.

Mahendra, Beni C.
1936 On Two Collections of the Ophidian Genus *Cylindrophis* Wagler. *Proceedings of the Indian Academy of Sciences,* Ser. B, Vol. 4 (3): 230–238.
1938 The Lepidosis of *Xenopeltis unicolor* Reinw. *Current Science,* Vol. 6 (11): 559–560.

Maki, Moichiro
1931 *A Monograph of the Snakes of Japan.* Tokyo: Dai-ichi Shobo.

Marx, Hymen
1953 The Elapid Genus of Snakes, *Walterinnesia. Fieldiana, Zoology,* Vol. 34 (16): 189–196.

Marx, Hymen, and Robert F. Inger
1955 Notes on Snakes of the Genus *Calamaria. Fieldiana, Zoology,* Vol. 37: 167–209.

Marx, Hymen, and George B. Rabb
1972 Phyletic Analysis of Fifty Characters of Advanced Snakes. *Fieldiana, Zoology,* Vol. 63: 1–321.

McCoy, Michael
1980 Reptiles of the Solomon Islands. *Wau Ecology Institute Handbook,* Vol. 7: 1–80.

McDowell, Samuel B., Jr.
1967 *Aspidomorphus,* a Genus of New Guinea Snakes of the Family Elapidae, with Notes on Related Genera. *Journal of Zoology,* Vol. 151: 497–543.
1969 *Toxicocalamus,* a New Guinea Genus of Snakes of the Family Elapidae. *Journal of Zoology,* Vol. 159: 443–5 11.
1970 On the Status and Relationships of the Solomon Island Elapid Snakes. *Journal of Zoology,* Vol. 161: 145–190.
1975 A Catalogue of the Snakes of New Guinea and the Solomons, with Special Reference to Those in the Bernice P. Bishop Museum, Part II. *Journal of Herpetology,* Vol. 9 (1): 1–79.
1979 A Catalogue of the Snakes of New Guinea and the Solomons, with Special Reference to Those in the Bernice P. Bishop Museum, Part III. *Journal of Herpetology,* Vol. 13 (1): 1–92.
1987 Systematics. *In*: Richard A. Seigel, Joseph T. Collins, and Susan S. Novak (eds.). *Snakes: Ecology and Evolutionary Biology.* New York: McGraw-Hill.

Mertens, Robert
1930 Die Amphibien und Reptilien der Inseln Bali, Lombok, Sumbawa und Flores (Beiträge zur Fauna der Kleinen Sunda-Inseln, I). *Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft,* Vol. 42 (3): 115–344.

Mitchell, Joseph C.
1982 Reptilia: Squamata: Serpentes: Colubridae: *Farancia. Catalogue of American Amphibians and Reptiles* (pp. 292.1–292.2).

Nutphand, Wirot, and Bunyuen Tumvipart
1982 *The Treatment of Poisonous Snakebite Victims and the Venomous Snakes of Thailand.* Bangkok. (In Thai.)

Ota, Hidetoshi, and Masanao Toyama
1989 Taxonomic Re-Definition of *Achalinus formosanus* Boulenger (Xenoderminae: Colubridae: Ophidia), with Description of a New Subspecies. *Copeia,* 1989 (3): 597–602.

Peters, James A.
1964 *Dictionary of Herpetology. A Brief and Meaningful Definition of Words and Terms Used in Herpetology.* New York: Hafner.

Pitman, Charles R. S.
1974 *A Guide to the Snakes of Uganda.* 2nd ed. Codicote: Wheldon and Wesley.

Pope, Clifford H.
1935 *The Reptiles of China: Turtles, Crocodilians, Snakes, Lizards.* New York: American Museum of Natural History.

Rabb, George B., and Hymen Marx
1973 Major Ecological and Geographic Patterns in the Evolution of Colubroid Snakes. *Evolution,* Vol. 27 (1): 69–83.

Rooij, Nelly de
1917 *The Reptiles of the Indo-Australian Archipelago. II. Ophidia.* Leiden: E. J. Brill.

Rossman, Douglas A., and Van Wallach
1991 Reptilia: Squamata: Serpentes: Colubridae: *Virginia. Catalogue of American Amphibians and Reptiles* (pp. 529.1–529.4).

Roze, Janis A.
1967 A Check List of the New World Venomous Coral Snakes (Elapidae), with Descriptions of New Forms. *American Museum Novitates,* Vol. 2287: 1–60.
1974 Reptilia: Squamata: Serpentes: Colubridae: *Micruroides, M. euryxanthus.* Catalogue of American Amphibians and Reptiles (pp. 163.1–163.4.)

Roze, Janis A., and A. Bernarl-Carlo
1987 Las Serpientes Corales Venenosas del Género *Leptomicrurus* (Serpentes, Elapidae) de Suramérica con Descripción de una Nueva Subespecie. *Bollettino del Museo Regionale di Scienze Naturali,* Vol. 5 (2): 573–608.

Saint-Girons, Hubert
1972 Les Serpents du Cambodge. *Mémoires du Muséum National d'Histoire Naturelle, Zoologie,* Sér. 2, Vol. 74: 1–170.

Savage, Jay M.
1960 A Revision of the Ecuadorian Snakes of the Colubrid Genus *Atractus. Miscellaneous Publications, Museum of Zoology, University of Michigan,* Vol. 112: 1–86.

Savage, Jay M., and Pete N. Lahanas
1991 On the Species of the Colubrid Snake Genus *Ninia* in Costa Rica and Western Panama. *Herpetologica,* Vol. 47 (1): 37–53.

Smedley, Norman
1932 Amphibians and Reptiles from the Cameron Highlands, Malay Peninsula. *Bulletin of the Raffles Museum, Straits Settlements* (1931), Vol. 6: 105–123.

Smith, Hobart M.
1940 Descriptions of New Lizards and Snakes from Mexico and Guatemala. *Proceedings of the Biological Society of Washington,* Vol. 53: 55–64.
1942 A Review of the Snake Genus *Adelphicos. Proceedings of the Rochester Academy of Sciences,* Vol. 8: 175–195.

Smith, Hobart M., and Edward H. Taylor
1940 A Review of the Snakes of the Genus *Ficimia. Journal of the Washington Academy of Sciences,* Vol. 31 (8): 356–368.

Smith, Hobart M., Rozella B. Smith, and H. Lewis Sawin

1977 A Summary of Snake Classification (Reptilia, Serpentes). *Journal of Herpetology,* Vol. 11 (2): 115–121.

Smith, Malcolm A.
1931 The Herpetology of Mt. Kinabalu, North Borneo, 13,455 ft. *Bulletin of the Raffles Museum, Straits Settlements,* Vol. 5: 3–33.
1943 *The Fauna of British India, Ceylon and Burma, Including the Whole of the Indo-Chinese Sub-Region. Reptilia and Amphibia. Vol. III. Serpentes.* London: Taylor and Francis.

Stone, Richard
1992 No Ordinary Ungulate. (Random Samples coloumn.) *Science,* Vol. 257 (5071): 742.

Storr, Glen M.
1968 The Genus *Vermicella* (Serpentes, Elapidae) in Western Australia and the Northern Territory. *Journal of the Royal Society of Western Australia* (1967), Vol. 50 (3): 80–92.

Storr, Glen M., L. A. Smith, and R. E. Johnstone
1986 *Snakes of Western Australia.* Perth: Western Australian Museum.

Strauch, Alexander A.
1885 Bemerkungen ber die Schlangengattung Elapomorphus aus der Familie der Calamariden. *Bulletin de l'Acadéie Impéial des Sciences de St. Pétersbourg* (1884), Vol. 29: 541–590.

Tanner, Wilmer W.
1961 A New Subspecies of *Conopsis nasus* from Chihuahua, Mexico. *Herpetologica,* Vol. 17 (1): 13–18.

Taylor, Edward H.
1922 *The Snakes of the Philippine Islands.* Manila: National Institue of Science and Technology.
1941 Herpetological Miscellany, No. II. *University of Kansas Science Bulletin,* Vol. 27, Pt. 1 (7): 105–138.
1949 A Preliminary Account of the Herpetology of the State of San Luis Potosí, Mexico. *University of Kansas Science Bulletin,* Vol. 33, Pt. 1 (2): 169–215.
1951 A Brief Review of the Snakes of Costa Rica. *University of Kansas Science Bulletin,* Vol. 34, Pt. 2 (1): 1–188.
1954 Further Studies on the Serpents of Costa Rica. *University of Kansas Science Bulletin,* Vol. 36, Pt. 2 (11): 673–801.
1963 New and Rare Oriental Serpents. *Copeia,* 1963 (2): 429–433.
1965 The Serpents of Thailand and Adjacent Waters. *University of Kansas Science Bulletin,* Vol. 45 (9): 609–1096.

Taylor, Edward H., and Hobart M. Smith
1942a Concerning the Snake Genus *Pseudoficimia. University of Kansas Science Bulletin,* Vol. 28, Pt. 2 (12): 241–251.
1942b The Snake Genera *Conopsis* and *Toluca. University of Kansas Science Bulletin,* Vol. 28, Pt. 2 (15): 325–363.

Tweedie, M. W. F.
1983 *The Snakes of Malaya.* 3rd ed. Singapore: Singapore National Printers.

Underwood, Garth
1967 *A Contribution to the Classification of Snakes.* London: British Museum (Natural History).
1979 Classification and Distribution of Venomous Snakes in the World. *In*: Chen-Yuan Lee (ed.). *Handbook of Experimental Pharmacology. Snake Venoms.* Berlin: Springer-Verlag. Vol. 52: 15–40.

Underwood, Garth, and Elazar Kochva
1993 On the Affinities of the Burrowing Asps *Atractaspis* (Serpentes: Atractaspididae). *Zoological Journal of the Linnean Society,* Vol. 107 (1): 3–64.

Wall, Frank
1921 *Ophidia Taprobanica or the Snakes of Ceylon.* Colombo: H. R. Cottle.

Wallach, Van
1985 A Cladistic Analysis of the Terrestrial Australian Elapidae. *In*: Gordon Grigg, Richard Shine, and Harry Ehmann (eds.). *Biology of Australasian Frogs and Reptiles.* Chipping Norton: Royal Zoological Society of New South Wales.
1988 Status and Redescription of the Genus *Padangia* Werner, with Comparative Visceral Data on *Collorhabdium* Smedley and other Genera (Serpentes: Colubridae). *Amphibia-Reptilia,* Vol. 9 (1): 61–76.
1991 *Comparative Visceral Topography of African Colubrid Snakes of the Subfamilies Aparallactinae and Atractaspidinae.* Master's thesis, Louisiana State University, Baton Rouge.

Williams, Ernest E., and Fred Parker
1964 The Snake Genus *Parapistocalamus* on Bougainville, Solomon Islands. *Senckenbergiana Biologica,* Vol. 45 (3–5): 543–552.

Williams, Kenneth L., and Van Wallach
1989 *Snakes of the World. Volume I. Synopsis of Snake Generic Names.* Malabar, Florida: Robert E. Krieger.

Wilson, Larry D.
1982a A Review of the Colubrid Snakes of the Genus *Tantilla* of Central America. *Milwaukee Public Museum Contributions in Biology and Geology,* Vol. 52: 1–77.
1982b Reptilia: Squamata: Serpentes: Colubridae: *Tantilla. Catalogue of American Amphibians and Reptiles* (pp. 307.1–307.4).
1987a A Résumé of the Colubrid Snakes of the Genus *Tantilla* of South America. *Milwaukee Public Museum Contributions in Biology and Geology,* Vol. 68: 1–35.
1987b Squamata: Serpentes: Colubridae: *Geagras, G. redimitus. Catalogue of American Amphibians and Reptiles* (pp. 430.1–430.2).

Wilson, Larry D., and Cesar E. Mena
1980 Systematics of the *melanocephala* Group of the Colubrid Snake Genus *Tantilla. San Diego Society of Natural History Memoir,* Vol. 11: 1–58.

Wilson, Larry D., and John R. Meyer
1981 Systematics of the *Calamarina* Group of the Colubrid Snake Genus *Tantilla. Milwaukee Public Museum Contributions in Biology and Geology,* Vol. 42: 1–25.
1985 *The Snakes of Honduras.* 2nd ed. Milwaukee: Milwaukee Public Museum.

Witte, Gaston-François de
1953 *Exploration du Parc National de l'Upemba. Fascicule 6. Reptiles.* Bruxelles: Institut des Parcs Nationaux du Congo Belge.
1962 Genera des Serpents du Congo et du Ruanda-Urundi. *Annales du Musée Royal de l'Afrique Centrale, Sciences Zoologiques,* Sér. 8° Vol. 104: 1–203.
1963 The Colubrid Snake Genera *Chamaelycus* Boulenger and *Oophilositum* Parker. *Copeia,* 1963 (4): 634–636.

Witte, Gaston-François de, and Raymond F. Laurent
1947 Révision d'un Groupe de Colubridae Africains. Genres *Calamelaps, Miodon, Aparallactus* et Formes Affines. *Mémoires du Musée Royal d'Histoire Naturelle de Belgique,* Sér. 2, Vol. 29: 1–134.

Wright, Albert W., and Anna A. Wright
1957 *Handbook of Snakes of the United States and Canada.* 2 vols. Ithaca: Comstock Publishing.

Zug, George R.
1993 *Herpetology. An Introductory Biology of Amphibians and Reptiles.* San Diego: Academic Press.

Cryptozoology, 11, 1992, 38–50

LARGE PERUVIAN MAMMALS UNKNOWN TO ZOOLOGY

PETER J. HOCKING
Natural History Museum, National Higher University of San Marcos, Lima, Peru

ABSTRACT: Following the cryptozoological method, the author has uncovered evidence in the tropical forests of Peru of the possible existence of several large mammal forms that are unknown to zoology. Most of the information presented has been collected through personal interviews with native hunters who have either seen or killed the mammals discussed. One of the mammals is a large primate. Four others are felids, three of them large. It is hoped that other zoologists will pursue further investigation.

INTRODUCTION

Having been born in Peru (to American parents), and raised in the tropical forest region of Pucallpa, I became interested in wildlife at an early age, and was a bird collector and taxidermist when in high school. Upon finishing my studies in the United States, I returned to Peru, and began collecting birds for scientific study. I took advantage of every opportunity that presented itself to gather information from hunters concerning the birds and mammals that they knew. In this way, I have learned about several bird forms that are unknown to zoology, and, surprisingly, several large mammal forms that also are unknown to zoology.

In a future paper, I shall report on the unknown birds. The present paper reports on what I have learned about the mammals, one primate and four felids. None of these forms are included or even mentioned in any of the standard mammalian reference works, such as Honacki, Kinman, and Koeppl (1982) and Nowak and Paradiso (1983), and, indeed, are quite unknown to zoologists who have studied the fauna of South America.

It should not really be too surprising that there remain large animals in Peru that are still unknown to zoologists. The Peruvian Amazon has many still-unexplored regions—at least unexplored by scientists—where many life forms could easily remain "hidden," especially in isolated tropical mountain ranges. What is surprising to me, however, is that a mammal that appears to be so widely distributed as a chimpanzee-sized primate, and collected by so many hunters, should still be unknown to zoology. I have gathered all such cryptozoological information directly from native hunters. My method has been to first converse in a relaxed manner as to what kinds of birds and mammals the hunter is familiar with, to determine if we both know the same animals. For instance, we might talk about how many kinds of guans

he knows, then what kinds of parrots, squirrels, monkeys, etc. I have found that, if I do this in a friendly manner, showing interest and admiration for what the hunter knows of wildlife rather than showing skepticism, this encourages him to share information that he might otherwise keep to himself. On some occasions, I ask the hunter directly if he knows of a particular animal.

When I am given information that is new, or of special interest, I begin asking specific details. When a seemingly unknown animal is described, I ask questions that would clarify if the informant may have observed an animal that is already known to zoology. By having the hunter himself describe the animals he knows with minimum input from me, I can compare his description with those provided by others, and I can then determine if he is describing something that may really exist. If such a report is given to me by a trusted friend, whom I have no reason to suspect would invent a story simply to please me, then I consider the information to be of value.

This has been the case in many of the instances where native people have supplied me with cryptozoological information. I have discussed several such supposed "new" animals with zoologists who are specialists in a particular field of taxonomy. This usually clarifies matters greatly. In some instances, the supposed "new" species have been satisfactorily explained in terms of known species. In other instances, more than one zoologist has affirmed that "no such critter exists."

Using the above method of gathering cryptozoological information from native informants, I have become aware of several cryptids; that is, bird, mammal, and reptile forms that appear to be unknown to zoology. In a few cases, I have obtained only one report of a particular cryptid. Because such reports involve only scanty information, they are not being included in this paper. Should I obtain further information on these particular cryptids in the future, I will report on them.

I believe that the cryptids reported below deserve serious consideration as potential existing species, and should be investigated further by other zoologists. Such investigations could lead to the securing of specimens, their scientific description as new species, and, preferably, their study in the wild.

THE *ISNACHI*: THE PERUVIAN "APE"

Cryptid description. The *isnachi* appears to be a large monkey, about twice the body-size of the common spider monkey, *Ateles paniscus*. (This cryptid is known by different native names in different parts of Peru; *isnachi* is a Quechua name which I use generically in this paper.) It is reportedly very muscular—in contrast to the spider monkey, which is lanky, and long-armed. The *isnachi* is said to be about 4 feet (1.2 m) tall—about the size of the African chimpanzee. It is barrel-chested. Its arms are thicker than those

of most men, and its thighs are nearly as big as those of most men. It has a short, thick tail, about 6 inches (15 cm) long. It is covered with short, thick, black hair similar to that of the common woolly monkey, *Lagothrix lagothricha*.

The reports I have collected in northern Peru indicate that the *isnachi* is entirely black, with a brownish sheen on its fur when seen in the sunlight. However, reports from southern Peru indicate that it is dark brown. These different color descriptions may represent two distinct geographical races. The animal's hands and feet are clearly those of a primate, with nails rather than claws. Its face is reported to be entirely black, and to have a snout and large teeth like those of a mandrill.

Habitat. In the reports that I have gathered on this primate, all but one indicate that it lives in montane tropical forest, usually isolated ranges, at altitudes between 1,600 and almost 5,000 feet (ca. 500 and 1,500 m). In the montane regions where it is reported, its population is not evenly distributed. Rather, it is reported only in small colonies in areas where there is a sufficiently large food supply. Hunters agree that it is only found where there are many wild fruits and *chonta* palms, and where there is an abundance of spider-monkeys, with which it travels. Probably the main reason that the *isnachi* has not been collected by zoologists is that it inhabits isolated montane regions which are very difficult to penetrate.

Behavior. The *isnachi* exhibits solitary behavior. Hunters report that they usually only encounter single individuals feeding in the midst of a troop of spider monkeys. Occasionally, a pair will be seen, and on rare occasions entire troops have been encountered. This primate spends most of its time in the trees, but when angered or threatened it quickly descends to the ground and is said to attack by running on its hind limbs.

Hunters who are familiar with this primate fear it because of its great strength and supposed fierce temperament. They believe that it could easily kill them, and that even two hunters together would run out of ammunition before they could stop an attacking troop. (Troops of 15 to 20 have been reported in the Cordillera Sira.)

The *isnachi* is a vegetarian, feeding mostly on wild fruits. It also feeds on the tender shoots of the *chonta* palm, *Euterpe precatoria.* It does this by ripping open the tops of the palms with its great strength, and pulling out the tender heart. Some hunters have told me that one way to know that one is in *isnachi* territory is the presence of dead but standing *chonta* palms. Dead palm trees usually are not found standing in the forest; they normally die only after being blown down in a storm. The *isnachi* is reported to make arboreal platforms, or nests; these are used for resting during the heat of the day, or for sleeping at night. It makes these platforms by bending branches together, evidently much the same way as is done by chimpanzees.

Distribution. This primate has been reported to me by hunters from various regions, as discussed below. The numbers correspond to the numbers on the accompanying map (Fig. 1). The first two regions are those from where I have collected the most kill reports from hunters.

1. Cerros de Orellana (Loreto and San Martin provinces). This is a long mountain range that divides the provinces (or "departments," as they are known in Peru) of Loreto and San Martin. Hunters have reported it on both sides of the range. It is in this region that it is called *isnachi*, which is a Quechua name meaning "strong man."

I have talked with four hunters who have killed it in this mountain range, and I know of another who states that he has killed three of them. The descriptions given by all of these informants are similar. Julio Martinez was the first hunter to give me a detailed description of the *isnachi*. He reported that he observed a solitary individual moving in his direction high in the branches of the trees. He decided to shoot it, but he was so frightened by seeing such a large primate that his shooting was inaccurate. The first shot from his 16-gauge gun only wounded it in a leg, and the second wounded it in an arm. The *isnachi* then began breaking branches, and made a nest in which it hid. Martinez was determined to finish it off, so he climbed a nearby tree to a position higher than the nest, and from there was able to see the primate well enough to shoot at it again. However, this was still difficult, and he had to shoot three more times to kill it. The animal fell to the ground dead, and Martinez examined it closely. He was still so shaken by the experience that he left the body to rot in the forest.

2. Cordillera Sira (Ucayali province). This is a mountain range that divides the provinces of Ucayali and Huanuco. I have talked with three different hunters who have killed the primate in this range. They informed me that they found it on the Ucayali side of the range, but only in certain locations, which the native Campa Indians of the region are familiar with. (In 1987, a story appeared in one of Peru's newspapers about such a large primate stealing a small girl from one of the colonists in this range, and that several men banded together to form a hunting party to rescue the girl. Nothing was later reported as to the outcome of the expedition. It sounds like a wild story, but there may well have been some truth to it.)

3. Cordillera de Bagua (Amazonas province). This mountain range is near Bagua Grande, directly north of the town. In 1984, I talked with a hunter in the region who two years earlier had gone hunting on the back (northern) side of the range, and had killed a large black monkey that he called a "gorilla." His description of it corresponds to the *isnachi*. He encountered the large primate one day's travel by foot in the lower parts of the range, in an untouched forest nearly directly north of Bagua Grande.

4. Cordillera de Yanachaga (Cerro de Pasco province). These mountains

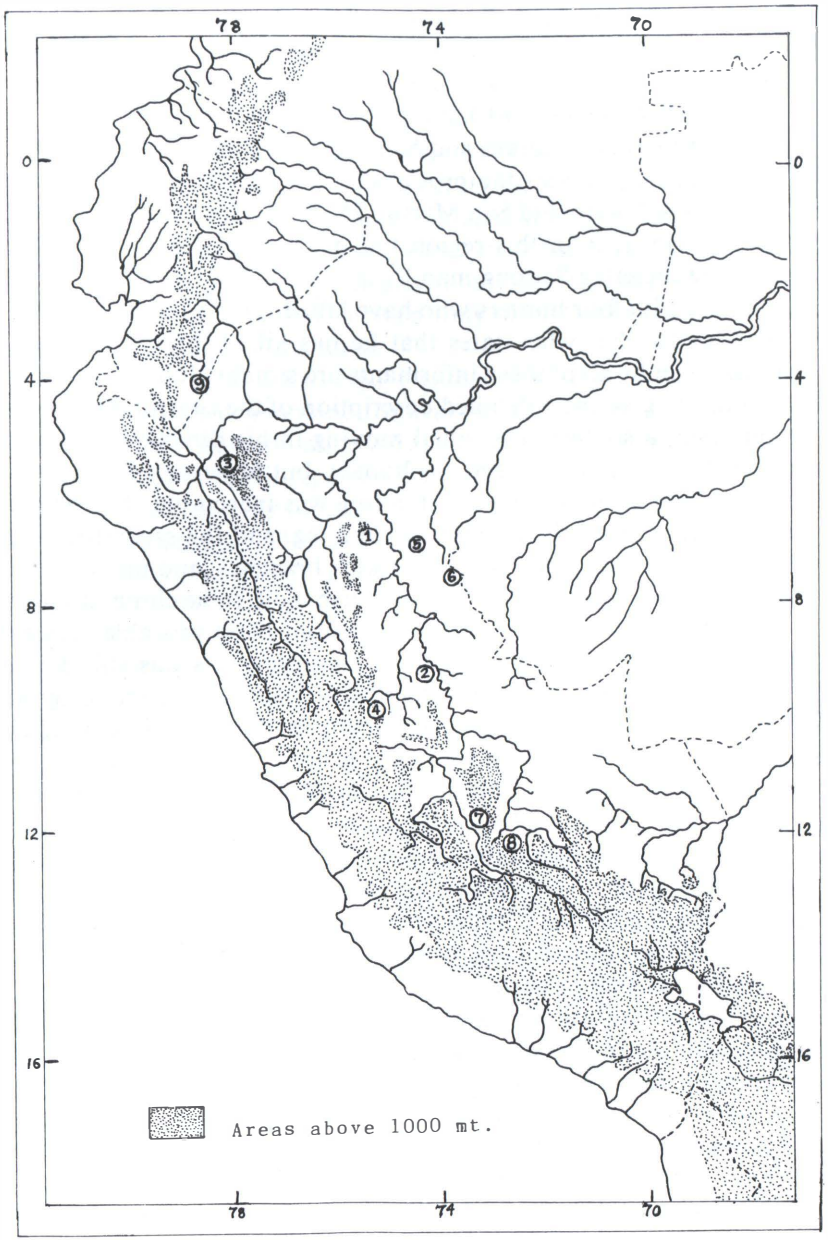

FIG. 1.—The nine locations in tropical Peru where the author has encountered reports of a large unknown monkey called *isnachi*. 1) Cerros de Orellana; 2) Cordillera Sira; 3) Cordillera de Bagua; 4) Cordillera de Yanachaga; 5) Cerros de Canchahuaya; 6) Mountains on the Peru–Brazil border; 7) Cordillera Vilcabamba; 8) Cordillera Urubamba; 9) Peru–Ecuador border.

are to the east of the town of Oxapampa, on the route to the Palcazu River. Three native hunters of the Amuesha tribe from that region have reported the same kind of primate to me. None of them have killed it, but they are familiar with it, and their descriptions are in accordance with the descriptions given to me by others. The Amueshas do not kill it because they fear it may possess demonic powers. They call it *camuenare*, which in their language means "father of the monkeys." The primate is said to live in the two highest mountains of the range. Most of the range, including those two mountains, are within the Yanachaga-Chemillen National Park, a region that has never been thoroughly explored.

5. Cerros de Canchahuaya (Loreto province). This is the back (north-eastern) side of a low mountain range that is near Contamana, a large town on the Ucayali River. About 12 miles (20 km) to the northeast of the town is a low, isolated mountain range called Cerro Azul. I have made collecting trips into several parts of this range, on the Contamana side, but have never found any sign of this primate, nor have native hunters reported it there. However, one hunter claims to have killed a specimen on the other side of the range, in the part called Cerros de Canchahuaya.

6. Mountains on the Peru-Brazil Border (Loreto province). Far to the east of Contamana, there is another much higher and longer mountain range on the border between Peru and Brazil. A hunter of my acquaintance informed me, on his own initiative, of his encounter with one of these large primates in this range when he and a friend made an extremely long hunting trip into a region not normally visited by hunters.

They found an abundance of spider monkeys, and in one of the troops they saw a large monkey. Most of the details of the description given to me fit the *isnachi*, except that the hunter believes that it had a long tail—as, of course, did the spider monkeys. The men were so frightened by the sight of such a large primate that they left the area without shooting it. Several native hunters from the Contamana region who know of this giant monkey call it *makisapa maman*, which means "mother of the spider monkeys."

7. Cordillera Vilcabamba (Cuzco province). These are the mountains on the eastern side of the Apurimac River. The primate is reported to live on the Apurimac River-side of the range, near the town of Luisiana, sometimes causing problems for the settlers by frightening their horses when they are feeding alone. I was told that the primates sometimes jump on the backs of the horses, causing them to bolt.

8. Cordillera Urubamba (Cuzco province). These mountains are located on both sides of the upper Urubamba River, in the region inhabited by the Macheguenga Indians. These people are familiar with the primate, and hunt it for food. Their native name for it is *maemi*. The primate is said to be most abundant in the mountains around the Pongo de Maenique. I was given this information by Juan Sebastian, a Piro Indian who worked several years

with the Macheguengas, and was given *maemi* meat to eat. The Piros, who live on the lower Urubamba River, also know the monkey, and call it *majero.* However, they informed me that it has nearly disappeared from their region, presumably due to over-hunting and deforestation.

9. Ecuador-Peru Border. An official of the Division of Forestry and Wildlife of Peru's Department of Conservation, in Lima, transmitted an interesting report to me. When he learned that I was investigating a large, unknown Peruvian primate, he stated that it might be the same animal that an Ecuadorian botanist named Benigno Malo had once reported to him in casual conversation in his Lima office. Malo had informed him that, about a year earlier (ca. 1985), while collecting orchids in Ecuadorian forests near the Peruvian border, he was surprised to see a large, black "ape" moving in his direction through the trees. He took a photograph of the "ape" before it disappeared. Malo did not seem to give the matter very much importance, stating that he believed that what he probably had photographed was a chimpanzee that some circus must have released into the wild. However, it seems more likely that what Malo actually observed was the *isnachi*, and that he very likely has the first photograph ever taken of it. I have written to him several times requesting more specific information, and offering a good price for the photo. Unfortunately, I have yet to get a response.

Discussion. Some zoologists whom I have consulted about the *isnachi* suggest that what the hunters have seen and killed was probably the spectacled bear, *Tremarctos ornatus.* This is because of the bear's size, black coloration, large snout, and habitat. However, I am convinced that the reported animal is not a bear. I have carefully questioned the hunters involved, and they all independently affirm that the animals that they killed did not have paws or claws, but, rather, the hands, feet, and nails—and tails— typical of monkeys. The animal is said to be quite black, with no white markings, which also seems to rule out the spectacled bear. They say that the animal moves along the branches of trees, and from tree to tree, a feat which the spectacled bear definitely cannot perform. The spectacled bear can climb trees, but cannot move from one tree to another in such a manner. Its mode of locomotion is strictly terrestrial.

The above information does not represent the first reports of "apes" in South America. Bernard Heuvelmans (1958) reports the killing of what seems to have been some form of large spider monkey—named "Loys's Ape" after the Swiss explorer who photographed and reported it. This occurred on the Colombian-Venezuelan border. Heuvelmans (1958) also reports several legends of reddish hairy "apes" in Brazil. Pino Turolla (1980) reports seeing and hearing "apes" in the forests of Venezuela. However, the primate that I have been investigating seems to he different from any of the "apes" described in the above reports; they reported primates 5 feet (1.5 m) tall, or close to that size, ground-dwelling, and gray, brown, or reddish in color. However, the *isnachi* is about 4 feet (1.2 m) tall, is usually black, and is arboreal. Another difference is that these other South American "apes" have faces that are said to be human-like, while the Peruvian "ape" is reported to have a face more like that of a mandrill.

Considering the wide distribution of this large Peruvian primate, and that it has been killed by many hunters, it is amazing that a specimen has not yet reached the hands of zoologists, particularly when one considers that its distribution may extend as far north as Colombia and as far south as Bolivia. I undertook an expedition into the Orellana range in 1988 to try to locate a specimen, with no success. However, I was able to collect more information from new informants who had killed the primate in those mountains. I plan to continue fieldwork in attempts to collect the animal.

The Giant Black Panther

Cryptid description. As the name suggests, this animal is said to be a very large black felid. The reports that I have collected concur that the animal is entirely black, without markings of any kind. Its eyes are said to be large and greenish. It is reported to be at least twice the size of the jaguar, *Panthera onca*. The term *yana puma* is the most common name by which this felid is known, being a descriptive Quechua name meaning "black mountain lion."

Habitat. It is reported only from montane forest regions, usually large ranges rarely visited by humans, at altitudes of between about 1,600 and almost 5,000 feet (ca. 500 to 1,500 m). It often is reported in the same areas where the *isnachi* is known.

Behavior. Hunters report that if they encounter this cat during the daytime, when it is usually resting, it assumes a passive attitude towards them. It is believed that this giant felid does not track or attack hunters during the day, as jaguars sometimes do. For this reason, hunters leave it alone if they encounter it. However, those who have done so have sometimes had reason to regret their action because, when night descends, the big cat is said to become a determined hunter, tracking humans to their camps. It is reported to have wiped out entire hunting parties by killing the men while they slept. It is said to be so fearless at night that it frequently will roar as it moves toward a camp.

In one such instance reported to me, the hunters prepared to defend themselves, and were able to kill the animal. In another case I learned of, a young man in the hunting party had a "premonition of evil," and climbed a nearby tree after his companions had gone to sleep. Thus, he became the sole survivor of the hunting party; the large cat crept into camp and killed each hunter by biting his head. It tracked the survivor to his tree, but was unable to reach him.

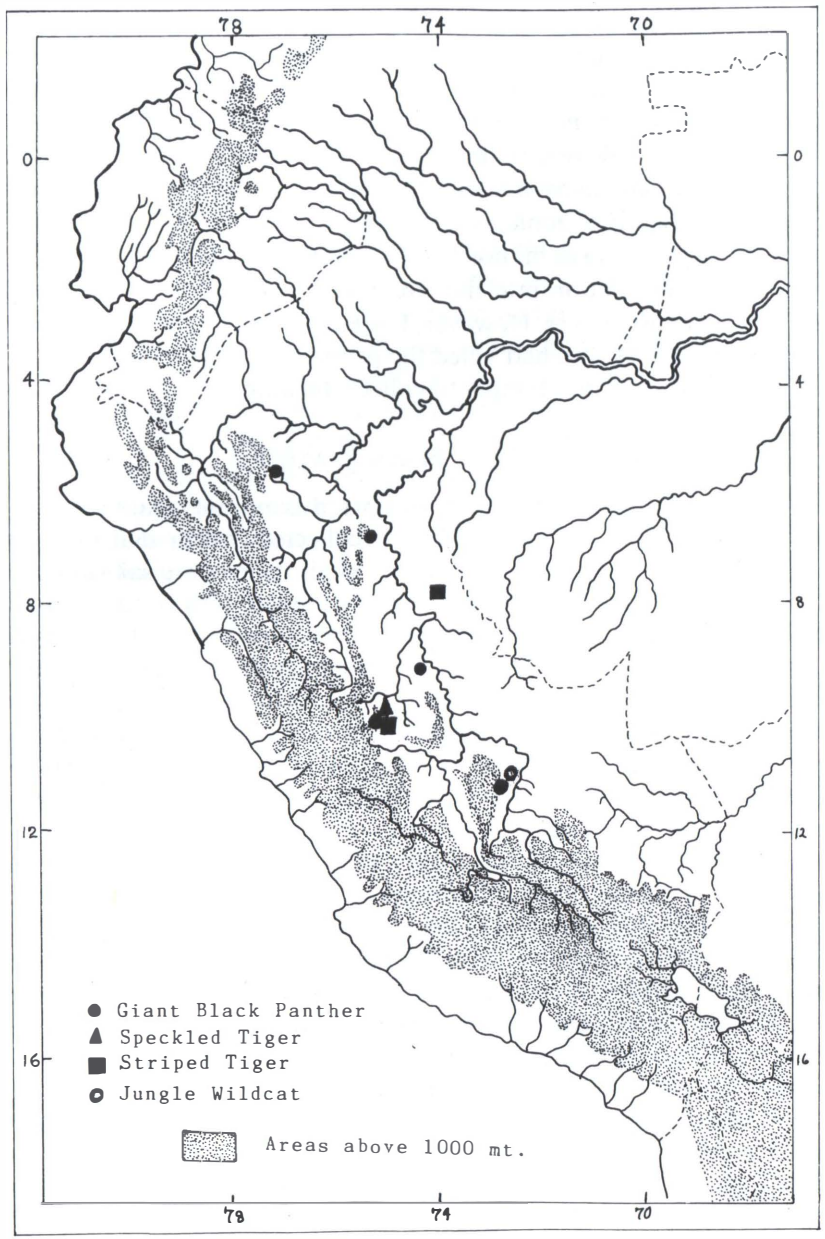

FIG. 2.—Locations in tropical Peru where the author has encountered reports of unknown felids.

Distribution. I have talked to hunters who have killed this large felid in the following regions, as indicated on the second map (Fig. 2).

1. Headwaters of the Mayo River (San Martin province).
2. Cordillera Sira (Ucayali province), by the headwaters of the Iparia River.
3. Cordillera Urubamba (Cuzco province), near Miaria, on the Urubamba River.

I have collected reports indicating that it also inhabits the following regions:

4. Cerros de Yanachaga (Pasco province).
5. Cerros de Orellana (Loreto province).

Discussion. Mammalogists have suggested to me that this black felid is probably just the melanistic form of the jaguar, which is not uncommon in the Amazon. However, this black jaguar form is exactly the same size as the colored jaguar, while the *yana puma* is reported to be at least twice its size. All the reports are consistent in that the cat is enormous. Thus, I propose that this cryptid represents an unknown species. I have been unable to determine to whom the skins of the killed specimens were sold. It is unfortunate that no skin or skull has ever reached the hands of zoologists, but forest felids always have been difficult to find and collect.

THE SPECKLED TIGER

Cryptid description. This felid is approximately the same size as the jaguar, but its head is reportedly larger. Its main distinguishing characteristic is its coloration; its body color is reported to be gray, covered by solid black speckles. (In contrast, the jaguar is tan and white, with rosettes.) There are only two reports known to me, and, as far as I know, there are no native names for the animal.

Habitat. This species is reported in montane tropical forest, at altitudes of about 1,600 feet (ca. 500 m).

Behavior. The two reports I have on this cryptid were given to me by the Amuesha native hunters who killed them. The first report dates from about the early 1970's. In this report, the informant told me how he and another native hunter were hiding in a tree-hut near a mineral-lick waiting for deer. Suddenly, his companion nudged him to look out of his peep-hole. What he saw seized him with fear: on a tree branch near them was a large cat crouched and ready to jump onto their hut.

By means of hand signals, the men agreed which one would shoot the animal, after which they would throw themselves out of the hut in opposite directions. This they did, and the wounded felid landed on the hut, tore it apart, and fell to the ground dying. The two men ran to the village, returning later with several other hunters. All were amazed at seeing the animal, and no one could remember having ever observed a speckled cat like it before. They skinned it and later sold the skin.

In 1991, another Amuesha Indian hunter described to me his experience of killing another of these cats in the same region. A few years ago, while hunting deer at night, he was hiding behind a tree near a mineral-lick. He eventually heard a deer approaching cautiously, but it suddenly seemed alarmed and ran away. The hunter turned on a flashlight to see what had startled the deer, and he saw the eyes of a large cat. The animal came straight for him, so he shot it dead. He gave the skin to his father-in-law, who no longer has it. It deteriorated so much, he threw it away.

Distribution. The only two reports that I have of this felid indicate that it lives in the lower Palcazu River valley (Pasco province). Both reports are from the Cuchurras area.

The Striped Tiger

Cryptid description. This felid also is about the size of the jaguar. It is reported to be tan colored, but it has tiger-like stripes instead of the jaguar-like rosettes.

Habitat. This animal is reported in both hilly and lowland rain forest.

Behavior. Nothing is known about its behavior. Like the spectacled tiger, it is a very rare animal, and I have only two reports of it. It is said to sometimes track hunters, as indicated by the following report from a hunter who killed one. He was on a hunting trip far from any human settlements, having trekked all morning through untouched forest—which he found to be strangely silent. He was unable to find game to shoot, but finally, late in the morning, he shot a tucanet so as to not return to camp empty-handed. On his way back to camp, after crossing a dry stream-bed, he sat down on the bank to rest, leaving his shotgun leaning against a tree beside him.

He was securing the tucanet to his belt when he heard a small twig snap, and he looked up. On the opposite bank of the dry stream-bed, at the place where he had descended, was a large cat crouching, and obviously preparing to spring upon him. Keeping his eyes fixed on the eyes of the felid, the hunter reached slowly for his gun, drew it to him, and took aim at the throat of the animal. Upon firing, the hunter quickly threw himself to one side, rolling away. It was fortunate for him that he took this precautionary action because the large, wounded cat landed where he had been sitting. It mauled a nearby tree-trunk until it died.

The shaken hunter hurried back to his camp, and the next day returned with a companion to skin the animal. However, the tropical heat had begun speeding decomposition, and the skin could not be saved. The event shall remain forever engraved in the memory of my friend, who recalls quite well the main distinguishing feature of the large felid: that it was different from any other cat that he had ever seen before in that it had stripes rather than spots or rosettes.

Distribution. In the above case, the hunter did not give me a clear indication of where he killed the felid. All the information I have is that it was somewhere in the region of the upper Abujao River (Ucayali province). The second report I have of this animal is from an Amuesha friend who said that he had heard that a striped tiger had once been killed in the lower Palcazu River valley, in the Chuchurras region (Pasco province). These regions are indicated on the second map (Fig. 2).

The Jungle Wildcat

Cryptid description. This felid is about the size of a common domestic cat, and has varied coloration similar to that of domestic cats; that is, individuals have blotches of various colors and shapes. An unusual feature is that its canines are noticeably longer than those of domestic cats, or those of the smaller wild felids of the Neotropics, such as the ocelot or the margay.

Habitat. This cat is reported in montane forests at elevations of about 2,300 feet (ca. 700 m).

Behavior. Two native Piro hunters have informed me that this cat has the unusual habit—unknown in other New World felids—of hunting in packs. The packs reportedly include 10 or more individuals, and are said to sometimes be accompanied by ocelots and jaguarundis. These mixed-species packs reportedly comb the jungle for birds and rodents of all kinds. Piro hunters fear encounters with such packs because, despite the relatively small size of the individual cats, they reportedly become very aggressive in packs, attacking hunters and overwhelming them.

Distribution. These small cats have been reported to me from only one region: the lower Urubamba River valley, around the town of Miaria.

Conclusions

I have presented cryptozoological evidence for one large unknown primate and four unknown felids—three of them very large—reported in the tropical forests of Peru. Many of these forest areas remain relatively unexplored or at least poorly known zoologically. Based on all the evidence I have uncovered, I believe that these zoologically-unknown forms do, in fact, exist, and are known to the native peoples of the areas concerned. I hope that this evidence will stimulate other zoologists and cryptozoologists—especially mammalogists—to pursue this evidence further, with the ultimate aim of collecting specimens and, if appropriate, describing new species.

What would complicate such field investigation is that many of the regions where the *isnachi* and the unknown felids are reported are controlled by terrorist groups or drug-traffickers, making those regions very dangerous and essentially off-limits to outsiders. A further problem is that felids, by their very nature, are very difficult to locate.

Because I do not have the necessary resources or time to pursue evidence

for these animals on a continuous basis, I am doing what seems to be the next best option: that is, I have offered hunters in a few of the regions a good price for a skin and/or skull of one of the animals. Hopefully, this will eventually provide positive results.

References Cited

Heuvelmans, Bernard
1958 *On the Track of Unknown Animals.* New York: Hill and Wang.
Honacki, James H., Kenneth E. Kinman, and James W. Koeppl (eds.)
1982 *Mammal Species of the World.* Lawrence, Kansas: Allen Press/Association of Systematic Collections.
Miller, Marc E. W., and Khryztian E. Miller
1991 Further Investigation into Loys's "Ape" in Venezuela. *Cryptozoology*, Vol 10: 66–71.
Nowak, Ronald M., and John L. Paradiso
1983 *Walker's Mammals of the World* (2 vols.). Baltimore: The Johns Hopkins University Press.
Turolla, Pino
1980 *Beyond the Andes.* New York: Harper and Row.

Cryptozoology, 11, 1992, 51–69

SOME UNPUBLICIZED AUSTRALASIAN "SEA SERPENT" REPORTS

Paul Cropper
87 Croydon Avenue, Croydon Park, New South Wales 2133, Australia

Malcolm Smith
No. 7, Twenty-Third Avenue, Brighton, Brisbane, Queensland 4017, Australia

Abstract: Thirteen reports of unidentified marine animals from Australian and Papua New Guinean waters, dating from 1877 to 1981, are presented. One 1874 report from the Atlantic Ocean, but published only in Australia, is also included. Although all but one of these reports were originally recorded in various newspapers, they have generally been overlooked by cryptozoological investigators, and have not appeared in anthologies. Where it has been possible to locate the original witnesses, significant extra details have been obtained. One report appears to have been a hoax. A few others are open to question, or suffer from lack of detail. Nevertheless, the evidence strongly suggests that several different unknown species have been sighted, including some not referable to known "sea serpent" types.

Introduction

News items of a cryptozoological nature are not well publicized in Australia. In part, this may be due to the national character. Despite their easy-going exterior, Australians tend to be intolerant of deviant opinions. Ridicule is likely to be the immediate reward of both the person reporting the experience and the newspaper taking it seriously.

The result is that cryptozoological items are often first reported in small, regional newspapers, and only later, if at all, do they reach the big capital city dailies. Even then, they are often abbreviated. While this practice may discourage wild and ill-conceived reports, the fact remains that the average Australian has little chance of learning the full story behind a particular sighting, and people overseas even less.

The incidents presented in this paper, with one exception (item 14), were originally reported in the press. They have not, however, previously appeared in anthologies. In particular, careful cross-checking has been made with the volume *In the Wake of the Sea-Serpents* (Heuvelmans 1968), it being assumed that anything not recorded in that encyclopedic work is unlikely to be well-known in the Northern Hemisphere. Heuvelmans' classification of "sea serpent" types has also been used where appropriate.

The full texts of the newspaper reports have been deposited in the archives of the International Society of Cryptozoology (ISC). In four cases, it was possible to locate the original witnesses and obtain further information. In each case, whether contact was made by correspondence or by interview, care was taken to avoid leading questions.

The Reports

1) Carlisle Castle, 1874. This was mentioned by Heuvelmans (1968), but no details were given. It is really a North Atlantic sighting, but the report was only published in Australia. This account is from the *Sydney Morning Herald,* January 8, 1875:

> A SEA SERPENT.—A Sea Serpent (says the [Melbourne] Argus) has again made its appearance, it having been seen by those on board the ship Carlisle Castle, during the voyage from London to this port. From the statements of those on board, it appears that at 6 a.m. on the morning of October 17th, when in 45 north latitude, and 12 west longitude, the ship steaming W by S, a large serpent crossed the wake about thirty yards distant. The head, and about six feet of the body, were out of the water and distinctly visible. The head is described as like that of an immense snake. The length of the animal could not be distinctly ascertained, but was considerable.

Comment: Obviously a "long-necked" or "merhorse."

2) Maid of Judah, 1877. The source of this story is an undated clipping from the *Sydney Morning Herald*:

> A SEA SERPENT NEAR THE AUSTRALIAN COAST.—The chief officer of the Maid of Judah sends us the following memorandum: "Tuesday, November 20th, 1877. Longitude 121.26 E., latitude 40.2 S., at 11 a.m., while some of the hands were aloft they saw a very large serpent on the weather bow. The vessel passed close to it about forty yards off, and it appeared to be about the length of the vessel: the head of this object appeared to be sunk down out of sight, while a good part of the body and tail was to be seen quite plainly. It was of a browny green colour, and did not appear to have any motion at the time of the vessel passing. There was a fresh gale blowing at the time and a good deal of sea on, yet the thing was broadside on to the sea in curves, as if it was swimming, but the vessel was going faster, and so I could not see if it had any motion."

Comment: The meager information contained in this report makes identification or categorization almost impossible. Mackal (1980) has suggested that such headless, lethargic creatures could be giant salp chains (sub-phylum Tunicata), which tend to grow in cold waters such as prevail in the area of the sighting. The incident has been recorded for its interest value, but it cannot be assumed to relate to a true unknown.

3) Melville Island, 1916. It is characteristic of many "sea serpent" sightings that they are reported only long after the event. Early reports of the Loch Ness Monster inspired a letter to the *Sydney Morning Herald* of April 28, 1934, from a Mr. W. S. Arthur, who claimed to have spent half a century on—or connected with—the sea. On the King's Birthday holiday in June, 1916, he, a trawler skipper called Ned Baxter, and six others crossed the Dundas Strait to Melville Island, off of the Northern Territory, in a 27-foot surf boat:

> About 6.30 pm, most of the men were laid out in the boat in thwarts, and in the bottom of the boat. Baxter was sitting in the bow keeping a lookout for a reef marked on our chart called the Elphinstone Reef, in Latitude 11 degrees 10 South, and long 131.25 degrees E, about 5 miles from Cape Fleeming, Melville Islands S.E. point. [He means N.E. point.] I was steering with the big sweep oar, when Baxter shouted out to me "Whats that just astern there?" I turned sharply, thinking it was rocks when to my surprise, and not more than 30 feet from me, appeared a huge head about 6 ft out of the water, and with 5 or 6 large parts of its body in a straight line with a division between each of them, reaching in all at least 40 feet. As it came nearer I lifted the blade of my oar as high out of the water as I could and tried to hit it on the head, which by this time was only a foot above the water. I missed hitting it, but felt a hard sudden jerk on my oar blade which nearly knocked me over the side. I grabbed the sheet of the sail, or I must have gone over. I looked around again, but could only see its wake windward to our boat. I found 4 teeth, 3 on 1 side and 1 on the other broken off deeply into the ash oar. We extracted them from the oar and kept them as souvenirs, 2 of which are still in my possession.

Comment: The writer concentrated on the small details of the voyage while providing few on the animal itself, which is hardly to be expected of a hoaxer. The animal closely fits the "merhorse" or "long-necked" category. The teeth extracted from the oar may well be the only physical evidence of such an animal, and it is to be regretted that every attempt to locate them has failed.

4) Green Island, 1924. Green Island lies just northeast of Cairns, Queensland, at 16°45′ S, 145°59′ E, and has now become a major Barrier Reef tourist resort. The following account, from an unnamed witness, is from the *Daily Pictorial* of June 16, 1930, and was prompted by the Bellambi Reef and Scarborough sightings documented by Heuvelmans (1968):

> "At Green Island, about 13 miles out from Cairns, in the winter of 1924," he writes, "there rose from the sea part of the body of some animal. It was only a few oars' lengths from the launch, and about nine feet of an arched neck was exposed. With a diameter about 15 inches, its colour was a mottled brown and yellow. The whole body must have been of great length. It was assuredly a member of the serpent order, and not a porpoise, seal, dugong, or tortoise, with all of which I am familiar. Others saw the animal. It was no optical illusion, and there was no liquor on board!"

Comment: Little comment is necessary. This case clearly belongs to the "long-necked" or, possibly, "merhorse" category.

5) Tabourie Lake, 1931. The following report is from *The Moss Vale Post* of February 6, 1931. It appears that the site was the coastal New South Wales town of Tabourie Lake (35°27′ S, 150°24′ E)—rather than the small lake of the same name a few miles to the north—as the animal was reported to have made off for the open sea. In any case, the lake is connected to the sea by a stream only about 2 miles (3 km) long:

> When fishing at Tabourie Lakes recently, Mr. Walter Roots, of Lagoon Street [Goulburn, Victoria], saw a strange sea animal which he is convinced was the much discussed South Coast sea serpent. Mr. Roots was fishing off the rocks when he was surprised to see the creature swimming past in the deep water immediately beneath him. The animal, Mr.

Roots said, was a reddish brown colour and was from 25 to 30 feet long. It had a head resembling a pig and just behind the head were two floppy arms. The body was similar to a huge barrel and the tail was vertical, like a ship's rudder. Most surprising features were the creature's eyes, which were protruding and appeared to be as large as saucers, and its teeth, which were sabre-like, were fully six inches long. Mr. Roots says that the animal dived into the water and rose with a fish in its jaws. The fore part of its body was lifted about five feet from the water and, swaying from side to side, the animal bit the fish in half and after chewing one portion, dived after the other, bringing it to surface and eating it also. In the intervals the animal would roar, like the loud grunt of pig. Mr. Roots says the appearance of the animal was most alarming and the roar added to its terrifying aspect. Messrs. Selby Ayliffe, of Goulburn, and Murray McBean, of Sydney, who were also in the party, did not see the animal, but state that Mr. Roots, who had been in ill health, was most upset after his experience. The animal swam past him just a few feet away and he saw it for fully 25 minutes before it made off towards the open sea.

Comment: A description issued just a few days after the lengthy observation of an animal at close range would be expected to be accurate. In fact, as items 8) and 10) will show, the main defect of newspaper reports is not inaccuracy, but lack of detail. From its shape, behavior, and vocalizations, the animal was most likely a pinniped, but the only species remotely approaching it in size is the southern elephant seal, *Mirounga leonina,* a male of which was once recorded at 22′4″ (McFarlan 1989), and which is the correct color. However, although the male proboscis may make the head appear superficially pig-like, and the hind flippers may occasionally appear to be vertical, it is hard to see how the illusion could be maintained for 25 minutes at such close range. The size of the eyes and fangs, and the position of the front flippers are also discordant. In short, identification with a known species would require more witness error than the circumstances of the sighting would warrant, nor is it easy to fit it into any familiar "sea serpent" category.

6) Coff's Harbour, 1934. The early 1930's saw a surprising number of "sea serpent" reports from eastern Australia. This one comes from the *Sydney Morning Herald* of September 14, 1934. Coff's Harbour is a major northern New South Wales coastal town, situated at 30°18′ S, 153°08′ E:

COFF'S HARBOUR, Thursday.—Charles Blanche and Alfred Jackson, two well-known deep-sea fishermen report that about four miles from Coff's Harbour they saw from their launch yesterday what they at first took to be a log. Then they saw two legs, which were about a foot in diameter, and were about 20 feet apart. They turned their craft about to make a closer inspection, but, when nearing the object, they saw it roll over and a head, which both men declare resembled that of a horse, appeared. With a snort the creature plunged down to the depths, disappearing in a cloud of spray. Blanche and Jackson declare that the monster was up to 40 feet in length, and that in all their years of the sea they had never seen before such a weird-looking sea dweller.

Comment: This is an excellent example of the very poor standard of Australian journalism in the field of cryptozoology. Important details such as distance and viewing conditions are completely absent, and what little information is given is ambiguous. What interpretation, for example, can be put on the legs "20 feet apart"? Was the animal lying on its side?

7) HMAS Kurumba, 1939. On November 23, 1980, the *Sun-Herald* (Sydney) published a review of the book by Heuvelmans (1968), which inspired a letter to the editor, published on November 30, by ex-Leading Seaman Cecil W. Walters about a sighting he had made in 1939. One of us (PC) was able to interview Walters on January 15, 1989. It transpired that he had made notes of the incident in 1969. As these notes include all the details given in the letter to the editor, and since they are over two decades closer to the event, they are transcribed as follows:

About the middle of October 1939, while serving as a gunner on a naval oil tanker proceeding from Darwin, I had what I now realise to be a most remarkable experience in as such as I saw a real sea serpent. As we were app. 2 days out of Darwin there was no question of my sobriety which is always brought up when I speak of this occurrence. What is more I did have one person to corroborate my story, unfortunately he was killed in the war. Perhaps others saw it or we told them of it no doubt, but I do not remember names as I left the ship at Fremantle and have seen no more of them since.

We were somewhere N.W. of King Sound around East Longitude 114°, Lat 20° South W heading South West 10 Knots. It was about 2 bells in the afternoon watch when we sighted the object on the starboard quarter about 4 miles distant overtaking us quite fast on a roughly parallel course. Not being experienced in such matters I can only guess its speed at about 20 knots. I trained the gun on it and looking through the telescope I saw the serpent plainer. It appeared in three half loops thus, 10 feet out of the water 30 feet long from loop to loop. The body thick as a man's and marked exactly like a giraffe, pale blue, green, yellow patches and small ears flat on the head. We watched for about half an hour until it disappeared in the haze on our starboard bow. I decided to write this because of the mention of an anthropologist looking for the sea serpent. (Signed) C. Walters

Included with the notes were a number of sketches (Fig. 1) The following details emerged at the (PC) interview: The time was 2 bells, or 1 pm, the weather fine but hazy, though not sufficient to prevent a clear view of the animal. He and another seaman called Jack Mack were on anti-submarine watch at the stern gun, which was flanked on either side by a telescope. Walters was the first to sight the animal. He called to Mack, who then looked through his own telescope, for they were automatically coordinated to focus on the same object. Being designed for gun-aiming, these telescopes were powerful enough to make the object appear very close, and they obtained a good view of it. It was approximately 4 miles (6.5 km) distant on the starboard quarter, and traveling so fast that at first Walters thought it was a mechanical device. The fact that it produced a bow wave implied that its speed was at least 10 knots, and since it was overtaking the ship, which was itself doing 10 knots, a minimum estimate of its speed would have been 15 knots. Its course was slightly divergent from that of the ship; i.e., southwest rather than south-southwest. For the next half hour, Mack intermittently

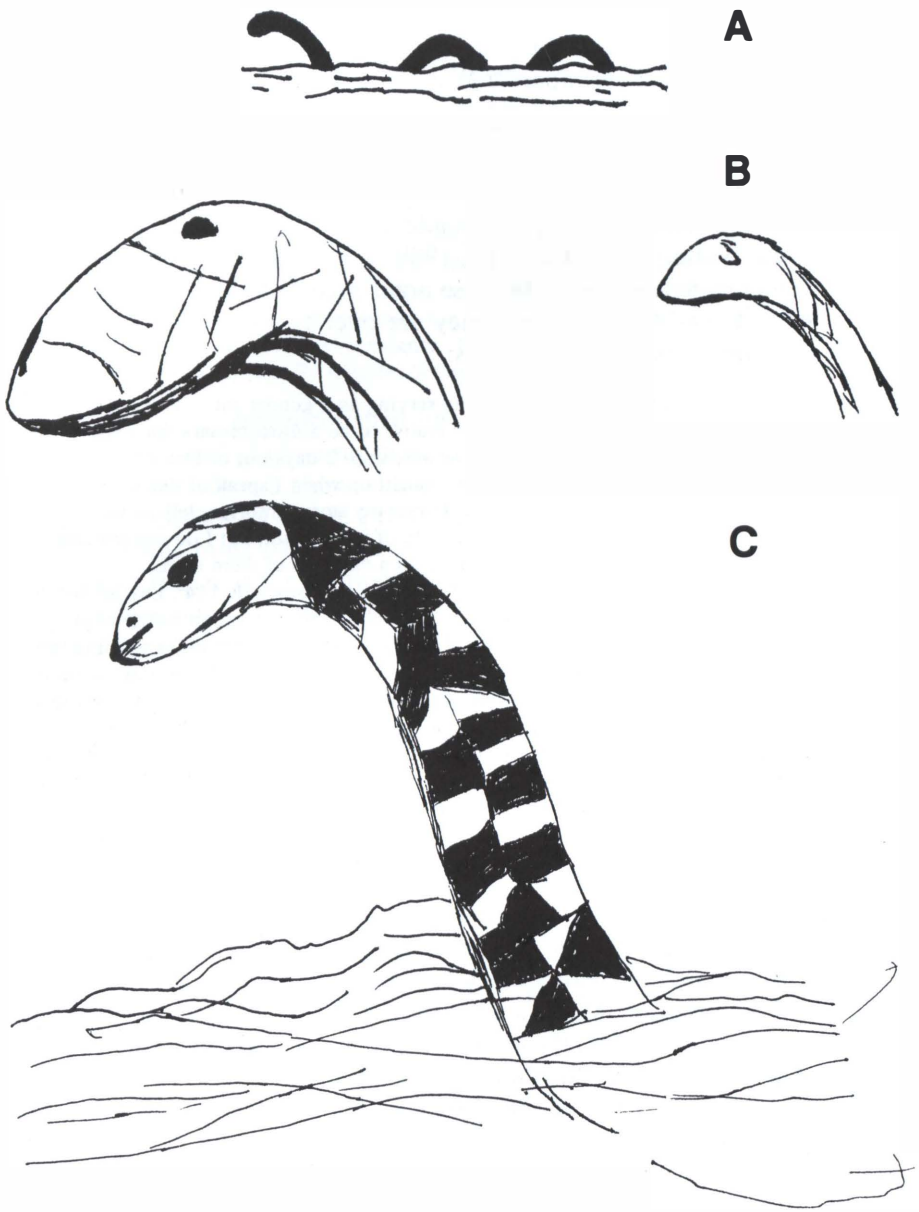

FIG. 1.—Sketches by Cecil W. Walter of the *Kurumba* "sea serpent." A. Original 1969 sketch; B. Preliminary sketches of head; C. Final sketch, probably from 1989.

trained the telescopes on it, while still continuing the anti-submarine watch, up to the maximum forward angle of the gun; eventually, the animal disappeared into the forward haze.

The neck and body were easily as thick as a man's, with the front end an estimated 10 feet (ca. 3 m) out of the water, and a space of about 30 feet (ca. 10 m) between sections. The overall length of the visible parts was thus 90 feet (ca. 27 m). No tail, fins, limbs, or any means of propulsion could be seen. The loops did not move, but maintained the same relative positions throughout.

The background color was a brownish yellow, like a withered leaf, with a multicolored, giraffe-like pattern superimposed, as described in the notes. There were dark greenish patches over the eye and around the nostril, as well as on the ear. He could not see the texture of the skin, but it was definitely organic skin, not a metallic surface. The pattern was like matt paint rather than shiny, but the contrasting colors made it quite distinct.

There was no distinct division between the head and the neck, nor did the head move. The mouth did not open, but the jaws were constantly "working" and a tongue constantly flicking in and out. An eye was visible, and the witness particularly noticed a dainty little ear, which was tucked back behind the eye, but quite definitely an ear.

He does not remember talking about the incident afterwards. Nobody else appears to have seen the animal, and he doubts if the sighting was entered in the log.

Comment: Even if considerable allowance is made for memory distortion due to the lapse of 50 years, this is still a truly remarkable sighting. Whereas animals of a similar shape have been reported before, the multicolored pattern on this creature appears to be unique. The very meager details volunteered in the letter to the newspaper, the notes made for personal reference, and the demeanor of the witness during the interview all argue against it being a hoax. One thing should be noted: if the guns were calibrated for aiming, the estimated distance would be fairly accurate, in which case the overall length, although large, is unlikely to have been exaggerated.

8) Deception Bay, 1959–60. Deception Bay lies just north of Brisbane, Queensland, and is bordered on the north by Bribie Island and on the south by the Redcliffe suburb of Scarborough. In the center of its curve, at approximately 27°09′ S, 153°03′ E, lies the mouth of the Caboolture River. Under the title of "Brisbane SS," Heuvelmans (1968) was able to provide only minimal information about the case. However, it was enough to permit one of us (MS) to contact one of the witnesses, Nigel Tutt, and his daughter, Carol Borck, of Melbourne. In 1989, both submitted independent reports. Tutt also gave a personal interview, drew a sketch (Fig. 2), and provided a collection of contemporary press cuttings.

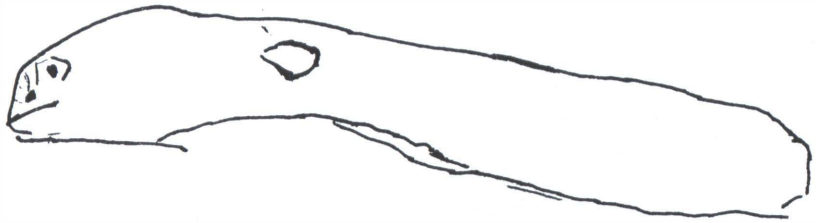

FIG. 2.—Sketch by Nigel Tutt of Deception Bay animal.

On Jan 3, 1960, the *Sunday Truth* (Brisbane) reported that Ron Spencer, 22, who had fished in the bay for 8 years, and had seen dugongs, porpoises, and turtles, claimed to have seen a "monster" five times in the previous 12 months:

> "A huge head came two or three feet out of the water. The monster looked around for a few seconds then dived again with a terrific splash," he told *Truth* last night. "It does not seem to have any neck. But its eyes are very strange and staring. The monster is a brownish colour. . . . Its head is between 18 inches and two feet wide. . . . It comes close to the boat as if it was anxious to look at you, then dives again. . . . But it follows the boat, reappearing every now and then."

His wife, Jeanette, 21, stated that she had seen it 9 months before. Their friend, John Belcher, 22, had seen it 2 weeks before when fishing with Spencer.

On January 10, the same newspaper reported that 10 people had phoned to say they had seen it, and they printed a brief report by Nigel Tutt.

Later, an unidentified Brisbane newspaper reported a sighting at 7:20 a.m. by David Manners, 26, and his mother at Woody Bay (a mere curve of beach on the southern tip of Bribie Island, at the very northern end of Deception Bay):

> "The head is round, something like a man's, at least 2ft. 6in. across and 2ft. long, with a flat nose and sort of semi-detached to the body," he said today. "The body is about 25ft. long. . . . It surfaced about 20 yards off-shore and was clearly visible in the shallow water," he said. "I dropped my rod, and Mum and I followed it at walking pace for about 1½ miles before we went to breakfast. It was a dirty brown color and appeared to have a body about 2ft. across and a queer-looking fin 18ft from the head. It kept surfacing about every 50 yards."

After that, the *Truth* ran a contest for the best Queensland "monster" story. The result was a collection of outrageous "tall stories," though the following may be genuine (*Sunday Truth,* October 10, 1960):

> Mr. E. J. Bailey, of Beaconsfield-terrace, saw a strange beast in the water off Russell Island in Redland Bay [i.e. right next to Brisbane], "like a horse or a hippopotamus, with an arched neck, a short back, that moved through the water with great speed and power."

Then, on October 16, 1960, the newspaper announced the winner of the contest to be Nigel Tutt, and it published his version of the sighting in full:

> "The day I saw the Deception Bay Monster the sky was very clear, the sea calm and the tide full. We were out looking for a fishing spot—myself, my daughter, Carol, now 16, and a girl-friend of hers, Joy Zeller, of Deception Bay. . . . We left from the kiosk and headed to the mouth of the Caboolture River to see the huge flocks of black swans that feed there along the whiting banks. On the way back we headed well offshore, looking for deep-water channels where the big fish might be. We were just on the edge of the shipping channel, and I throttled the engine back, handed the tiller to the girls and went up to the bow to look at the water. . . . Then, suddenly right in front of our bows, a huge, square-shaped head rose up about four feet out of the water. . . . The girls let out a shriek and turned the tiller so hard they nearly tied the boat in three knots. . . . 'Plop'—the head disappeared. When we straightened things out again I felt disappointed at not getting a clearer view of the thing. So I decided to run the launch a couple of circles in case it should surface again. . . . Sure enough , it was most obliging. It came up three more times. In fact, it seemed quite a friendly creature—I'm sure it liked people. Its body was of two shades of brown, in big mottles, and its skin looked lumpy, not scaly. Its head was square-shaped, and hard to describe. But if you've ever seen the boot of a Mayflower car—well, it was something the shape of that. . . . It had a yellow mouth, and appeared to have nostrils.
>
> "As it was acting so friendly, we decided to make for shore and get a camera. So I opened the outboard motor out, and after 10 minutes decided the Monster must have been left behind. . . . But then came the best view we had of him—there he was, curving and gliding calmly along beside the boat and only about 8 ft. away, about 22 ft. long and as thick as a sack of corn, with a fin about 6 ft. to 8 ft. back from his head. I thought, 'Could he be a giant eel, the daddy of them all?,' but an eel swims with a sideways motion, and this fellow was undulating up and down." . . . Nigel says he got a camera, went back out in the launch again, but no Monster! He didn't give up the search, though. "I'm so keen to get a photograph of him," he said, "I've built myself a special dinghy for the search. It's got unsinkable air tanks in it, and a special waterproof compartment in which I keep a camera—fully loaded."

The camera, in fact, was purchased with the 20-guinea prize money. He also won a baby crocodile called Huey, which subsequently died.

The following additional information was provided byTutt and his daughter Carol Borck. The third witness, Joy Zeller, confirmed the event, but was unable to remember much detail. Copies of their written statements have been deposited in the ISC archives.

Circumstances: The sighting lasted about 20 minutes, and occurred about 2 miles (3 km) from the river mouth on New Year's Day, 1960, in water 12 to 40 feet (3.5–12 m) deep. The day was sunny, and the sea was absolutely still.

Length: About 18–20 feet (5.5–6 m) (not 22 feet as recorded in the *Truth*), extending beyond both ends of the boat.

Skin: Extremely coarse, possibly lumpy, and mottled, with the underside of the jaw lighter. Definitely not furred.

Neck: Only a slight constriction behind the head.

Fins: According to Tutt, they were more like paddles, with a definite rigid structure, and were placed somewhat high just behind the neck. In his letter, he said they were "about a foot [30 cm] or a little more each way and rather rounded," but at the interview he suggested they were slightly longer than the head.

Head: Both witnesses agreed that the mouth was very wide, but neither could remember a tongue, teeth, or vibrissae. Tutt stated that the head was 2 feet (60 cm) wide, or perhaps a little more, and almost square, with a truncated muzzle. The eyes were well forward, and the nostrils widely spaced a few inches above the mouth, as in Fig. 2.

Tail: Not clearly seen. Tutt feels it was elongated rather than lobed.

Behavior: Unaggressive. At first its head surfaced almost vertically, but later came up at progressively smaller angles. It swam by means of shallow, vertical undulations, but did not appear to possess humps.

At the end of the interview, Tutt was shown a chart titled "Pinnipeds Around the World" from the April, 1987, edition of *National Geographic* magazine. The only similarities he could see was with the color and general profile of the leopard seal, *Hydrurga leptonyx.* However, the animal he had seen had had a squarer head, thicker neck, and more elongated body. Its fins were rounder, much shorter, and in a different position. It was also twice as long.

Comment: It is quite obvious that all the sightings refer to the same animal. Even the reported behavior was the same. The discrepancy in the position of the fins can be reconciled if we assume that Manning meant "18 inches" (45 cm) rather than "18 feet" (5.5 m) and included the neck with the head. Identifying it is another matter. The vertical undulations reveal it to be a mammal, but no known pinniped or cetacean fits the description. There are geographical problems in relating it to previously defined "sea serpent" types. The greatest similarity is with the "super-otter" which, according to Heuvelmans (1968), is found only in the North Atlantic, and has not been seen since 1848. Another possibility is Heuvelmans' "many-humped," especially as it is sometimes reported as bearing a small shoulder fin. However, its provenance is also the North Atlantic, and, like the "super-otter," it is two or three times the size of the Deception Bay animal. Perhaps an even closer correspondence is with the *naitaka* of the west Canadian coast and lakes, which Mackal (1980) believes to be relict archaeocetes. The naked skin of the Deception Bay animal would tend to indicate a cetacean rather than a pinniped. In either case, the unusual "fins" are unexplained.

This case has two postscripts. Firstly, the same area became the center of further sightings in 1962. These are reported by Heuvelmans (1968) as the Bribie Island and Brisbane "sea serpents," and at least one belonged to the quite different "long-necked" variety. This may also have appeared in the past, because when Tutt won the "monster" contest the *Sunday Truth* published a further comment:

> Another story this week came to us from New South Wales—from Mrs. M. L. Carr, a former Queenslander, now living at Williamtown Air Force Base. She told us about a Monster she once saw in the water on a reef near Bribie Island, "with a big body and neck, poised as if staring up at me."

Secondly, during the interview, Tutt casually mentioned seeing a tiger-like animal in southeast Queensland in 1940. The sighting had taken place in mid-morning at a distance of no more than 10 yards (ca. 10 m). Upon being questioned, he produced an account of the incident which he had written for the benefit of his daughter. The details were confirmed by a second witness, his brother Charles. Incredible as it may seem, Nigel Tutt has observed both marine and terrestrial unknown species—at close range under perfect viewing conditions. He may well be the only person alive with that distinction.

9) Maningrida, 1972. Maningrida is a major settlement in the Northern Territory Aboriginal reserve known as Arnhem Land. On June 23, 1972, the community's newsletter, the now-defunct *Maningrida Mirage* (Vol. 142) carried a report of an outlandish monster which thrashed the sea into foam and made:

> a sustained high pitched moaning, a cross between the howl of a dingo and a bellowing elephant. It was not possible to ascertain the creature's exact colour except that it was generally dark, but there appeared to be glistening sections as the sun was being reflected from incredibly large metallic-like scales. As fantastic as it seemed then and does now in retrospect, it was felt by the two fishermen, that the creature's head, if it could be called that, was in fact in three sections, almost similar to the sections on a three-bladed propeller with all parts being centrally attached to the body.

Sixteen years after the event, one of us (MS) wrote to Maningrida and was referred to Dan Guillespie of the Australian National Parks and Wildlife Service, who stated:

> As I recall that story was written as a practical joke by a school teacher. If it is attributed to me this was done in error. These kinds of ruses are perennial up here—the results of a combination of the vigorous climate & overindulgence in strong drink.

Comment: The vagueness of the circumstances of the sighting and the extravagance of the description both point to a hoax. It is only included here to set the record straight, as versions of the story understating the fantastic elements appeared in capital city newspapers, and so are likely to turn up in later anthologies.

10) Aireys Inlet, 1973. This incident took place about 2.5 miles (4 km) southwest of Aireys Inlet, Victoria, which is situated at 38°28′ S, 144°06′ E, roughly 60 miles (96 km) southwest in a direct line from Melbourne. The witnesses were Neil Blyth, a 25-year-old architect, and his father-in-law, Norman Robertson, whose skill in estimating size and distance dates from his Air Force work in World War II. The sighting occurred at 3:30 p.m. on June 3, 1973. According to the *Geelong Advertiser* for June 4, 1973:

Mr. Blyth said last night: "All of a sudden there was this hissing noise, then out of the water came this snake-like thing about seven or eight feet high." Mr. Blyth said the "snake" was nine inches thick, rose out of a swelling surf, about 150 feet from their boat. They had a clear view of it. It had a small, "dog-like" head. "It just sat up seven feet or so in the water—it was really weird," he said. "It just sort of slid up and stayed there for two or three seconds, then slid down again." Mr. Blyth said the "monster" hardly moved. He said he and his father-in-law immediately sketched what they saw and both drawings were similar. Mr. Robertson also described the "monster" as a black snake-like object. "It sat there for the odd second, then just slid back the same way as he came up," he said. "I thought at first it was the tail of a whale coming out of the water. Then I saw a blob on the end of it which was obviously a head."

The next day, the newspaper published a sketch made by Robertson at the time (Fig. 3).

Fourteen and a half years after the event, a questionnaire was sent to both witnesses by one of us (MS), and the resultant answers, although very similar, were clearly independent. Again, copies have been submitted to the ISC archives.

Viewing Conditions: About 0.5 miles (ca. 800 m) offshore on a fine, dull winter's day, with swells 4 to 5 feet (1.2–1.5 m) high, without white caps, and troughs perhaps twice the length of the boat. When a swell rears towards breaking point, a hissing sound is quite audible. So when a hissing sound was heard, Robertson assumed that an extra large swell was approaching. He looked up to see the creature appear. The sighting lasted about three seconds.

Color and Texture: Black and shiny (in a dull light).

Head: No constricture at the neck. Blyth claimed that the head was tapered, but Robertson considered it to be blunt. No eyes were visible.

Dimensions: Both recorded their impressions an hour or so after the event. Blyth estimated a neck 9 inches (23 cm) thick and 6 feet (1.8 m) out of the water, at a lesser angle than Robertson, whose figures were 12 inches (30 cm) and 9 feet (2.7 m) respectively. Considering the height of the swells, it is probably safer to accept the larger estimates.

Behavior: It rose gracefully with a slight "S" movement, did not appear to notice the men, and slid back like a periscope without a splash.

Robertson added a further comment: "Two separate and unreported events occurred at Aireys Inlet about 2 hours before our sighting. A woman at the Aireys Inlet store (about 400 yards [ca. 365 m] in from the beach) observed an unusual dark object moving along the surface of the water parallel with the shore towards the direction of Eastern View. Also, about the same time, my wife was on an Aireys beach when a large number of fish (from memory, mullet and garfish) were tossing themselves onto the beach. I think this also occurred on other nearby beaches."

Comment: Despite the brevity of the sighting, the poor viewing conditions, and the lapse of years, this must be considered an excellent sighting. The details cannot easily be attributed to any known species. Moreover, the angle of the object and its very brief appearance would rule out the other obvious explanation, a submarine periscope. However, the description fits perfectly Heuvelmans' "long-necked" sea serpent, observed all over the world's oceans and in many inland waters (cf Costello 1974, Dinsdale 1966).

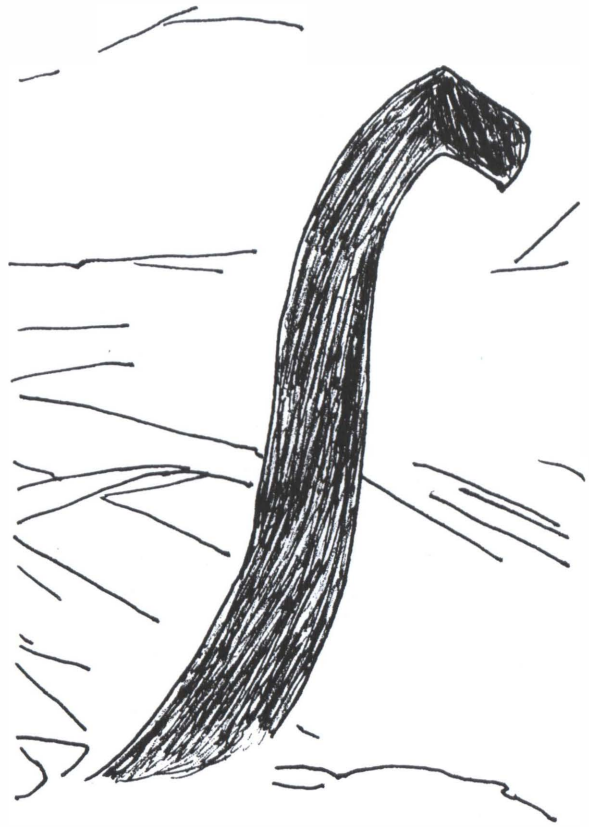

FIG. 3.—Sketch by Norman Robertson of the Aireys Inlet "sea serpent."

11) Bynoe Harbor, 1977, 1978. Bynoe Harbor is the long, narrow inlet immediately southwest of Port Darwin, Northern Territory, at approximately 12°41′ S, 130°34′ E. The primary report of the sightings is a front page story in the Northern Territory's largest daily newspaper, *The Northern Territory News* (Darwin), for February 2, 1980. Burge Brown, a beach sand prospector, claimed that the harbor was a breeding ground for plesiosaurs, which he had seen during the previous seven years, always during the wet season, December through February. The last time was on a fishing trip two years before:

> The day was still and the fish had been biting when, without any apparent reason, fish and sea snakes began leaping out of the water. Mr Brown said soon after this he saw the monster heading down the harbor like a "submarine." The creature had a tail and front like an elephant's trunk with pairs of dorsal-like fins running down the length of its back. It was the pairs of fins which fascinated Mr Brown most—they were not rigid but "flopped about." Police Sergeant, Kevin Maley, was one of the five people in the boat with Mr Brown that day. "It was the most incredible thing you have ever seen in your life," he said. "It was black, about 30m long with a head the size of a football," Sgt Maley said. Sgt Maley said the monster appeared soon after the sea became alive with marine life and kept within 20 m of the boat for about 20 minutes. It did not appear vicious and stared at the boat and its human occupants.

Jack Davis, who was in a boat in a different part of the harbor, was able to confirm the disturbance in the water. The year before that, according to Brown, he and his son, Geoffrey, had heard a bellow like a bull being branded:

> "About 15 minutes later I looked over and saw there were three of them—the big one had to be 30m." The three monsters were about 800m away so Mr Brown used his field glasses on them.

Burge Brown is now deceased. However, in November, 1989, one of us (MS) was able to contact Sgt. (now Chief Inspector) Maley, who provided the following details: The animal surfaced within 65 feet (20 m) of their boat and just lay there—neither shy nor aggressive—for about 20 minutes before submerging. Its length was more like 25 feet (7.5 m) rather than the reported 100 feet (ca. 30 m), and there were no obvious humps. There was a triple (not double) row of triangular serrations along the back, not unlike those on a crocodile's back, except that they were floppy and about 6 inches (15 cm) in size. The neck was about 8 to 10 feet (2.5–3 m) long, with a vertical "S" bend "like a sewage pipe," but close to the surface. He could not remember any details of the head. He is convinced that the animal was not a crocodile, dugong, turtle, or shark.

Comment: Inspector Maley's testimony brings down to earth a newspaper report which reads like a fisherman's "tall story." The journalist was obviously short on interviewing skills since, despite the sensationalism of the report, its information content is quite low. Nevertheless, it is sufficient to rule out any known species. Despite the unusual feature of the dorsal serrations, the animal should perhaps be grouped with the "long-necked" kind of "sea serpents" rather than the "many-finned," which are more often described as short-necked with larger serrations.

12) Larrekeyah, late 1940's. The previous report prompted a response, which was published in *The Northern Territory News* on February 15, 1980. This sighting apparently took place in Darwin Harbor itself, as the Larrekeyah Barracks are just west of the downtown area. R. M. Richardson of Batchelor wrote to say that, 30 years before, he had been walking along the cliff near

the barracks when he realized that what he had thought were three logs, about 26 feet (8 m) long, were in fact alive and swimming:

> "One raised its head which was serpent like, reminding me of a tiger snake ready to strike," he said.

A few days later, he was in Government House and he mentioned it to Mick Driver, who was Administrator for the period 1946–50. The latter said he knew of the animals, which reportedly visited the waters only intermittently.

Comment: The information content of this report is minimal, but sufficient to eliminate any known species. The size alone would rule out any of the snakes known from the area, and nothing else could even remotely approach the description. We can relate the animals to the "long-necked" kind of "sea serpents" or "merhorses," and they could well be the same as the Bynoe Harbor beasts.

13) Darwin, 1980. Five days later, on February 20, 1980, the same newspaper printed another front page report.

At about 11 a.m., the newspaper received a call from Terry Annesley and John Hamilton, employees of Eagle Insurance. Journalists Fred McCue and Dave Trounce and photographer Keith Scott joined them on the sixth floor to watch with binoculars:

> a dark body about 15m long with what appeared to be dorsal fins breaking the surface. . . . Trounce said he saw several fins burst through the surface, at one stage five at a time. "They appeared to be all on the back of a single eel-like object, but it was too far away to be sure," he said.

Unfortunately, the distance of about 1 kilometer (over 3,000 ft) was too far to use the camera.

It might seem more than a coincidence that such an animal should appear at such an opportune time. However, one of us (PC) was able to make telephone contact with Terry Annesley and discuss the incident. At the time of the sighting, he had been on the third floor (or fourth floor according to American usage) of the Hooker Building, located at the edge of the Harbor. The sighting took place some time between 10 a.m. and noon. He was the first person to notice the object, which was moving from the direction of Bynoe Harbor towards the shore in front of the building. It seemed to be moving at about the same speed as a whale. He watched it for about two minutes before alerting a fellow worker, John Hamilton. Both then watched it for some time.

The creature looked identical to sketches he had seen of the Loch Ness Monster, with several loops ("something like a half car tire") sitting high out of the water. There appeared to be a total of five or six loops, but this number constantly changed, and at least once only three were visible. He

stated that the length of each loop above the water appeared to be the same as the distance between the loops under the water. At no stage were less than three loops visible. The animal's total length was bout 65 feet (20 m), and its skin appeared black. By the time the journalists arrived, the animal was heading away from their position and towards the mouth of Darwin Harbor.

Apparently, the journalists were in total shock, with the photographer angry that he had not brought a sufficiently powerful telephoto lens. They all watched it for about half an hour, using binoculars, until it disappeared from view. Annesley is convinced that it was not a manta ray or a school of dolphins, and because of the way it moved he is certain it was only a single animal.

Comment: The description of this animal, although sketchy, is not immediately reconcilable with that of any known species. The animal appears to have been moving by vertical undulations, and so was presumably a mammal. It may have belonged to "many-finned" variety of "sea serpent." In any case, considering the proximity in time and space, it was probably of the same species as the Bynoe Harbor beasts. If so, there is hope that, eventually, it will make a further visit.

14) Ramat Bay, 1958, 1981. Ramat Bay is an inlet only a few hundred feet wide on the eastern shore of the island of New Ireland, Papua New Guinea, at 3°35′ S, 152°22′ E. These sighting reports have not been published before. They are based on 1983 interviews with the witnesses, Bernie Gash, an expatriate Englishman, and his native wife, by J. Richard Greenwell, who has kindly provided the information to the authors. Gash, who operates coconut plantations in southern New Ireland, lives in Namatanai, but also has a plantation house on a hill overlooking Ramat Bay approximately 8 miles (13 km) to the north.

The first sighting occurred between 9:30 and 10 a.m. on a day in August, 1958, and lasted 3–4 minutes. The animal, which was moving at about 5–6 knots, came into the bay to within a few hundred feet of the shore, turned, and moved out. The body appeared to be about 50 feet (15 m) long, and consisted of four gray-green loops spaced about 10 feet (3 m) apart. It had a frill along its back. No head was visible, but a vertical, segmented tail about 2 feet (60 cm) long was noted. The second sighting took place on April 26, 1981. The whole family was present, and Gash and his wife were interviewed separately about the incident. The time was about 5:15 p.m., the distance about 600–900 feet (ca. 180–275 m). They first saw a neck 10–15 feet (3–4.5 m) long and 2 feet (60 cm) wide, with a head like a python's (Fig. 4A). It appeared black because of the distance and the fading light, which turned it into a silhouette. They watched it for 2–3 minutes, until it splashed down and submerged. Three minutes later, they observed three small loops (Fig. 4B shows four) rolling along until they sank.

Gash's son, Edward, who was 11 in 1983, reported that he had seen the

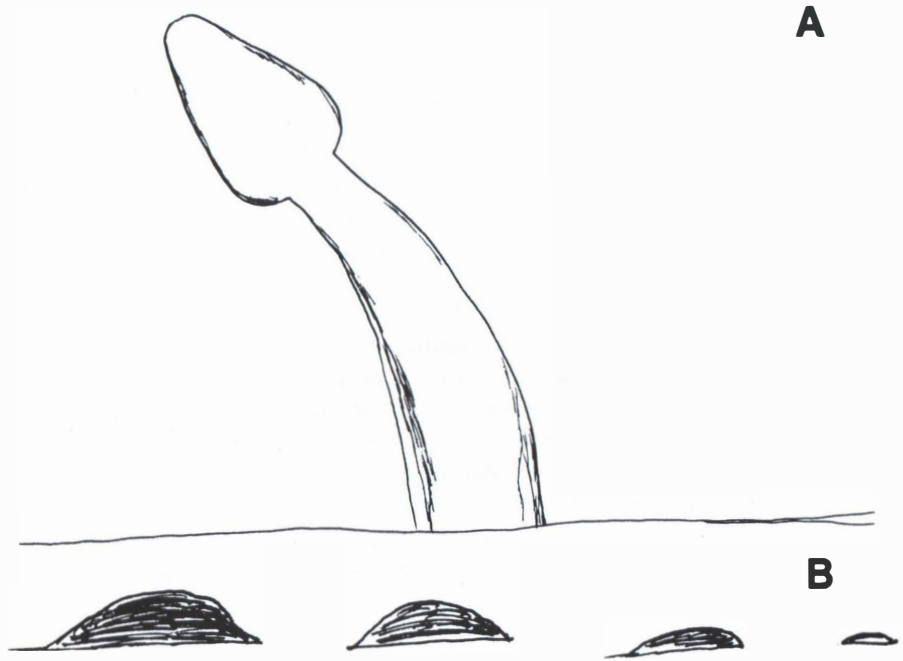

FIG. 4.—Sketches by Bernie Gash of the Ramat Bay "sea serpent." A. First appearance; B. Second appearance 3 minutes later.

animal seven times in the years 1981–83, probably because he lived in the plantation house overlooking Ramat Bay itself. Greenwell also interviewed 12 Barok tribesmen at the nearby village of Kolanabai, American anthropologist Roy Wagner acting as translator. They claimed to know the animal, and called it *ah-een-meelow,* meaning "the fish eel." They stated that they sometimes see it far out to sea on both sides of the island when fishing. It was said to be dark in color and to undulate vertically.

Comment: Two sightings made in the same area 23 years apart should not automatically be assumed to refer to the same species, but a continuing tradition among the indigenous people would tip the balance in favor of such an interpretation. Also, the two sightings have much in common, even though the dorsal frill was absent from the second report. Factors such as age, sex, season, and viewing conditions would easily explain the discrepancy.

Relating it to other "sea serpent" reports is not so easy. Readers of Heuvelman's (1968) compendium will know that the combination of multiple humps, long neck, and large head is not often reported, least of all from tropical seas. The "long-necked" kind of "sea serpent," for instance, pos-

sesses the first characteristics, but its head is usually described as having the same thickness as its neck and set at an angle to it. Also, it does not normally splash when submerging. Of course, the "neck" of the Ramat Bay animals might have been simply the anterior end of the body, but, if so, it is strange that it should have been held more or less vertically for 2–3 minutes. Like the Bynoe Harbor monsters, these creatures must be considered isolated unknowns. In fact, considering the lack of details in the Bynoe Harbor reports, they may well refer to the same species.

Conclusions

What can be learned from this disparate collection of reports? Firstly, even when due allowance is made for faulty observations, memories, and reporting, and for undetected hoaxes, it seems that several quite different animal species unknown to science have been visiting Australasian waters. Furthermore, some of them appear to be quite new even to the field of cryptozoology, and some of the strangest are also the best attested. The general form of many of these, and the references to vertical undulations, suggests that they, at least, are mammals, possibly archaeocetes or pinnipeds.

Secondly, newspaper accounts are woefully inadequate, but cross-checking with the original witnesses reveals that what information they do provide is usually accurate. The memories of a witness, on the other hand, tend to remain vivid even decades after the event. In the future, therefore, every effort should be made to locate such witnesses.

Thirdly, notwithstanding the above, newspapers still remain the major source of "sea serpent" reports, and the source is far from exhausted. It must be emphasized that Australia is a continent. Capital cities are hundreds of miles apart, and public libraries, even in the capitals, will maintain only a small selection of country newspapers even from their own state. Issues published before the Second World War are particularly hard to find.

At the time of the Aireys Inlet sighting, some journalists claimed that Gabo Island, near the New South Wales-Victoria border, had been the focus of unusual sightings for years. It has not been possible to follow up this lead, nor the rumors of sightings near the Hawkesbury River mouth in 1975–76. Even many of the "classic" cases need following up, as frequently the reports published in anthologies were based on second-hand rather than original accounts. The Deception Bay sightings of 1960 are good examples of how much additional information can be unearthed by a local investigator.

Furthermore, Heuvelmans quotes a number of sightings of which virtually nothing is known: the Mourilyan, Mackay, and *Rahata* sightings of 1934, and the John Kentworth sighting of 1962. The 1934 sightings at least are known to have been reported in various North Queensland newspapers, but they have not yet been located. The search is also still in progress for the original account of the Bellambi Reef sighting of 1930. Anyone who lives

in an area with access to these records would be in a position to make a worthwhile contribution to cryptozoology.

References Cited

Costello, Peter
1974 *In Search of Lake Monsters.* London: Garnstone.
Dinsdale, Tim
1966 *The Leviathans.* London: Routledge and Kegan Paul.
Heuvelmans, Bernard
1968 *In the Wake of the Sea-Serpents.* London: Rupert Hart-Davis.
Mackal, Roy P.
1980 *Searching for Hidden Animals: An Inquiry into Zoological Mysteries.* London: Cadogan.
McFarlan, Donald (ed.)
1989 *The Guinness Book of Records 1989.* Enfield: Guinness Superlatives.

Cryptozoology, 11, 1992, 70–82

IS THERE A LARGE, UNKNOWN PRIMATE IN CHINA? THE CHINESE YEREN OR WILDMAN

FRANK E. POIRIER
Department of Anthropology, The Ohio State University, Columbus, Ohio 43210, U.S.A.

J. RICHARD GREENWELL
Secretariat, International Society of Cryptozoology, P.O. Box 43070, Tucson, Arizona 85733, U.S.A.

ABSTRACT: The authors undertook an evaluation of the evidence for the Yeren or Wildman during a two-month visit to China. Evidence such as "monkey babies," footprint casts, and fecal remains proved useless. Eyewitnesses were interviewed, and this evidence is considered generally reliable and consistent. Discussions were held with Chinese scientists who had undertaken studies of purported Yeren hair using both scanning and transmitting electron microscopes (SEM and TEM), and an analytical technique called proton-induced X-ray emission (PIXE) spectrometry. The results of both kinds of analyses suggest the possible presence of a scientifically-unknown higher primate in China. The PIXE analysis was replicated in Britain, with the same results. The *Gigantopithecus*-Yeren ancestral-descendant hypothesis is discussed. As some eyewitnesses described red hair combined with quadrupedal locomotion, the possibility of a surviving population of mainland Asian orang-utans is also addressed.

INTRODUCTION

"The centuries-old riddle of the Chinese Wildman remains unresolved. There is currently not enough evidence to prove the existence of such creatures. Scientific discretion dictates that we either reject claims for the existence of such creatures, or at least withhold judgment until some valid, verifiable evidence is produced. Until contrary evidence is absolutely convincing, however, there is always a possibility that the Wildman exists—but one should not hold one's breath" (Poirier, Hu, and Chen 1983: 39). There now exists some evidence of the possible existence of the Yeren—a term which translates into English as "Wildman."

There have been written reports of the Chinese Yeren for over 2,000 years. Within the past 40 years, reports of sightings and encounters have come from the provinces of Guizhou, Hubei, Sichuan, Shanxi, the Tibet Autonomous Region, Yunnan, and Zhejiang. Most reports come from Sichuan and Hubei, especially from areas bordering the Shennongjia forest reserve—home to many of China's rare mammals. A review of the ecology of Shennongjia appears in Poirier, Hu, and Chen (1983). The largest and most extensive search for the Yeren occurred in Shennongjia in 1977 and 1979 to 1980. The 1977 research team included scientists from China's Institute

of Vertebrate Paleontology and Paleoanthropology. Despite their efforts, nothing of note was found (Shang 1981, Zhou 1982).

In October and November, 1989, the current authors, as part of a television documentary film project, investigated Yeren sightings in Sichuan, Guizhou, Yunnan, and Hubei provinces (Greenwell and Poirier 1989). The documentary film, *The Wildman of China*, was first broadcast in 1990.

DESCRIPTION OF THE CHINESE YEREN

There are no known photographs, undisputed bodies, or skeletal remains. Although the Yeren has reportedly been killed and/or captured on several occasions, no bodies have ever been made available for study. On the other hand, there are centuries of purported contact, drawings, and lengthy descriptions. Physical evidence has been presented in the form of footprint casts, fecal remains, nests, so-called "monkey babies," severed hands and feet, and hair. A more extensive review of this purported evidence appears in Poirier, Hu, and Chen (1983), and Zhou (1982). Interviews with eyewitnesses (one of whose reports led to the above-mentioned Shennongjia expeditions) appear in Greenwell and Poirier (1989).

Eyewitness descriptions are generally difficult to evaluate. The problem is compounded with the Yeren because some descriptions are thousands of years old. Most recent descriptions come from a variety of sources, including government officials, forestry workers, soldiers, and local villagers. Most sightings are reported by villagers. There has been no attempt by scientists to systematically interview a significant number of supposed eyewitnesses. There are many reasons for this, including: 1) a disavowal of such animals by the scientific establishment, and 2) a less than charitable attitude expressed towards the village peasants making the reports. This has left the investigation to generally unqualified individuals.

A general description of the Yeren follows. The reputed animal is large—the greatest reported height is over 10 feet (3 m), but most reports cite a height of about 6.5 feet (2 m). Zhou (1982) gives a range of 4–8 feet (1.2–2.5 m). Weight is estimated to be as high as 500lb (225 kg). The arms are shorter than the legs, and the human-looking forelimbs are not used in locomotion. The hands are capable of precision grip and manipulation. The animal is generally reported to walk bipedally and flat-footed. (However, some interviewed eyewitnesses mentioned the animal fleeing quadrupedally—see below.) One footprint cast measured 19 inches (48 cm). The first and second toes are diverged. There is no tail.

One trait agreed upon by modern and historical reports alike is that the Yeren has long hair, variously described as reddish, brown, golden, or white. The hair on the back is especially long. The face and jaw are prognathic. In some reports, the nose is prominent. The stomach may be described as large, and, by some accounts, female breasts and the penis are pendulous.

There are reports of its diet (vegetarian) and social behavior, or general lack thereof. The animal generally described manifests a mix of human and nonhuman primate traits in both its morphology and behavior. (See Poirier, Hu, and Chen [1983] for a further description.)

Before discussing the latest findings, we shall briefly evaluate the physical evidence mentioned above. Most of the kind of evidence presented as proof of the Yeren's existence was examined either by Poirier in 1982 or by the current authors in 1989.

Evaluation of Evidence

1) Monkey babies: A birth defect produces a condition that local people refer to as "monkey babies." Afflicted children are claimed to result from a mating (usually a rape) between a male Yeren and a female villager. (Rarely is a male villager reported raped by a female Yeren). The children are born with multiple physical and mental handicaps. The physical deformities affect the limbs, face, and skull most prominently. Poirier met one such child in 1982 while working in central Hubei. In 1989 we saw the skeleton of another individual. Zhou (1982) studied this young adult male skeleton and concluded that it was merely of a seriously deformed human—a conclusion with which we agree.

2) Footprints: More than 1,000 Yeren footprints have been reported. Some were casted and/or photographed. Because very few casts are of a quality to be closely evaluated, they are probably worthless as scientific specimens.

3) Fecal remains and nests: Although we did not see this evidence, we think it is of dubious value. Chinese giant panda experts who have seen the nests and fecal remains suggest a close resemblance of both to those of the giant panda. However, giant pandas are not known to inhabit areas where the Yeren is reported. The fecal remains belong to an omnivore.

4) Eyewitness accounts: There are numerous problems with eyewitness accounts. The wide publicity that supposed Yeren sightings receive could color the reports and/or lead to some misinterpretation and possibly deception. Our interviews in 1989 produced some new details, and in all seven cases we concluded that the witnesses had nothing immediately to gain by deception. Many animals, including rhesus macaques, the endangered gibbon, the snub-nosed monkey, and bears have been called the Yeren at one time or another. Although many eyewitness accounts are generally considered unsatisfactory, such reports show a consistency and have a legacy of more than 2,000 years.

5) Severed appendages: Hands and feet were reportedly once severed from a Wildman by villagers warding off an attack. An extensive investigation of such severed appendages was reported by Zhou (1984), who concluded that the specimens came from a large—perhaps scientifically undescribed—macaque. We saw these specimens in 1989; they belonged to a terrestrial macaque.

Results of Hair Analyses

A few hundred hairs have been collected by people who reportedly either encountered a Yeren or plucked its hair from the ground or a tree. Most written and oral accounts report an animal with long reddish, golden, or brownish hair. Some Yeren hairs have been analyzed by use of both scanning electron microscopes (SEM) and transmitting electron microscopes (TEM). One study involved Keratin content analysis. Some hairs have also been subjected to an analytical technique called proton (or particle) induced X-ray emission (PIXE) spectrometry. These analyses were conducted in China and in Britain.

SEM and TEM Analyses

SEM and TEM analyses of Yeren hairs were conducted by Cao et al. (1987) in the Biology Department of East China Normal University, Shanghai. Cao and his colleagues compared four supposed Yeren hairs from different localities in China—three from Sichuan and one from Zhejiang—with hairs from a(n): 1) white-browed gibbon; 2) rhesus macaque; 3) common chimpanzee; 4) Asian black bear; 5) serow; and 6) modern Chinese human. The gibbon and chimpanzee hairs came from zoo animals; the macaque, black bear, and serow hairs were from Shennongjia—the site of many Yeren reports. The study by Cao et al. (1987) focused on the shape of the cuticular scales; the size of the medulla and the compactness of microfibers in the medulla; and the density, number, and scatter of pigment granules. Kassenbeck (1979) and, to a lesser extent, Rosen (1974) discuss the use of cuticular scales as a means of identification, and Clement et al. (1981) discuss hair identification using SEM and TEM techniques. Rosen (1974) has cautioned that cross-sectional areas of human hair are generally similar to those of Old World monkeys.

When compared with the six known animals (1–6 above), the supposed Yeren hairs yielded the following results:

1) Two hairs from Sichuan show similarities to one another. One hair is brownish and glossy, while the other is golden and glossy. The hairs are similar in their pigment distribution and the size and density of their medulla. In these features, they differ from the hair of nonhuman primates, black bear, and serow, but are similar to human hairs. However, they differ from Chinese human hairs in coloration. (In this remote region of China, it is unlikely that the hair is from a non-Chinese human.) Cao et al. (1987) conclude that the brown hair belongs to the unknown primate currently known as Yeren. This hair comes from Wuxi, Sichuan province, a center of Yeren reports.

The supposed Yeren hair has veins that are densely compacted in the medulla (16 rows/100u), the medulla is small, the number of pigment granules is small and distributed in the outer range of the cortex. In the Chinese human hair sample, the medulla is small, a moderate number of pigment granules are distributed in the outer range of the cortex, and the veins are densely compacted in the medulla. The only real contrast here between Yeren and Chinese human is where the pigment granules are distributed. The significance, if any, of this difference is not known. Given the similarities between the purported Yeren hair and the hair of a modern Chinese human, it cannot be ruled out that this sample is from a modern Chinese human. The nonhuman animal hair sample had veins sparsely compacted in the medulla, a large medulla, and pigment granules distributed around the center of the cortex. Clement et al. (1981) have noted that only human hairs have a clear microfibrillar and macrofibrillar ultrastructure. The presence of such structures in the supposed Yeren hair indicates either a misidentification of a modern Chinese human hair as that of a Yeren (which pigment differences and PIXE analysis seem to discount), or that the hair comes from an animal closely related to humans.

2) The hair from Zhejiang province does not belong to a macaque. It was a yellow and brown color.

3) The fourth hair sample, said to be at least five generations old, could not be accurately analyzed because of its age. It was bright red.

Brian McCarthy, at the British Textile Technology Group, who has over 40 years experience in the analysis of animal fibers and who has worked on the Shroud of Turin, examined three supposed Yeren hairs under a SEM. These hairs (which were not analyzed by SEM or TEM in China) were provided to Geraldine Easter by different sources in China. Two hairs are from the Wuxi area in Sichuan. McCarthy's analysis indicated that the hairs were either from a human or another higher primate (personal communication, Brian McCarthy to Geraldine Easter, 1991).

Keratin Content Analysis

X. He, P. Yan, and M. Liu (Studies on Keratins of Some Unknown Animal Hairs, unpublished manuscript, in Chinese) analyzed the keratin content of hair from humans, chimpanzees, orang-utans, gibbons, baboons, black bears, and pigs. The results were compared to three supposed Yeren hairs, one each from Guizhou, Sichuan (Wuxi), and Hunan provinces. The purported Yeren hairs had a higher acid protein content, and contained 16 amino acids versus the 17 amino acids found in the hairs from other animals. The missing amino acid was not specified. The range of variation of these features in humans is not available to the authors at this time.

PIXE Analysis

The first application of the PIXE method to trace analytical problems was published in 1970. The high sensitivity afforded by PIXE, its simultaneous multi-element capability, and the small sample size requirements, make it ideal for studying trace elements in biological samples. PIXE analyses have been used to uncover faked manuscripts and works of art (Cahill and Kusko 1981), to determine the chemical element contents of meteoritic samples, to measure water and air pollution, and to examine trace elements in bone, skin, hair, blood, albumens, cell walls, and tooth enamel, among others. PIXE can be used by archaeologists (Zeng et al. 1989) to determine the origins of pottery (Baijot-Stroobants and Bodart 1977) and of artifacts (Campbell 1977), and should be very useful in identifying dietary patterns and diseases in faunal samples. The uses to which PIXE can be put, limitations of the procedure, and details about sample preparation are found in *Nuclear Instruments and Methods,* Vol. 181 (1981), pages 1–343; and Vol. B (1984) pages 105–701.

Hair has been a rather common subject for PIXE (Valkovic 1977). (See also pp. 347–360, *Nuclear Instruments and Methods*, Vol. B, [1984]). Before hair is analyzed by PIXE, it must undergo proper preparation. Surface contamination can pose a problem (Campbell 1979), and the thickness of the specimen needs to be considered (Baptista et al. 1981, Campbell 1977, 1979, Willis and Walter 1977). Some problems have been encountered in the direct analysis of hair by irradiation because hair strands are thick with respect to the particle energy usually employed, and some of the light element X-rays are attenuated to a considerable extent (Mangelson and Hill 1981). To overcome the problem of destroying a sample by overheating, PIXE is used in combination with the external beam technique (Raith et al. 1981). A number of articles in *Nuclear Instruments and Methods*, Vol. B (1984), discuss using external beam techniques for analyzing thick targets.

A number of purported Yeren hairs underwent PIXE analysis in the Department of Nuclear Science at Fudan University, in Shanghai, and the Shanghai Institute of Nuclear Research (Li, Zeng, and Hua 1987, Qin et al. 1988, Zeng et al. 1990). Previous hair analysis at Fudan University was published by Chen et al. (1981). Three Yeren hairs were also analyzed by PIXE by Ranjeet Sokhi in the Department of Physics and Space Research, University of Birmingham, England. These three hairs also underwent PIXE analysis in China, and they are the same hairs studied by Brian McCarthy of the British Textile Technology Group by SEM.

Li, Zeng, and Hua (1987) conducted a PIXE analysis of ten supposed Yeren hairs, the results of which were compared with analysis results of hair from eight healthy Chinese humans, and hairs from the snub-nosed monkey, a gibbon, an orang-utan, and a chimpanzee, as well as hair from both the

Asiatic black and Asian brown bear. PIXE analysis resulted in three distinct groupings. The first group included the human hair samples and only one Yeren hair; the second group contained *only* three of the 10 hairs originally designated as Yeren hairs, and the third group contained all the other hairs, including six originally designated as Yeren hairs.

Using PIXE, Li and his colleagues reclassified some of the supposed Yeren hairs. One hair was from a human, and six hairs belonged to other known animals. From the original sample of 10 so-called Yeren hairs, three hairs differed in their trace element content from all the other hairs. Two of these hairs were red, and one was yellow and white. The Fe/Zn ratio of the three Yeren hairs was found to be 54 times higher than that of the Chinese human hairs, and 8.1 times higher than that of all the other animals used in the comparison. Furthermore, the ratios of Ca, Mn, Fe, Cu, and Zn in the Yeren hairs differed from the ratios of the same elements in the human and nonhuman primate sample. All three hairs came from Sichuan, and two came from the Wuxi area. If the high Fe/Zn ratio found in the Yeren hairs is a significant differentiating feature, then a similarly high ratio should be found in all hairs attributed to the Yeren—no matter their locale of origin.

To test the diagnostic function of the Fe/Zn ratio, Li and his colleagues added three more supposed Yeren hairs to their sample. These were all red, and came from Guizhou and Hunan provinces. Using the same procedures as in the original analysis, these hairs were compared with monkey and bear hairs. As before, the Fe/Zn ratio of the three Yeren hairs was significantly different from that of the monkey and bear hairs. Combining data from both tests, Li, Zeng, and Hua (1987) showed that the Fe/Zn ratio in the six Yeren hairs was 50 times higher than that of human hairs, and 7 times higher than that of the nonhuman animal hair sample. Despite the fact that the six Yeren hairs came from three different provinces, they all had a similarly high Fe/Zn ratio. Because the hairs came from different regions, and were handled by different people, but all still showed a similarly high Fe/Zn ratio, contamination can probably be ruled out as an explanation for the high Fe/Zn ratio.

Qin et al. (1988) conducted a PIXE spectrophotometry analysis of 26 hairs: five supposedly came from the Yeren; two from unidentified animals that might have been the Yeren; six from modern nonhuman primates (snub-nosed monkey, two Chinese macaque species, hoolock gibbon, orang-utan, and chimpanzee); one hair each from an Asian brown bear and a serow; two hairs from the Asiatic black bear; and nine from modern Chinese humans (females and males ranging in age from 23 to 52 years). The five reported Yeren hairs were red, and came from Guizhou, Sichuan (Wuxi area), and Hunan provinces. One of the two hairs from the unidentified animals came from Wuxi, and was brown in color. This is the same hair that the SEM and TEM analyses by Cao et al. (1987) determined belonged to the Yeren sample.

PIXE analysis of this hair supported the SEM and TEM determinations that the hair came from an unknown primate. At least this is the considered opinion of a number of Chinese scientists.

The sequence of concentrations of the four most common elements found in human hair seems to be Ca>Zn>Fe>Cu. The mean content of Ca, Cr, Mn, Fe, Co, Cu and Sr was significantly higher in the Yeren hair than in the human and nonhuman hair samples ($P<0.01$). The nonlinear mapping algorithm (NLM) of the three types of hair indicates that the Yeren, human, and nonhuman hairs (including the monkey and ape samples) have their own distinctive element characteristics.

Ranjeet Sokhi analyzed three Yeren hairs in his laboratory in Birmingham, England. (These are the same hairs that Brian McCarthy at the British Textile Technology Group had analyzed by SEM.) These three hairs had also been analyzed by PIXE at the Nuclear Science Department at Fudan University, Shanghai. That work was conducted by X. Zeng. The hairs were not cleaned prior to analysis. In Zeng's analysis, two of the three hairs had showed the high Fe/Zn ratio seemingly common to Yeren hair samples. Sokhi's analysis showed that the Yeren hair had a Fe/Zn ratio 30 times higher than that found in human hair. (We are uncertain whether or how melanin content might affect these figures.) Sokhi (personal communication, 1991) reported: "All we can really conclude is that these hairs (which are claimed by some to be from Wildman) show entirely different elemental characteristics to normal human hair, which is extremely difficult to explain. I'm surprised we've shown such a high level of agreement with Shanghai's analysis—very surprised."

Because neither Sokhi nor Zeng cleaned the hairs prior to analysis, perhaps their results were somehow affected by contamination. However, the comparability of their data suggests that the lack of cleaning is not relevant to the results. Furthermore, because all three hairs originate from different times and places in China, it seems too coincidental that they all should suffer from similar contamination. The combined results of the various hair analyses discussed above are summarized in Table 1.

What is the Yeren?

Hair analyses suggest the possibility that an animal which the Chinese refer to as Yeren may exist. If this animal does exist, what could it be? Listed below are three explanatory hypotheses.

1) One hypothesis attributes all reports to observations of scientifically known animals, or to hoaxing. The SEM, TEM, and PIXE data seem to void this as a strong possibility.

2) Another hypothesis is that most Yeren reports refer to some kind of scientifically-unknown nonhuman primate. Our 1989 interviews suggest that perhaps two primates are being described. One is a very large bipedal animal

TABLE 1.—Combined results of hair analyses of purported Chinese Yeren hairs.

Yeren	Human	Nonhuman primates
Thickly compacted veins in medulla	Same as Yeren	Sparsely compacted veins in medulla
Small medulla	Same as Yeren	Large medulla
Small number of pigment granules	Moderate number	
Pigment granules distributed in outer range of cortex	Evenly distributed throughout cortex	Distributed around center of cortex
16 amino acids	17 amino acids	17 amino acids

Observations:

Acid protein content higher in Yeren than in human and nonhuman primates.

Fe/Zn ratio is 50 times higher in Yeren samples than in human samples and 7 times higher than in nonhuman primate samples (Li, Zeng, and Hua 1987 study). Fe/Zn ratio is 30 times higher in the Yeren sample than found in humans (Sokhi study).

Ca, Cr, Mn, Fe, Co, Cu, and Sr contents are significantly higher in Yeren samples than in human and nonhuman primate samples.

covered with reddish, golden, or light brown hair, while the other is a smaller quadrupedal primate. Some descriptions of these quadrupeds may refer to orang-utans. The long red hair and prominent stomach mentioned by some eyewitnesses are very reminiscent of orang-utans. Further evidence are the nests, which orang-utans are known to build.

Although there are no verified reports of orang-utans currently extant in China, orang-utan fossils demonstrate that they persisted in mainland Asia at least into the late Pleistocene. Whether they persisted in China into historical times is uncertain, but local myths, as well as 19th century works, such as by Jardine in 1833 and Geoffroy in 1851, support the notion that orangs may have been present in recent centuries. Von Koenignswald (1981) suggested that giant orang-utans might still dwell in such parts of China as Guandong, Guangxi, and Yunnan—the latter two provinces report sightings of the Yeren. Fossil orang teeth found in Chinese herbal shops in the 1930's were traced to caves in Guandong and Guangxi. These teeth came from deposits that also yielded giant panda and serow remains. Von Koenignswald noted that he had many fossil orang-utan teeth whose dimensions exceeded the maximum reached by extant orangs.

Perhaps orangs have somehow survived in parts of mainland Asia. Chinese scientists once took reports of orang-like creatures in Yunnan seriously enough to conduct field surveys (Wu Xinzhi, personal communication, 1989). However, when hairs placed into the Yeren category by PIXE analysis were compared to orang-utan hairs, they were considered to be distinct.

3) A third hypothesis proposes a relationship between the bipedal Yeren and the fossil primate genus *Gigantopithecus*. Two provinces where Yeren

reports are concentrated, Guangxi and Hubei, have yielded *Gigantopithecus* fossils. In terms of its reputed body size and habitat, *Gigantopithecus* makes a good *theoretical* ancestor to the Yeren. However, there is no direct evidence of such a relationship. Interestingly, assuming that such large, unknown primates may actually exist, 80 percent of American and Canadian Ph.D.-level physical anthropologists specializing in primatology and human evolution, when surveyed, supported *Gigantopithecus* as the preferred taxonomic candidate (Greenwell and King 1981).

It is necessary to be very clear about the results of the PIXE and other analyses (summarized in Table 1). PIXE and other analyses showed that some of the hairs attributed to the Yeren are chemically and structurally different from the hair of all known animals in the comparative sample, including human and nonhuman primates. However, these analyses alone do not allow us to place the Yeren in the order Primates. That assignment depends on oral and written descriptions of the animal. PIXE, SEM, and TEM analyses all suggest that the Yeren hair came from either a scientifically unknown animal or to a higher primate. Oral and written descriptions suggest that this animal is a higher primate, more specifically that it is either an ape or a human, or closely related to them.

Future DNA analysis of Yeren hairs should resolve the issue of whether it exists, and to which animal group it is most closely related. As of now, such hair samples must necessarily include the root structures containing sufficient DNA. Attempts at DNA analysis of the above hairs already tested by SEM, TEM, and PIXE have not been possible because of their rootless condition (Frederick W. Miller, personal communication, 1992).

We think it appropriate at this time to open a scientific debate on the possible existence of the Yeren. Given the analytical techniques now available, evidence for the existence of animals such as the Yeren no longer needs to be only in the form of a body or skeletal material. Applying modern analytical techniques to hair samples can result in strong evidence to support or deny the existence of such unknown animals.

CONCLUSION

Very much different from our starting position, especially Poirier (see Poirier, Hu, and Chen 1983), we now conclude that there *may* be some veracity to reports of the Yeren's existence. The possible presence of one and possibly two scientifically-unknown higher primates, covered with long reddish or brownish hairs and reported for over 2,000 years, should be seriously considered by primatologists and mammalogists.

Even if definitive evidence of its physical existence never materializes, the Yeren of China warrants anthropological interest and research. If the Yeren is *not* one or more unknown biological species, it is a folkloric entity that has existed for 2,000 years—a unique situation in its own right.

Acknowledgments

We thank Kun Shi and Zheng Xu for translating Chinese publications. We are indebted to Chinese researchers who continue to search for scientific answers to the Yeren. Various Chinese scientists shared their insights and data: Han min Cao, Weizhi Ji, Mingzhuang Liu, Xinzhi Wu, Xianzhou Zeng, and the members of the Wuxi Science Committee were especially gracious. Xianzhou Zeng was especially generous in sharing the results of his PIXE analyses. Yu-sheng Shan of CCTV helped make the necessary arrangements for our filming in China, and was an indefatigable host. Geraldine Easter of The Filmworks, London, was responsible for launching the film project and handling the innumerable details of the pre-planning and the expedition itself. We owe her a special debt of gratitude for her enthusiasm and patience, and for seeing the project through to its completion. The hairs that were analyzed were graciously provided by Ms. Easter. Bernadette Drury of The Filmworks, Ian Duncan of Windfall Films, London, cameraman Michael Coles, and soundman George Hitchins were all indispensable to our efforts. We thank Ranjeet Sokhi, University of Birmingham, England, for conducting PIXE analyses, and Brian McCarthy, British Textile Technology Group, Manchester, England, for undertaking SEM and TEM analyses. Frederick Miller, David Metzer, and Phillip Trinity are thanked for their efforts.

References Cited

Baijot-Stroobants, J., and F. Bodart
1977 Ancient Pottery Analysis by Proton Bombardment and Mossbauer Spectroscopy. *Nuclear Instruments and Methods*, Vol. 142: 293–300.

Baptista, G., E. Montenegro, A. Paschoa, and C. Barros Leite
1981 Analysis of Trace Elements in Human Hair by PIXE. *Nuclear Instruments and Methods*, Vol. 181: 263–267.

Cahill, T., and B. Kusko
1981 Analyses of Inks and Papers in Historical Documents Through External Beam PIXE Techniques. *Nuclear Instruments and Methods*, Vol.181: 205–208.

Campbell, J.
1977 Specimen Preparation in PIXE Analysis. *Nuclear Instruments and Methods*, Vol. 142: 263–273.
1979 Progress in Biological Applications of PIXE. *IEEE Transactions on Nuclear Science*, NS 26: 1363–1367.

Cao, Hanmin, Jinpeng Zhou, Fumin Jiang, and Minzhung Liu
1987 Comparative Studies of Ultrastructure of Hairs of Some Unknown Animals. *Journal of the East China Normal University* (Natural Science Edition), Vol. 3: 98–103. (In Chinese.)

Chen, J., Y. Guo, H. Li, C. Ren, G. Tang, X. Wang, F. Yang, and H. Yao
1981 Trace Element Analysis of Human Hair by PIXE. *Nuclear Instruments and Methods*, Vol. 181: 269–273.

Clement, J., R. Hagege, A. LePareux, J. Connet, and G. Gastaldi
1981 New Concepts About Hair Identification Revealed by Electron Microscope Studies. *Journal of Forensic Sciences*, Vol. 26: 447–458.

Greenwell, J. Richard, and James E. King
1981 On the Taxonomic Status of Sasquatch: An Anthropological Consensus. *Northwest Anthropological Research Notes*, Vol. 15: 57–59.

Greenwell, J. Richard, and Frank E. Poirier
1989 Further Investigations into the Reported *Yeren*-The Wildman of China. *Cryptozoology*, Vol. 8: 47–57.

Kassenbeck, P.
1979 Morphologie und Feinstruktur der Cortex und Cuticulzaellen von Humanhaaren. *First International Congress of Hair Research Compendium*, p. 4.

Koenigswald, Ralph von
1981 Gibt es in China Noch Orang utans? *Natur and Museum*, Vol. 111: 260–261.

Li, M., K. Sheng, P. Chin, Z. Chen, X. Wang, J. Chin, T. Rong, M. Tan, and Y. Xu
1981 A Completely Automated PIXE Analysis System and its Applications. *Nuclear Instruments and Methods*, Vol. 181: 37–41.

Li, Z., X. Zeng, and T. Hua
1987 Trace Elements Analysis of Hair From Unknown Primate by PIXE. *Nature Journal*, Vol. 10: 488–493. (In Chinese.)

Mangelson, N., and M. Hill
1981 Recent Advances in Particle-Induced X-ray Emission Analysis Applied to Biological Samples. *Nuclear Instruments and Methods*, Vol. 181: 243–254.

Poirier, Frank E., Hongxhin Hu, and Chung-Min Chen
1983 The Evidence for Wildman in Hubei Province, People's Republic of China. *Cryptozoology*, Vol. 2: 25–39.

Qin, J., M. Li, Y. Xu, and Z. Hua
1988 The Study of the Trace Element Spectrum of "Savage" (Wildman) Hair. *Nuclear Techniques*, Vol. 11: 52–56.

Raith, B., A. Stratmann, H. Wilde, and B. Gonsior
1981 PIXE Analysis by Means of an External Proton Beam. *Nuclear Instruments and Methods*, Vol. 181: 199–204.

Rosen, S.I.
1974 Identification of Primate Hair. *Journal of Forensic Sciences*, Vol. 19: 109–112.

Russell, S., R. Gibson, S. Faiq, and J. Campbell
1981 Proton Backscatter as a Means of Mass Normalization in PIXE Scanning of Human Hair. *Nuclear Instruments and Methods*, Vol. 181: 97–98.

Shang, S.
1981 A Brief Note on the Investigations of Shen Nong Jia—The Wildman. Unpublished manuscript. (In Chinese.)

Valkovic, V.
1977 Proton-Induced X-ray Emission: Applications in Medicine. *Nuclear Instruments and Methods*, Vol. 142: 151–158.

Vis, R., C. Van der Stap, and A. Bos
1984 Macro- and Micro-PIXE Analyses of Biological and Medical Samples. *Nuclear Instruments and Methods*, Vol. B: 319–325.

Willis, R., and R. Walter
1977 Proton-Induced X-ray Emission Analysis of Thick and Thin Targets. *Nuclear Instruments and Methods*, Vol. 142: 67–77.

Zeng, Xianzhou, Xiankang Wu, Qiyyun Shao, and Huiying Yao
1989 An Improved On-Demand Beam Pulsing System and its Application to Art and Archaeology. *Vacuum*, Vol. 39: 91–95.

Zeng, Xianzhou, Huiying Yao, Yongnian Sun, Xiankang Wu, and Fujia Yang
1990 Biomedical Applications of PIXE at Fudan University. *International Journal of PIXE*, Vol. 1: 43–54.

Zhou, Guoxing
1982 The Status of Wildman Research in China. *Cryptozoology*, Vol. 1: 13–23.
1984 Morphological Analysis of the Jiulong Mountain "Manbear"(Wildman) Hand and Foot Specimens. *Cryptozoology*, Vol. 3: 58–70.

Research Reports

Cryptozoology, 11, 1992, 83–89

DISTRIBUTIONAL PATTERNS OF CRYPTID EYEWITNESS REPORTS FROM LAKE CHAMPLAIN, LOCH NESS, AND OKANAGAN LAKE

YASUSHI KOJO
Office for the Investigation of Buried Cultural Properties, Waseda University, 3-4-67 Higashifushimi, Hoya-City, Tokyo 202, Japan

ABSTRACT: The distributional patterns of sighting times of reported large, unknown aquatic animals in Loch Ness, Scotland, and Okanagan Lake, Canada, were compared with similar data from Lake Champlain, U.S.A. The results show that the distributional patterns are probably not an outcome of the observers' behavior, but a consequence of the behavior of the animals themselves. These findings are supportive evidence for the existence of such unknown aquatic animals.

INTRODUCTION

In a previous paper (Kojo 1991), the author proposed that, by isolating a behavioral characteristic reported for large, unknown aquatic animals in Lake Champlain, U.S.A. (Champ), it is demonstrable that such animals do, in fact, exist. An apparent increase of sighting reports right before sunset suggests nocturnal behavior. The author also pointed out that the distributional pattern of sighting times is quite different from that for similar unknown animals reported in Loch Ness, Scotland (Nessie). Sighting times of the animals reported in Loch Ness have a very peculiar distributional pattern; there are two peaks, one in mid-morning (between 10 and 11 a.m.), and the other in mid-afternoon (between 3 and 4 p.m.), with an apparent decrease of sightings in the middle of the day (between 1 and 2 p.m.). Mackal (1976: 85) interpreted this pattern not as a result of the behavior of the animals themselves, but of the human observers; i.e., "we would expect fewer persons to be watching the loch at night and during the midday or siesta period."

However, if this is actually the case, the same midday decrease should also be observable in the pattern of sighting reports from Lake Champlain, as it is unlikely that midday behavior of the people around Loch Ness and Lake Champlain are significantly different. The fact that the same midday

decrease is not observable in the Lake Champlain reports suggests that the distributional pattern of sighting times of the animals reported in Loch Ness is likewise a result of a behavioral characteristic associated with the animals themselves. That the pattern is a product of sampling error is hardly conceivable because the sample size is fairly large (n = 122).

In order to test the above hypothesis, the distributional pattern of sighting times of similar animals reported in another body of water, British Columbia's Okanagan Lake (Ogopogo), was examined and compared with those of the animals reported in Lake Champlain and Loch Ness.

Method

In order to test the hypothesis that the distributional pattern of sighting times at Loch Ness is a result of the animals' behavior, we should ideally examine the distributional patterns of sighting times of known animals (e.g., seals, otters) in the same lake, and whose behavioral patterns are known. However, because such data are not easily available, the distributional patterns of sightings of similar unknown animals in other lakes was examined in order to determine if the same pattern is observable. An attempt was made to examine the sighting patterns of as many similar unknown animals in other lakes as possible. However, published data on sighting times of similar unknown animals in other lakes are very few. The only instance for which a sufficient number of sighting times is known is for the animals reported in Okanagan Lake, British Columbia. The reported times of 82 sightings between 1923 and 1990 are shown in Table 1.

Results

The distributional pattern of sightings of the animals reported in Okanagan Lake (Fig. 1) is apparently quite different from that of the animals reported in Lake Champlain (Fig. 2), and is similar to that of the animals reported in Loch Ness (Fig. 3). In the sighting patterns of the animals reported in Okanagan Lake and Loch Ness, the mid-morning peaks occur at exactly the same time; i.e., between 10 and 11 a.m. Although there is a 1-hour difference, the mid-afternoon peaks are similar: between 4 and 5 p.m. for Okanagan Lake, and between 3 and 4 p.m. for Loch Ness. While there is again a 1-hour difference, the midday decrease of sightings is also similar: between 12 noon and 1 p.m. for Okanagan Lake, and between 1 and 2 p.m. for Loch Ness. It is hardly conceivable that the midday behavior of the people around Okanagan Lake and Lake Champlain are significantly different, while the midday behavior of the people around Okanagan Lake and Loch Ness are the same. Therefore, it is highly probable that the similar distributional patterns of sighting times of the animals reported in Okanagan Lake and Loch Ness are a result of a common behavioral characteristic associated with the animals themselves.

Table 1.—Listing of all available large, unknown animal sighting reports from Okanagan Lake which include specific or approximate sighting times.

Item no.	Year	Month	Day	Time	Source
1	1923	Jul.	21	10 a.m.	Moon 1977:50
2	1925	Aug.	17	7 a.m.	Moon 1977:169
3	1926	Jul.	19	7 a.m.	Moon 1977:170
4	1926	Early Sep.		10 a.m.	Moon 1977:172
5	1931	Jul.	25	9 a.m.	Moon 1977:174
6	1935	Oct.	6	2 p.m.	Moon 1977:175
7	1948	Feb.	26	7 a.m.	Moon 1977:176
8	1949	Jun.		Shortly before 8 a.m.	Moon 1977:176
9	1949	Jul.	19	2:30 p.m.	Moon 1977:177
10	1949	Jul.	19	4 p.m.	Moon 1977:177
11	1949	Jul.	19	5:30 p.m.	Moon 1977:177
12	1949	Jul.		7 p.m.	Moon 1977:176
13	1950	Jun.	25	9:45 a.m.	Moon 1977:178
14	1950	Jun.	29	5:30 p.m.	Moon 1977:178
15	1950	Aug.	12	4:30 p.m.	Moon 1977:178
16	1950			8 p.m.	Gaal 1986:28
17	1951	May	19	8 a.m.	Moon 1977:179
18	1951	Jun.		10 a.m.	Moon 1977:179
19	1951	Jul.	21	10:30 a.m.	Moon 1977:60–61
20	1951	Jul./Aug.		4 p.m.	Moon 1977:179
21	1951	Aug.	3	6 a.m.	Moon 1977:180
22	1951	Late Sep.		9:30 a.m.	Moon 1977:180
23	1952	Jul.	6	Between 12 and 2 p.m.[1]	Moon 1977:180
24	1954	Jul.	3	3:30 p.m.	Moon 1977:181
25	1955/56	Summer		11 a.m.	Moon 1977:182
26	1958	Jul.	19	8 a.m.	Moon 1977:182
27	1958	Sep.	10	3:45 p.m.	Moon 1977:182
28	1958	Sep.	10	4:30 p.m.	Moon 1977:183
29	1962	May		5:30 p.m.	Moon 1977:184
30	1962	Jul.	17	8 a.m.	Moon 1977:184
31	1962	Jul.		4 p.m.	Moon 1977:184
32	1962	Aug.		7 p.m.	Moon 1977:185
33	1964	Aug.		5 p.m.	Moon 1977:185
34	1967	Mid-Jul.		Between 6 and 7 p.m.[2]	Moon 1977:187
35	1967	Late Jul.		Between 2 and 3 p.m.[3]	Moon 1977:187
36	1968	Apr.		12:10 p.m.	Moon 1977:76
37	1968	Jul.	23	5:45 p.m.	Moon 1977:188
38	1968	Sep.	7	6:15 a.m.	Moon 1977:188
39	1969	Aug.	22	10 a.m.	Moon 1977:83
40	1969	Mid-Dec.		4 p.m.	Moon 1977:189
41	1970	Feb.	22	3 p.m.	Moon 1977:190
42	1970	Jun.	14	8:55 p.m.	Moon 1977:191
43	1970	Jun.	23	8:45 p.m.	Moon 1977:191
44	1970	Jun.		6:15 a.m.	Gaal 1986:116
45	1970	Jul.	20	7:15 p.m.	Moon 1977:191
46	1970	Aug.	21	11:30 a.m.	Moon 1977:191

TABLE 1.—Continued.

Item no.	Year	Month	Day	Time	Source
47	1970	Oct.	10	10:15 a.m.	Moon 1977:192
48	1970	Nov.	1	1 p.m.	Moon 1977:192
49	1971	May	5	3 p.m.	Moon 1977:90, 192
50	1971	Aug.	2	6 p.m.	Moon 1977:90
51	1974	Apr.	29	12 p.m.	Anonymous 1974
52	1974	Jun.	9	10:30 a.m.	Gall 1986:38
53	1974	Jul.		8 a.m.	[4]
54	1974	Late Aug.		Shortly after 4 p.m.	Moon 1977:92
55	1976	May	16	9:15 a.m.	Gaal 1986:39
56	1976	Jun.	30	12:30 p.m.	Gaal 1986:116
57	1976	Jul.	2	4:30 p.m.	Gaal 1986:40
58	1976	Jul.	17	1:30 p.m.	Moon 1977:194
59	1976	Jul.	22	9:50 p.m.	Moon 1977:97
60	1976	Aug.	3	Between 1 and 2 p.m.	Moon 1977:94
61	1976	Aug.	23	6 p.m.	Anonymous 1976
62	1976	Sep.	4	10 a.m.	Gall 1986:118
63	1977	May	18	6:15 p.m.	Gall 1986:118
64	1977	Aug.	8	12 p.m.	Gall 1986:43
65	1977	Nov.	5	11 a.m.	Gall 1986:43
66	1979	Aug.	5	4:30 p.m.	Gall 1986:45
67	1981	Jun.	12	6 a.m.	Anonymous 1981
68	1983	Jun.	23 or 27	2:45 p.m.	Gaal 1986:102
69	1983	Sep.	5	5 p.m.	Gaal 1986:102
70	1984	Jan.	28	2 p.m.	Gaal 1986:120
71	1984	Mar.	2	10:45 a.m.	Gaal 1986:103
72	1985	Jun.	28	6 a.m.	Anonymous 1985
73	1989	Jul.	30	3:55 p.m.	Kirk 1989:75–76
74	1989	Aug.	1	3:15 p.m.	Kirk 1989:77
75	1989	Aug.	26	10:45 a.m.	Kirk 1989:77–78
76	1989	Aug.	26	11:15 a.m.	Kirk 1989:78
77	1989	Aug.	29	3:45 p.m.	Kirk 1989:79
78	1990	Jul.	17	10:30 a.m.	Kirk 1990:87
79	1990	Jul.	17	11:30 a.m.	Kirk 1990:87
80	1990	Jul.	17	8:30 p.m.	Anonymous 1990a
81	1990	Aug.	5	2:15 p.m.	Kirk 1990:85
82	1990	Aug.		1:30 p.m.	Anonymous 1990b

[1] Regarded as 1 p.m.
[2] Regarded as 6 p.m.
[3] Regarded as 2 p.m.
[4] Gary S. Mangiacopra, personal communication, 1992.

DISCUSSION

If the observed patterns of sighting time distributions are more probably a result of behavioral characteristics associated with the animals themselves, this represents strong supportive evidence for their existence. This also raises the possibility that the animals reported in Okanagan Lake and Loch Ness

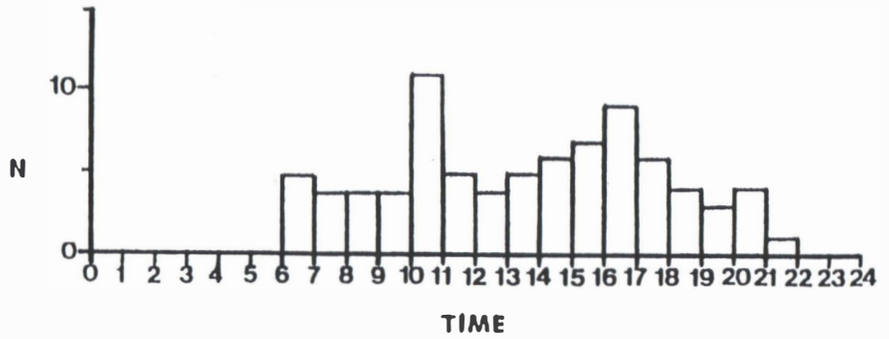

FIG. 1.—Sighting time distribution of large, unknown aquatic animals reported in Okanagan Lake, Canada.

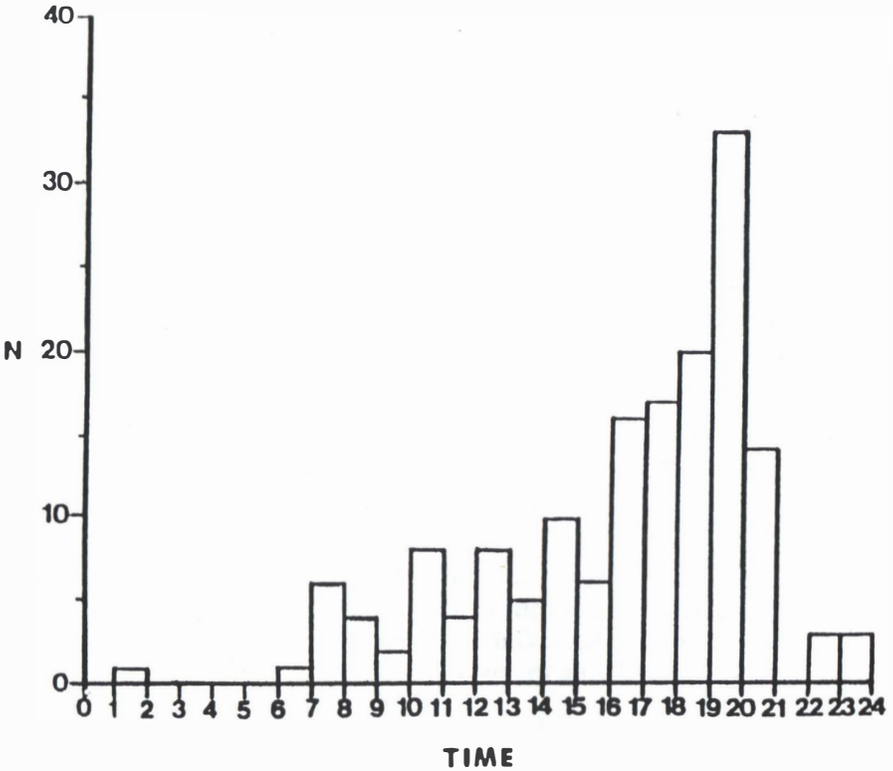

FIG. 2.—Sighting time distribution of large, unknown aquatic animals reported in Lake Champlain, U.S.A.

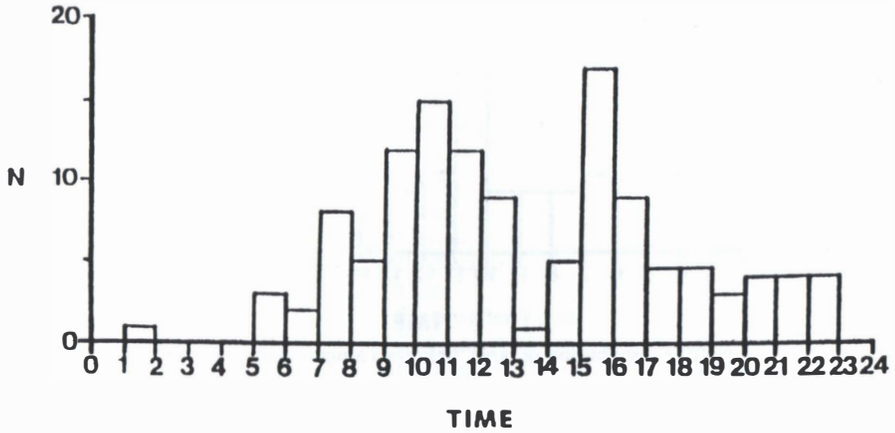

FIG. 3.—Sighting time distribution of large, unknown aquatic animals reported in Loch Ness, Scotland.

are different species from the animals reported in Lake Champlain. However, this does not necessarily mean that the animals reported in Okanagan Lake and Loch Ness are the same species, although the possibility is enhanced by these findings. It would be interesting to determine if there are corresponding similarities and differences in other behavioral and morphological characteristics of the animals reported in Lake Champlain, Loch Ness, and Okanagan Lake.

As already proposed (Kojo 1991), the animals in Lake Champlain are probably nocturnal. In terms of the contrasting patterns of sighting time distribution, it is proposed that the animals in Okanagan Lake and Loch Ness are not nocturnal. Those investigators wanting to undertake fieldwork at Okanagan Lake and Loch Ness should take into account the fact that the probability of sightings is highest in mid-morning and mid-afternoon, and lowest around noon.

Sighting time data are unavailable not only in most "lake monster" reports, but also in many reports of other cryptids. Sighting time data are, however, very important. If it can be demonstrated that the distributional patterns of sighting times result from behavioral characteristics of the animals themselves, then this represents strong evidence for the existence of such animals.

The author wishes to thank Gary S. Mangiacopra and James Spoonamore for their help in completing this work.

REFERENCES CITED

Anonymous
1974 *Summerland Review* (May 2).
1976 *Kelowna Courier* (August 26).

1981 *The Province* (June 14).
1985 *The Province* (July 3).
1990a *The Vancouver Sun* (July 25).
1990b *The Vancouver Sun* (August 14).
Gaal, Arlene
1986 *Ogopogo: The True Story of the Okanagan Lake Million Dollar Monster.* Surrey, British Columbia: Hancock House.
Kirk, John
1989 BCSCC Report on Okanagan Lake, 1989. *Cryptozoology,* Vol. 8: 75–9.
1990 BCSCC Report on Okanagan Lake, 1990. *Cryptozoology,* Vol. 9: 85–7.
Kojo, Yasushi
1991 Some Ecological Notes on Reported Large, Unknown Animals in Lake Champlain. *Cryptozoology,* Vol. 19: 42–54.
Mackal, Roy P.
1976 *The Monsters of Loch Ness.* Chicago: Swallow Press.
Moon, Mary
1977 *Ogopogo.* Vancouver: J. J. Douglas.

Field Reports

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

Cryptozoology, 11, 1992, 90–97

AN INVESTIGATION OF THE DUENDE AND SISIMITE OF BELIZE: HOMINOIDS OR MYTH?

MARK SANBORNE
29 Locust Road, Northport, New York 11768, U.S.A.

INTRODUCTION

In his classic compendium, *Abominable Snowmen: Legend Come to Life* (1961, Chilton, Philadelphia), the late Ivan T. Sanderson provided one of the few detailed accounts of the Duende of Belize (formerly British Honduras), in Central America. Referring to the Duende—Spanish for dwarf or goblin—by the anglicized form Dwendi, Sanderson described them as hairy hominoids between 3.5 and 4.5 feet (1–1.4 m) in height that allegedly inhabited the montane tropical forests of southern Belize. He also compiled reports of the Sisimite (there are various alternative spellings, all apparently derived from the Nahuatl term *tzitzimitl*), a hairy, Sasquatch-like giant from neighboring Guatemala. I subsequently discovered that the Sisimite was equally well-known in Belize.

Ever since reading Sanderson's book in the 1970's, I had viewed Belize as an intriguing and relatively accessible place to conduct cryptozoological fieldwork. My intentions were later solidified by reading Alan Rabinowitz's book *Jaguar: Struggle and Triumph in the Jungles of Belize* (1986, Arbor House, New York). In this account of his pioneering field study of jaguars in Belize's Cockscomb Basin, the zoologist author refers to the locals' widespread belief in the Duende and Sisimite, and even cites a personal encounter, brief and enigmatic, with what he says "looked like a little man, about three feet tall" standing at the edge of the nighttime forest. I finally arrived in

Belize in January, 1992, and spent the next three months traveling alone throughout the country on foot and by bus, often camping out in isolated locations (Fig. 1).

NARRATIVE DESCRIPTION

Just as important as my interviews with local informants was the fact that being in Belize afforded me the opportunity to study published materials available nowhere else. I was promptly shocked to discover that the Duende "myth" was so prevalent that the creature is actually depicted on a Belizean postage stamp as part of a series on folklore. There was also a wealth of information in *Characters and Caricatures in Belizean Folklore* (1991, Belize UNESCO Commission) on both the Duende and Sisimite.

Tata Duende—*tata* being a Mayan word for "old man" or "grandfather"—is most commonly depicted as a wizened, hairy little man with pointy heels, sometimes bearing a machete or stick, often clad in skins or rags, and always wearing a big hat (Fig. 2). (Sanderson ignored, or was unaware of, the accounts of clothing and implements. And he ingeniously explained the big hat by citing a chimpanzee he once saw in Africa holding a dead palm frond over its head like a Mexican *sombrero*!) The Duende is viewed as a trickster and a troublemaker, though generally not a malign one, and he sometimes rescues people lost within the forest. He is often credited with a facility for language, music-making or even mesmerizing powers.

The Sisimite (Fig. 3) is "best described as a large, hairy gorilla with a head much like a human." He cannot speak, and is a rather malevolent primate (unlike Sasquatch but similar to the mythical African gorilla of old) who will kill humans of the same sex and abduct and rape those of the opposite sex. He has four fingers and no thumbs, and sometimes his feet are said to point backwards, two anatomical oddities that are also attributed to the Duende in some parts of Belize. Both creatures are believed to live in caves deep in the "high bush"—the Belizean term for virgin montane tropical forest—although the Duende is sometimes "seen" in pastures and other more cultivated settings.

I also conducted valuable bibliographic research at the National Archives in Belmopan, Belize's tiny inland capital. The most interesting article I found was by anthropologist Michael Howard (1974, Kekchi Religious Beliefs and Lore Regarding the Jungle, *National Studies*, Vol. 3[2]: 34–49). Howard notes that the Kekchi Maya of southern Belize's Toledo District recognize three main classes of forest denizens. First are the major deities, led by *tzultacah*, a sky/earth, water/forest god. Next is a class of lesser, local spirits and personified beings (the Duende would probably fall under this heading, though the article does not mention it). Finally there are "various animals which are often considered to be in a close relationship with *tzultacah*, such as the *sissimito* [sic] and other more average animals like the mountain cow

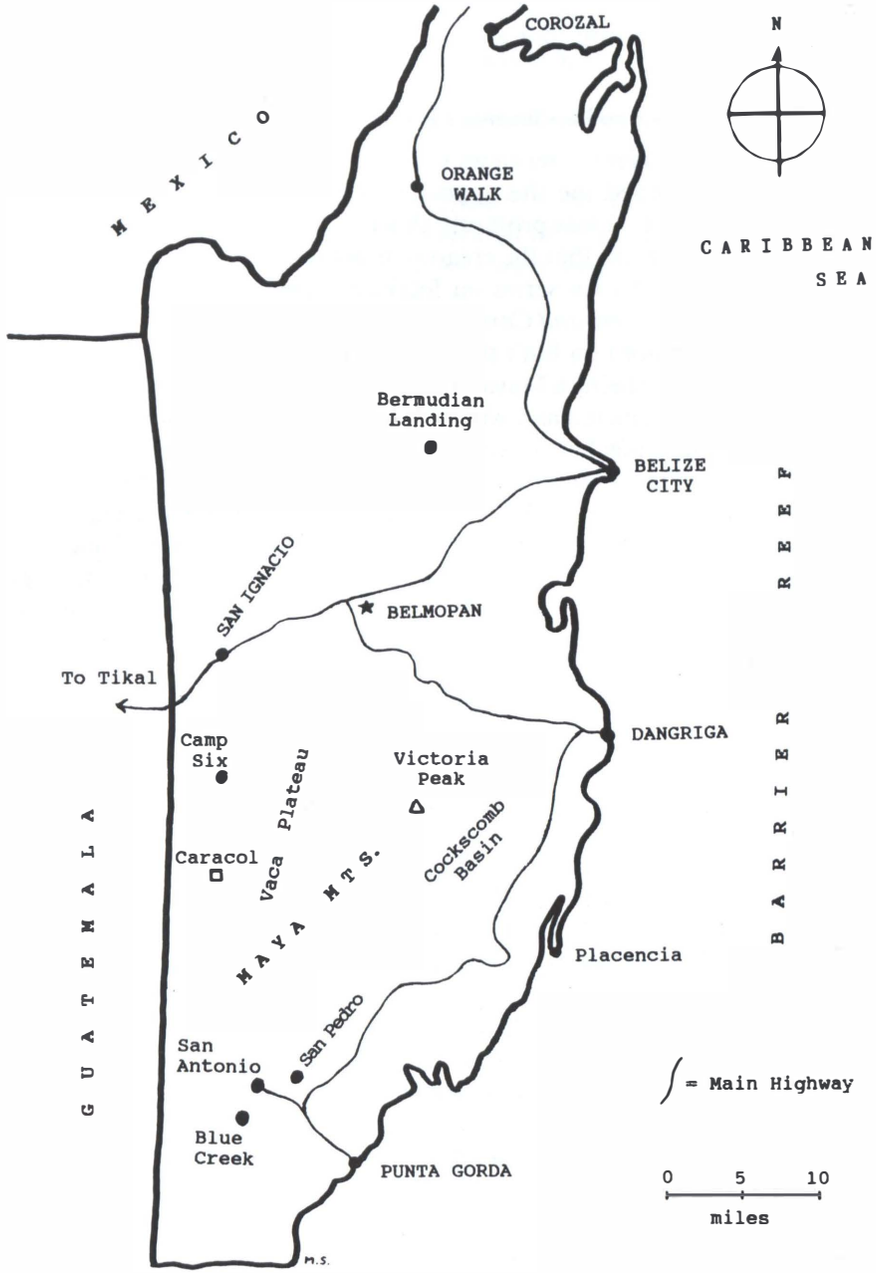

FIG. 1.—Generalized map of Belize (formerly British Honduras), showing major towns, smaller villages, and geographic sites visited by the author while gathering information on the Duende and Sisimite.

FIG. 2.—Popular depiction of the Tata Duende. Note hat, club, and backwards-pointing feet.

FIG. 3.—Popular depiction of the Sisimite. Often said to be like a large, hairy gorilla, it generally resembles reports of the American/Canadian Sasquatch (Bigfoot).

[tapir] and tiger [jaguar]." Thus, the Sisimite is clearly viewed as a rare animal, not a supernatural being.

The Kekchi see these special animals as indicator species present only in the healthy, undisturbed ecosystem of the "high bush." As this primary forest is felled, such animals retreat. Howard quotes one informant as saying: "Since the road has been opened and more people have come, *tzultacah* has taken his animals further into the bush, especially the *sissimito* and tiger." (The article also mentions a Kekchi description of the Sisimite as having "their big toes turned backwards," a possible explanation of the backwards-feet myth.)

What follows are the highlights of my conversations with various Belizeans, related in the order in which the interviews were conducted. First was a mestizo woman at the offices of the Belize Audubon Society, who said the Duende was a sort of spook in the form of a small, non-hairy man or boy with a hat. She said her brother claimed to have seen one once as a child.

Colin Young, a 14-year-old Creole boy at the Community Baboon (howler monkey) Sanctuary in Bermudian Landing, told me he personally did not believe in the Duende. But he related two interesting details from stories he had heard: that the Duende was covered with hair "like a sloth," and that it was so strong that a man who once tried to lasso a Duende was yanked off his horse by the creature.

FIG. 4.—The view from the ridgeline over the Cockscomb Basin, with Victoria Peak visible in the distance.

Chulin, a 62-year-old Mayan ex-*chiclero* (collector of *chicle* sap for chewing gum) from San Jose Succotz, near San Ignacio, laughingly told me he could not "remember" anything about the Duende or Sisimite. I attributed his reticence to one of two factors: either his lifetime of hunting and bush-whacking had convinced him that such creatures did not exist, or his evangelical Christian beliefs caused him to regard them as pagan demons.

Chulin served as my guide during my four-day trek to the ancient Mayan city of Caracol, located deep in the forest of the remote Vaca plateau. We spent one night at Camp Six, where we were hosted by another ex-*chiclero* and hermit, Antonio. A Jehovah's Witness, Antonio described Duendes as "demons."

I next spent several weeks at the Cockscomb Basin Wildlife Sanctuary and jaguar reserve founded by Rabinowitz, from where I staged a four-day hike to climb Victoria Peak, officially Belize's highest mountain (Fig. 4). My Mayan guide on that trip, Antolino Pop, said he had never seen a Duende or Sisimite, and was not sure if they still existed, although he recalled stories about them from his youth in San Antonio, the Toledo District's main Mayan community. On my last night in Cockscomb, one of the reserve's night watchmen, Galbino Pau, regaled with his own tales from San Antonio. He said his uncle had once been briefly abducted and left in a trance by a Duende

while hunting. He also recalled being frightened by the howls of the Sisimite while climbing in the hills outside the town; and he told of an American Sisimite-hunter who had been rescued from the creatures by a British army helicopter!

For the last phase of my trip, I traveled south to Toledo, the source of many stories. Leonardo Acal, a health worker and Kekchi shaman in San Pedro Colombia, told me that the Duende was a form-changing, supernatural being, a spirit of the dark representing the power of the land who could be summoned by a Mayan shaman using the proper prayers and incense. He said the Sisimite was "like Bigfoot." It was "not a simple animal," but a powerful ancestor of the Maya, a cave-dweller of the high bush whose appearance represented a harbinger to modern man.

In San Antonio, I spent a night at the only hotel in the area. Without initially mentioning anything about the Sisimite, I told the proprietor, a somewhat cosmopolitan Mayan gentleman named Mr. Bol, of my plans to camp out in the hills outside of town. He immediately warned me to beware of "the gorillas," and pulled out a Spanish-language comic book starring a Tarzan-like hero, which included realistic-looking portrayals of fierce, giant anthropoid apes. "That's what they look like," Mr. Bol said. He added that a local hunter had recently seen a huge footprint in the smooth earth of a *wee-wee* (leafcutter) ant nest up in the hills. He then repeated the tale about the American Sisimite-hunter, but in his version the hapless American had vanished and his bones were found years later.

The next day, and with some difficulty, I penetrated a good distance into the hills south of San Antonio, camping out that night on one of them. Needless to say, I was not accosted by any angry Sisimites.

My last stop was in Blue Creek, a tiny village southwest of San Antonio. I slept on a rock in a river outside Blue Creek cavern, a large cave alleged to be a Sisimite lair (unlikely, as it is visited fairly regularly by tourists). But Sylvano Sho, the site's Mayan caretaker and an expert in local natural history, related a fascinating anecdote. He said that only a few weeks before, a local man claimed to have seen a Sisimite in the forest along the Moho River. Sylvano and some of his friends had then launched a search for the creature, but without success. They then questioned the witness more closely, and he said the thing he had seen was between 4 and 5 feet (1.2–1.5 m) in height. So, "it was probably just a Duende," Sylvano explained.

I asked him if he had ever seen a Duende. Yes, he said, once under the bridge in Blue Creek village. He described it as hairy, and an animal rather than a spirit. But he went on to say that it was wearing something like a big black Mexican *mariachi* hat that appeared to be made of spun gold. When asked how an animal could be wearing a hat, Sylvano merely shrugged.

Results

The Duende seems to possess too many of the classic fairy-type traits to be any kind of valid candidate for cryptozoology, Sanderson notwithstanding. Assuming it is a purely mythical construct, its origins are unclear. It is also known in Guatemala and southern Mexico, so it may represent a melding of the classic Spanish *duende* (a troublesome household spirit) with Indian trickster/forest guardian beliefs. In Belize—a former British colony—the stories may have become further mixed with the fairy-faith of the British Isles, as well as tales by imported African slaves.

The Sisimite, on the other hand, seems to share many characteristics with the North American Sasquatch (leaving aside for the moment its supposedly aggressive nature, four fingers, and backwards feet). If one posits that Sasquatch is a surviving descendant of *Gigantopithecus*, it is quite possible that a relict population also survives in Central America. It is also possible, of course, that the Sisimite—and perhaps even the Sasquatch—are as "unreal" as the Duende appears to be.

There is also the "ape" question (Marc E. Miller and Khryztian E. Miller, 1991, Further Investigation into Loys's "Ape" in Venezuela, *Cryptozoology*, Vol. 10: 66–71.) If an unknown bipedal primate—also known as the *mono grande* ("big monkey")—indeed survives in South America, could it also exist north of the isthmus? If so, could it have contributed to the tales of either the Duende or Sisimite?

Whatever the case, my back-country trekking in Belize—a country the size of El Salvador but with a population of less than 200,000—left me convinced that it could be home to any number of undiscovered species.

Future Plans

Eventually, I would like to return to Belize and conduct more extensive fieldwork in the Maya Mountains, which take up nearly one third of the country, but which remain virtually uninhabited and unexplored. First, however, I plan to follow up on recent investigations into similar hairy hominoids in Indonesia (Deborah Martyr, 1990, An Investigation of the *orang-pendek*, the "Short Man" of Sumatra, *Cryptozoology*, Vol. 9: 57–65). The *orang-pendek*, at least, seems to be much more grounded in reality than the Duende.

Cryptozoology, 11, 1992, 98–101

AN UNMANNED MOTION-SENSITIVE AUTOMATIC INFRARED CAMERA TESTED IN A PACIFIC NORTHWEST QUEST FOR POSSIBLE LARGE PRIMATES

CHARLES W. WYCKOFF, DUANE MARSHALL, ROBERT H. RINES, JUSTICE C. RINES, AND PATRICK BROGAN
Academy of Applied Science, 2 White Street, Concord, New Hampshire 03301, U.S.A.

INTRODUCTION

While probably best known for its interest in the unidentified aquatic life in Loch Ness, Scotland (Robert H. Rines, 1982, Summarizing a Decade of Underwater Studies at Loch Ness, *Cryptozoology,* Vol. 1: 24–32; Robert H. Rines, Harold E. Edgerton and Robert Needleman, 1984, Activities of the Academy of Applied Science Related to Investigations at Loch Ness, 1984, *Cryptozoology,* Vol. 3: 71–73; Harold E. Edgerton, Charles Wyckoff, Robert H. Rines, Robert Needleman and Justice C. Rines, 1989, AAS Underwater Elapsed Time Camera Silhouette Photography Experiments at Loch Ness, 1989, *Cryptozoology,* Vol. 8: 58–63), the Academy of Applied Science has, since the mid-1970's, also collaborated with Peter C. Byrne, of Mount Hood, Oregon, in his investigations of Sasquatch (Bigfoot) in the Pacific Northwest (Peter Byrne, 1975, *The Search for Bigfoot: Monster, Myth or Man?,* Acropolis Books, Washington, D.C.). More recently, the Academy has again assisted, in 1991, in modifying and applying triggerable, automatic camera innovations developed for its Loch Ness research to the problems of the surreptitious, unmanned monitoring of forest and other areas where such reported large, unknown primates may frequent, as discussed also by other interested parties (James A. Hewkin, 1991. Sasquatch Investigations in the Pacific Northwest, 1991, *Cryptozoology,* Vol. 10: 76–78).

Such automatic movement-triggering cameras (and video versions) have other applications apart from these interests in the Pacific Northwest, including the Academy's recent cooperative effort with Peter Byrne in elephant tracking in Nepal (Peter Byrne, 1990, *Tula Hatti: The Last Great Elephant,* Faber and Faber, Boston and London).

Following development of the unmanned, automatic, motion-sensing 35mm camera, and laboratory testing by Charles Wyckoff and Duane Marshall in Needham, Massachusetts, the cameras were put to their first field use in the snow-ladened forests of Oregon, under Byrne's direction, during the period March 10–16, 1991. The team consisted of Robert H. Rines, Carol M. Rines, Justice C. Rines, and Patrick Brogan.

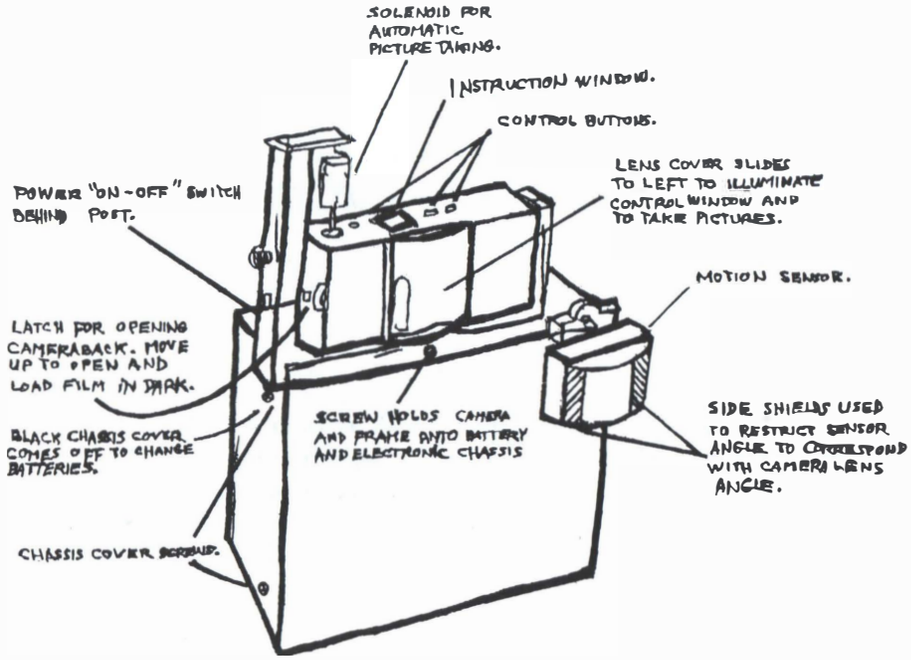

FIG. 1.—Isometric view of motion-sensitive, infrared camera viewed from the front. Batteries and circuitry are inside box. Motion detector has side shields (black tape) to restrict the detection angle to correspond to lens angle. Lens cover must be slid to left to operate camera. Solenoid is weather-protected with plastic. The camera is a 35mm Olympus Infinity Twin.

NARRATIVE DESCRIPTION

The objective of the March, 1991, fieldwork, later carried into the fall and early 1992, was to position the cameras in areas where suspicious tracks in mud and snow had been recently observed and reported. The camera was designed to be unmanned and undetectable to intruders, but to be automatically triggered by their movement into the camera vicinity. In addition to motion detection, the camera was to have the capability of multiple, unobservable infrared flashes while taking a series of successive corresponding photographs, and then periodically checking before continuing with additional series of successive exposures; this would ensure the continued presence of the intruder, thus avoiding dissipating all the film even though the intruder may have left the vicinity.

A further practical requirement for the replicative construction by researchers was the use of readily available cameras and components, and at relatively low cost. We selected the Olympus Infinity Twin as the basic 35mm camera because of its capability, in automatic mode, of taking three suc-

A B C

FIG. 2.—Calibration photos taken by motion-sensitive, infrared camera. A. Scene of possible intrusion. B. Pseudo-intruders Justice Rines and Patrick Brogan during automatic activation of camera. C. Same.

cessive pictures (about 1 second apart) with automatic flash, and film advancement upon a single depression of the trigger button, and then stopping.

For a motion detector, we used a conventional Sears home outdoor floodlight infrared motion detector, the circuit of which was modified so that the detector output, instead of causing the switching on of a floodlight, as intended, was signal-processed to trigger a solenoid, the armature of which was rigidly mounted by a vertical arm at the top trigger button side of the camera, directly on top of the button (Fig. 1).

Thus, upon the motion detector indicating an intrusion in front of the camera by its infrared (invisible) sensing, the camera trigger button would be depressed by the actuation of the solenoid armature, putting into operation the automatic successive three-picture exposures of the camera. Since the usual camera flash lamp has a substantial infrared light content, the covering of the flash lamp window with a strip of infrared filter made the flashing operation invisible; only the three "clicks" of the automatic picture-taking gave any clue to the camera's presence, and this was imperceptible, at least to humans, beyond a few feet in front of the camera.

The circuit was designed to de-energize the solenoid after 3 seconds (i.e., at the end of the automatic three-picture series). If, at such time, there was no further movement in front of the camera, there would be no further operation of the system; but if further movement occurred, the cycle would be repeated for three more shots; and so on.

RESULTS

The first experiments in the snow-covered forests of the Hood River region were conducted overnight at remote sites selected by Peter Byrne from his earlier fieldwork.

With the sensitivity of the motion detector adjusted to discriminate movement of leaves in the trees from larger moving bodies in front of the camera, calibration was accomplished by using human pseudo-intruders. Figs. 2A, 2B, and 2C are calibration photos taken by the camera at successive one-second intervals, using infrared film, at one of the forest sites. Fig. 2A shows the scene of possible intrusion, and Figs. 2B and 2C the triggering by pseudo-intruders Justice Rines and Patrick Brogan as they were automatically "caught" in traversing the area.

No cryptic intruding objects were photographed overnight in the initial field tests, or in the ensuing months.

FUTURE PLANS

While the kind of cryptic intruders hoped for did not appear despite interesting tracks in the snow, these cameras are now part of the continuing research project inventory.

Cryptozoology, 11, 1992, 102–108

CHAMP QUEST AT LAKE CHAMPLAIN, 1991–1992

RICHARD A. DEUEL AND DENNIS J. HALL
P.O. Box 261, Vergennes, Vermont 05491, U.S.A.

INTRODUCTION

This report describes our investigations of Champ—the Lake Champlain Monster—resulting from the formation of a new organization called Champ Quest.

The Lake Champlain Phenomena Investigation (LCPI), headed by Joseph W. Zarzynski, has led the search for Champ evidence since 1974, conducting extensive camera and sonar surveillance of the lake. LCPI began publishing annual field reports in *Cryptozoology* in 1982; its last field report was for 1990 (Joseph W. Zarzynski, 1990, LCPI Work at Lake Champlain, 1990, *Cryptozoology*, Vol. 9: 79–81).[1] With conclusive evidence still lacking, we hope that Champ Quest, through joint cooperative efforts, will ultimately be able to attain the proof needed to identify the animals involved.

NARRATIVE DESCRIPTION

Champ Quest fieldwork so far has primarily consisted of lake surface surveillance from shore. We established a permanent residence near the lake, and have conducted our investigations on a time-available basis. Deuel undertook about 270 hours shore-watching in 1992, concentrating on Bulwagga Bay, Crown Point, Button Bay, and Basin Harbor. Hall also conducted several hundred hours of shore-watching during 1992, mainly at Kent's Bay and Button Bay.

Yasushi Kojo, from the University of Arizona, in Tucson, also conducted surveillance in 1992. He operated at Malletts Bay during September 14–23, mainly observing from late afternoon until midnight. No sightings were reported.

Also conducting fieldwork in 1992 was Gary Burton, from Rhode Island, who used a Furuno FCV-661 sonar unit with a 50 kHz transducer having a range of 0–1,152 feet (0–350 m). Burton operated a four-person raft in The Narrows during the period August 6–21. He reported five anomalous sonar contacts (see below).

[1] Joseph Zarzynski has recently been heavily involved in an underwater archaeology project in Lake George—south of Lake Champlain—so LCPI fieldwork and the annual field reports have been put on hold temporarily.—Editor.

RESULTS

We have obtained five Champ sighting reports—one of them a land sighting report—for 1991, and 30 sighting reports for 1992. These are presented below in chronological order. In addition, we present details on a possible 1992 land crossover spot, and the five 1992 anomalous sonar contacts reported by Gary Burton. One of the 1991 sightings and six of the 1992 sightings were made by the authors.

The five 1991 sighting reports uncovered to date are listed below:

1) About March 23, 1991; 9:30–9:45 p.m.; out of Orville's Marsh into Otter Creek. Todd Huestis was riding his ATV along a toe path when his headlight lit up what appeared to be a black animal crossing the path. It made enough noise as it crashed through the marsh woods that he could hear it over the sound of his engine. It was off the ground as high as his chest, and had about 15 feet (4.5 m) of tail, which he might have ridden over. It was slow-moving on land, but when it reached the water, it quickly disappeared. He returned the next morning, and found a V indentation in the mud. He also reportedly found push-back prints, each with two "toe" marks.

2) About June 23, 1991; early evening; from Button Bay to Kent's Bay. One of us (Hall), observed a "neck on the surface" at the south end of the bay. As it headed south, Hall drove south in excess of 75 m.p.h. (120 k.p.h.) and caught a glimpse of it from Arnold's Bay. Continuing south, he observed it in Kent's Bay, between Mud Island and the shore. "Champ was in 4 feet (1.2 m) of water, thrashing its long neck back and forth against the surface," he reported. "Then its entire body was rolling and thrashing in the shallows." Right after it disappeared, a boat rapidly approached the area, circled once, and left.

3) September 20, 1991; 11:00 a.m.; Crown Point Bridge. Rosemarie Capuano and Louise Wheelock, while driving over the bridge, observed an animal northeast of the bridge. The head resembled that of a horse, 1.5–2 feet (45–60 cm) long. There were three bumps ("scallops"), each 5 inches (13 cm) wide, down its neck, which was 3.5–4 feet (1–1.2 m) long. Its back angled down into the water 2 feet (60 cm). It was dark, blackish-gray in color.

4) October, 1991; late afternoon; The Narrows; calm; overcast. Paul Keller and a guest. They observed an animal 1,000–2,000 feet (ca 300–600 m) from Basin Harbor Dock heading northeast. They described it as "something the size of a horse's head leaving a good size wake." It headed in a straight line, stopped in mid-lake, turned south, then went north and was lost beyond point."

5) Fall of 1991; about 11:00 a.m., and later at 1:00 p.m.; Crown Point Bridge and Bulwagga Bay. We were informed by Loretta, who runs Al's Deli

Mart in Crown Point, that her son and a friend had sighted Champ off of the bridge, and had described it "as big as a whale." She called Mike Kimball, who owns The Bridge Restaurant, and he went out and reportedly took photos of the animal's back. We have seen one of his photos, and all it shows is a long line of disturbed water in the distance, off of the Crown Point Historic Site. Loretta also stated that, 2.5 hours later, others in Port Henry believed they had seen two Champ animals in Bulwagga Bay.

The 30 1992 Champ sighting reports uncovered to date are listed below.

1) May 12, 1992; 10:00–10:10 p.m.; calm; bright moon. One of us (Deuel) observed through binoculars a bluish-white column of light to the southwest, and over 0.5 miles (800 m) away. It appeared as if something was reflecting the moonlight. It slowly followed the New York shoreline for 20–30 minutes. Sometimes it appeared as a bright flash, other times as a pinpoint of light, and sometimes all that could be discerned was that "something" was there. Possible moonlight reflecting off of Champ's eyes. Possibly a boat.

2) May 31, 1992; 5:57 p.m.; Bulwagga Bay; mirror calm; cloudy. Don and Rose Waters and Bernie and Barbara Austin were having coffee outside the Waters' camp at Moriah Town Beach when, for 5 minutes, they observed an animal about 400–500 feet (121–152 m) from shore, moving south into the bay. They observed two humps, described as "black" and "the color of a whale," which submerged and reappeared three or four times. Something under the surface was making a wake a few feet ahead of the humps. After the humps submerged for the last time, the wake could still be seen. A boat had passed in front of the camp just prior to the sighting, but the witnesses were sure that that wake had already dissipated. Don Waters took one inconclusive photo of the animal's wake. About 20–25 minutes after the sighting, he spotted a similar wake, through his binoculars, leaving the bay.

3) June 1, 1992; about 5:00 p.m.; Bulwagga Bay; calm. While motoring south on Route 9N, just south of the Pines Restaurant, in an area called the Rock Cuts, one of us (Hall) observed an animal for 3.5 seconds, 600 feet (182 m) away. A dark green "neck" was seen lying on the surface for 2 seconds; it then went straight up, and then back down. He observed the animal again 4 minutes later out near the buoys. The "neck" had a "tiny taper on the end." A boat appeared in the area, and seemed to be looking around for something.

4) June 3, 1992; evening; Button Bay. Over a one-hour period, one of us (Hall) glimpsed an animal through his binoculars sticking its neck up and down four times. It was about 0.5 miles (800 m) away, between Button Island and the northwest point of the bay. Six feet (1.8 m) of neck suddenly appeared, moved north at a tremendous speed, and disappeared around the point.

5) June 19, 1992; between 11:30 a.m. and 1:00 p.m.; Northwest Bay. The witnesses were Daniel Curtin and Linda Sabella. While sitting in the lounge of the Westport Yacht Club, Daniel noticed two distinct "wave forms" in the bay, described as "rolling walls of water," each 10 feet (3 m) long, and 1¾ feet (53 cm) high.

6) June 21, 1992; about 5:30 p.m.; between Gull Island and Light House Point, north of Isle La Motte. While perch fishing, Lawrence Gamelin observed an animal for 10 minutes about 400 feet (121 m) from the boat. He described it as "a large, dark hump about 5 feet (1.5 m) long, and 18 inches (45 cm) high." About 5 minutes later, he observed a "long round part which appeared to be attached to the hump." The animal submerged when he started the boat motor.

7) About June 26, 1992; 4:30–5:00 p.m.; Northwest Bay; perfectly flat; humid, gray. For 5 minutes, from inside the Westport Yacht Club, Amy Guglielmo and a coworker observed an animal about 200–400 feet (60–121 m) from shore, which slowly drifted 50 feet (15 m) to the southeast. They moved out onto the deck, and observed two very dark, greenish-black, round-shaped humps. After a few minutes, the humps submerged.

8) End of June, 1992; 9:49 a.m.; Button Bay; rough. While some friends were swimming at Button Bay State Park, Todd Remick observed a black, diamond-shaped head surface and submerge near Button Island.

9) Late June, 1992; 5:30–6:00 p.m.; Crown Point Bridge; still. From the end of Port Henry Pier, Yvonne and Andy Mendez observed an animal on the right end of the bridge, close to land, moving slowly towards Bulwagga Bay.

10) Early July, 1992; early evening; Arnold's Bay; overcast; light rain. Jo Pasby and grandchildren, Erin and Mark Irving, observed an object from shore. It "looked like a dolphin (size more like a whale)"; "rolled over twice like a dolphin moving along"; "upturned boat."

11) July 4, 1992; evening; Button Bay; calm. While conducting lake surveillance, one of us (Hall) observed a dark wake between Button Island and shore, moving south. A dark object appeared on the surface in an undulating fashion, appearing and disappearing. A boat passed in its path, but it still kept its form. It moved south into the bay, and was in and out of sight for 3 minutes before disappearing. Ten photos were taken with a 35mm camera of what appear to be two objects, one following the other.

12) July 7, 1992; 3:30 p.m.; Bulwagga Bay. While motoring along Route 9N, an anonymous witness observed an animal through rock cuts 0.5 miles (800 m) out in the bay. The animal had a dark green head, a neck, and two humps 8 feet (2.4 m) behind.

13) July 9, 1992; 3:15–3:20 p.m.; Bulwagga Bay; calm. While motoring north on Route 9N, Frank Soriano had his wife pull over so he could videotape the lake. While parked just south of the Pines Restaurant, he

began narrating that maybe he would be lucky enough to videotape Champ. While zoomed in on a seagull, he observed an animal with his unaided eye to the north, about 0.75–1 miles (1,200–1,600 m) away, moving southwest. It was described as: "a large tree stump, larger on the bottom, round on top"; "like a snail's head without antennae"; "black with shades lighter than black, maybe seaweed green?"; "moved like a periscope thorough the water." Twice he watched the animal slowly bend over and come back up. He panned in the direction of the animal, which he could not see through the camera's viewfinder, but he did capture it on videotape. The tape shows the animal popping up and down very quickly, moving through the water, and diving forward. After examining the tape, we believe that Soriano filmed a loon.

14) July 11, 1992; 4:45 p.m.; Willsboro Bay; 0.5 miles (800 m) north of Indian Bay Marina; rough. While trolling for salmon, Richard LaValley and a friend noticed an object west of the boat, moving parallel and in the same direction. "All you'd keep seeing was these black spots coming up at the surface," LaValley stated. They observed the object for 3 minutes before taking three photos. After examining the photos, we believe he photographed a wave.

15) July 6 or 7, 1992; Kimball Dock. Young Sam Pettibon observed an animal that stuck out of the water 3–4 feet (91–121 cm). It had three "horns or feelers" on its head. The head turned and then submerged.

16) July 15, 1992; 3:00–4:00 p.m.; off Basin Harbor Club; calm; nice and sunny. Two anonymous French-Canadian couples who were sitting on the deck outside the main dining room informed a passing employee that they had just seen "a whale" out in the lake. They were not familiar with Champ, and when it was suggested to them that that is what they had seen, they laughed and were adamant that what they had seen was a whale.

17) July 15, 1992; 7:30 a.m.; off point leading into the bay of Essex Marina; perfectly calm; crystal clear. While driving north on Route 22, one of us (Hall) observed an object 600 feet (182 m) away, heading south to northwest into the bay. Description: "A perfect arch sprung out of the water for a full second"; "you could see right through the bottom. Its muscles quivered, and then it snapped down and slightly forward. Dark green with a sheen."

18) July 19, 1992; 7:30–7:45 p.m.; just north of Button Bay; calm. While at the rocky point at the northwest end of the bay, Justine Anderson, Patrick Dean, and 8 other people observed two humps which headed north, and sent a wave into shore.

19) Mid-July 1992; Bulwagga Bay; rough, 2–3 foot (60–90 cm) waves. Yvonne and Andy Mendez, while off of Port Henry pier, observed an object on the left side of the pier. It bobbed up and down, similar to a log, and then disappeared. The object was in a black area of calm water, and was 50 feet (152 m) long.

20) July 22, 1992; Bulwagga Bay; 10:00 a.m. Debby Baker, a lifeguard, when arriving for work, observed an animal off Port Henry pier. Description: "A big black thing breaking the water's surface with slight waves."

21) Late July/early August, 1992; Shelburne Bay; 11:00 p.m. Judy Martin heard splashing, and saw what looked like a person's arm sticking out of the water. Co-witness Dennis Jones only remembers hearing a splash.

22) August 1, 1992; about 5:30 p.m.; Appletree Point; calm. Jay Lyons, Larry Salters and several others observed for 3–4 minutes an animal from North Beach. It was heading north at about 0.50–0.75 miles (0.8–1.2 km). It first appeared as a "peculiar wave" until the light hit it at a certain angle. Then three humps were seen following a "misty" area of plowed water. It disappeared past the point.

23) August 7, 1992; 10:00 a.m.; off of Basin Harbor Club. While riding on a bike-path behind the main dining room, Kate Esterline observed a strange wave off the southwest corner of the bay. She observed 5 feet (1.5 m) of an animal's back, which reminded her of a submarine. It headed north.

24) August 8, 1992; 6:00 p.m.; 5 miles (8 km) south of Alburg (north of Isle La Motte). While taking a rug off her clothesline, June Jones observed an object about 55 feet (17 m) off-shore, moving south. Description: "The thing just glided through the water showing the humps going in and out of the water." Spaces could be seen beneath the humps. It resembled "a huge eel" in that it was cylindrical. She screamed for her husband, Theodore Jones, who arrived just in time to see its tail submerge, and a long line of bubbles.

25) September, 1992; Crown Point Bridge. As his wife Eileen drove them heading west over the bridge, a Mr. Contarino observed something sticking out of the water off of Crown Point Museum.

26) Early September, 1992; 4:00 p.m.; Bulwagga Bay. While driving south on Route 9N, Joseph Drake and his wife observed an animal moving along the edge of the bay towards Crown Point Bridge. They pulled off the road by the Pines Restaurant, where other cars were pulled off and the passengers were watching the same thing.

27) September 11, 1992; 6:10 p.m.; Bulwagga Bay; clear. While motoring along Route 9N, Lora Clark observed an animal 300 feet (91 m) away. Description: "Two cars ahead of me stopped. I stopped, looked to my left, and there in the bay was Champ. I saw a long neck, head, and three humps." The neck was over 5 feet (1.5 m) long.

28) Late September 1992; Arnold's Bay; wavy; partly cloudy. Mark Palmer had just finished swimming in the bay when he heard four or five splashes. For 20 seconds, he observed an animal 200 feet (60 m) from shore heading south. It had darkish brown humps with patches, followed by a cylindrical tail which moved in a side-to-side motion, and with a fork at the end which

splashed the water as it moved sideways. The first hump submerged, then the second, then the tail.

29) Fall, 1992; 0.5 miles (800 m) south of Crown Point Bridge. Duane Stevens, while driving along Route 9N, observed a boat-sized wake being made by something under the water.

30) November 8, 1992; 4:30 p.m.; off Kent's Island. One of us (Hall), while conducting surveillance from Button Bay boat access, observed three objects for 12–15 minutes to the south and just west of Kent's Island. Description: "Three objects, like necks, sticking 8 feet (2.4 m) out of the water and moving south. While watching through 10 × 50 binoculars, a fourth neck suddenly stuck straight up out of the water to the left, but alongside the others. Same size in appearance."

The possible Champ land crossing is summarized below: November 10, 1992; 1.2 miles (1.9 km) down Ft. Cassin Road, off of Sand Road. Thomas Phillips, who frequently walks the road, observed a strange "groove" across the road, which he had not seen the day before. Even with the groove, on the north side of road, was a path of matted-down grass, 2–3 feet (60–90 cm) wide and 60 feet (18 m) long, leading out of Porter Bay. On the opposite side of road, the path continued for 9 feet (2.7 m) into Otter Creek. During our inspection of the area a month later, there were still signs where something large had crossed over, with both banks of the road hollowed out in a depressed half-circle.

The five anomalous sonar contacts made by Gary Burton are listed below: 1) August 10, 1992; late morning; off Basin Harbor. Close encounter with a large and fast-moving target. Large, dense soundings at 450 feet (137 m). It was tracked into surface noise. It was very likely moving from the deeper water up to near the surface. 2) August 10, 1992; Palisades; evening. "Two significant targets, the first at 800 feet (243 m), the second at 600 feet (182 m). They were both sharply defined. I lost each of them after 15 seconds or so." 3) August 13, 1992; midday; from camp north of Palisades. "The range was approximately 300 feet (91 m). It was likely a school of fish. There was a fairly strong echo; however, it was not well defined." 4) August 18, 1992; afternoon; off of Diamond Island. Strong trace at a range of 600 feet (182 m). 5) August 19, 1992; mid-morning; south of Palisades, about middle of the narrows. "There was a solid sounding at 900 feet (273 m) which was a sharp, well-defined trace."

Future Plans

We plan to continue our extensive shore surveillance, to collect eyewitness reports, and to educate the public. We would also like to deploy sub-surface sonar-triggered cameras.

Cryptozoology, 11, 1992, 109–112

SASQUATCH INVESTIGATIONS IN THE PACIFIC NORTHWEST, 1992

James A. Hewkin
35237 Aubuckon Drive, St. Helens, Oregon 97051

Introduction

This report updates my previous findings published in this journal concerning evidence of Sasquatch (Bigfoot), a presumed large, unknown primate in North America (James A. Hewkin, 1991, Sasquatch Investigations in the Pacific Northwest, 1991, *Cryptozoology,* Vol. 10: 76–78).

Several short trips were conducted in the Coast Ranges and Cascade Mountains, as well as one 3-day trip to the Blue Mountains of northern Oregon. Three persons were interviewed concerning sightings, none of which were recent observations.

Narrative Description

During March 27–29, Jack Sullivan and I visited the Blue Mountains site where we have periodically uncovered evidence of suspected Sasquatch activity (James A. Hewkin, 1990, Sasquatch Investigations in Pacific Northwest, 1990, *Cryptozoology,* Vol. 9: 82–84). Although no fresh sign was detected, we did locate suspected evidence in five locations: 1) an overturned rock; 2) a log with splinter torn off; 3) a stump with bark torn from one side; 4) a torn up log; and 5) a log rolled over. No visible claw or nail marks were found at any of these sites.

Investigating this area since 1986, when a deer hunter reported finding huge tracks in 4 inches (10 cm) of snow (on October 4, 1986), it has been apparent that the deer and elk population in the area is exceptionally reclusive and difficult to observe, regardless of the season.

On June 29, 1992, field activities were conducted with John Green and Jack Sullivan at the Glen Thomas rock pit in the Oregon Cascades, which I discussed some years ago (James A. Hewkin, 1986, Investigating Sasquatch Evidence in the Pacific Northwest, *Cryptozoology,* 1986, Vol. 5: 27–37). The purpose of the trip was to record measurements of the pit and the rocks. The pit diameter was measured at 7 to 8 feet (ca. 2.1–2.4 m) across the top, and it tapered to 3.5 feet (1 m) across the bottom. The depth was 5 feet (1.5 m). It should be noted that 25 years had elapsed since the pit was excavated, so there has been some natural displacement of rock. Indeed, on a later trip to the site in October, the pit had caved in considerably on one side, causing a wider configuration and shallower depth.

We weighed the rocks on bathroom scales—with some difficulty due to hazardous footing on loose, irregular, slab-shaped rocks. Of the seven rocks

that were weighed, the smallest was 35 lb (ca. 16 kg), and the largest was 240 lb (ca. 109 kg). The rock measurements were as follows:

Rock size and weight at Glen Thomas Rock Pit
(inches and pounds)

No.	Length	Width	Thickness	Weight	Remarks
1	23″	10″	6″	55 lb	Lying around
2	14″	10″	3″	35 lb	immediate perimeter
3	25″	18″	6″	40 lb	of pit
4	17″	14″	5″	70 lb	
5	40″	19″	8″	240 lb	
6	13″	9″	11″	90 lb	Lying 9 feet from pit
7	27″	18″	6″	130 lb	

Because of footing difficulties, it required two men to handle most of the rocks. In reflecting back on Glen Thomas' account, it is evident that great force would have been required to both free those rocks from crevasses and fissures and to lift them out. The strength of the animal involved had to have been phenomenal.

Measurements of a more recently dug pit, about 30 yards (27 m) from the aforementioned pit, indicated a depth of 3 feet (91 cm) and a 3-foot (91-cm) diameter. Of interest is the observation that it was dug after 1973, the year that I first visited the site and noted only a few rocks pulled out. By the visible slight weathering, this pit appears to be 10 to 16 years old.

In regards to Thomas' observations, one might propose quick success by these animals in locating hibernating rodents, and that this behavior has been established over a long period of time. Credence is given to this proposition by information regarding similar pits located in the Gifford Pinchot National Forest, in the state of Washington. I visited this site on July 7, 1992, with Jack Sullivan and Rip Lytle.

Apparently, these pits were discovered many years ago, and the U.S. Forest Service has maintained a trail to the site, which is designated "Indian Pits." Archaeologists who examined the pits believe that they were excavated by early Indians.

The pits are located in a cluster on a steep-sided ridge that pitches steeply into the Washougal River drainage, a tributary of the Columbia River. Silver Star Mountain, at 4,390 feet (1,335 m) elevation, stands immediately to the north of the site. I counted 15 pits, but I suspect many others are in the vicinity because of extensive talus slopes on adjacent ridges. Rough measurements showed pit depths varying between 1 and 4 feet (30 cm–1.2 m), and diameters varying from 3 to 9 feet (91 cm–2.7 m). Natural rock displacement over a long period of time has obliterated the original sizes. These

rocks were not weighed or measured, but visual evaluation is comparable to the Oregon excavations.

An interview with Gary Wielert, of Scappoose, Oregon, provided some interesting information from the Walla Walla area in 1983, when there was a rash of activity (Grove Krantz, 1983, Anatomy and Dermatoglyphics of Three Sasquatch Footprints, *Cryptozoology,* 1983, Vol 2: 53–81). The witness was in an elk camp with four hunting companions discussing the day's hunting experiences when the incident occurred. They were camped at Big Meadows, which is located on a high ridge between the Mill Creek drainage and the Walla Walla North Fork. The hunters noted what was initially thought to be another hunter walking across the meadow toward their camp, but when about 100 yards (ca. 90 m) away, the apparent Sasquatch veered its course back across the meadow.

The animal appeared calm and unconcerned, apparently not recognizing the camp while approaching. Upon reaching the timber, it paused and looked back, then continued into the canyon. It was late in the evening, approaching darkness, and the hunters looked at it through the scopes on their rifles. Not much detail was noted, except that it appeared large, heavy, and dark-colored. There was no investigation or follow-up, and they broke camp the next morning.

An interview with Ernie Fritz, of RidgeField, Washington, on November 28, 1992, revealed a bizarre incident which had occurred several years before. Fritz has a credible background, including a stint as a merchant marine during World War II, followed by U.S. government service in the Vista Program and the Peace Corps.

His observation of a purported Sasquatch occurred during late August, 1978. At that time, he was operating a small cattle ranch located in extreme northwest Montana, a few miles from the border with Idaho and Canada. He had left the cabin before daylight to hike the 5 miles (8 km) to a fishing area, which contained a series of beaver ponds. At about 4 miles (ca. 6.5 km) out and close to his destination, he paused at the edge of a meadow, a spot where he often had had the opportunity to see deer and moose. Suddenly, a buck deer raced into the meadow toward him and stopped. He had the impression that it had seen him. A moment later, a tremendous scream from the forest completely jolted him, and a huge bipedal animal strode rapidly out of the timber on long legs. It resembled a "long-legged gorilla." It grabbed the deer by the antlers, lifting it straight up, apparently breaking its neck, as there was no struggle. He thought it bit the neck, but he saw no teeth. The animal was growling and looking around; it looked in his direction twice, but Fritz had slumped into tall grass and thought he was well hidden. The animal grabbed the deer by the nose area with one hand, tossed it over its shoulder, and walked back into the timber.

He described the animal as completely hair-covered, including the hands

and feet, but less so on the face area. The witness had a camera with him at the time, but was too frightened to even think about taking a photograph.

After the incident, he decided to resume his trip to the fishing spot, but he did not remain there as long as usual, leaving early enough to return home before dark.

Some readers may be very skeptical of this account, but I am of the opinion that it is a credible report. If true, it provides important information revealing the predatory acumen of the Sasquatch. This report is similar to a previous report of a supposed Sasquatch seizing a fawn (James A. Hewkin, 1991, above). Such reports support the authenticity of several accounts of Sasquatch reportedly stealing deer and elk carcasses from hunter camps, etc.

I also conducted an interview with Dee Hayes, who formerly lived in Texas. She recounted an incident that had occurred early one morning, about 5:30 a.m., in October, 1981, while driving to work, and about 1 mile (1.6 km) from her home in the Sam Houston National Forest. The closest town was Clevland, just outside the southern boundary of the Forest. There was a double "S" turn on the highway. She had just passed the first "S" and was driving into the second "S" turn when the vehicle headlights showed an animal about 50 yards (45 m) off the road. It was standing erect facing the vehicle, with one arm extended a bit. Its color was brownish. The weather was clear. She stopped the car immediately and looked at it until it smoothly swung a leg around and disappeared into the forest. That evening, she took her husband to the site, and had him stand at the spot to compare the height of tree branches where the animal had stood. Her husband stood 6 feet, 2 inches (ca. 1.83 m) tall. The estimated height of the alleged Sasquatch was 7 to 8 feet (2.1–2.4 m). The only discernible tracks noted were indentations in the mossy ground cover. She also stated that there was another similar sighting report a few miles from there later in the week. She related her experience to only a few friends.

Results

Only scant evidence of undetermined origin was obtained in the field during 1992. However, past sightings by various segments of the public suggest that these unknown animals are frequently seen, but are not reported to the authorities—or get any public attention—at the time. The predatory habits of the Sasquatch are getting into sharper focus. The species is perhaps quite human-like in its opportunistic ways, and probably eats almost anything available.

Future Plans

Efforts will continue during 1993 to uncover further evidence of these supposed large, unknown primates in the U.S. Pacific Northwest. Field evidence as well as new eyewitness testimony will be sought.

Book Reviews

Cryptozoology, 11, 1992, 113–128

There Are Giants in the Sea. By Michael Bright. Robson Books, London, 1989. 224 pp. £12.95 (c.), £7.99 (p.). Parkwest Publishers, New York, 1992. $22.95 (c.), $12.95 (p.).

Michael Bright, a BBC documentary producer, has written an informative and entertaining book on seagoing mystery animals. It is not as all-encompassing as Bernard Heuvelmans' tome on the subject, but it provides a great deal of new material, and is the best current work available.

The introductory chapter, "The Mysterious Ocean," sets the tone by reviewing such recent marine zoological discoveries as the megamouth shark. Bright also surveys reports of barely-known and unknown cetaceans, and reviews the mystery of the giant leptocephalus netted by the research vessel *Dana* in 1930.

The next two chapters deal with "sea serpent" sightings in British and American waters, paying the most attention to 20th century reports, and offering especially thorough treatments of America's Chessie and Caddy. The most impressive case here is one Bright investigated first-hand. He recounts (p. 94) that, in November, 1983, a California road-building crew looked down from the seaside cliff they were working on and saw a huge snake-like creature thrashing in the surf directly below them. An engineer who watched the beast through binoculars thought it might be 100 feet (30 m) long. Skeptical zoologists are entitled to demand a carcass before they admit the existence of sea monsters, but this sort of close-up multiple-witness sighting should at least encourage everyone to keep an open mind.

The author moves on in Chapter 4 to reports of strange denizens of the high seas. Most of the classic cases are included, along with some equally interesting modern sightings. Highlights include an update on the 1966 report by Britons Ridgeway and Blyth, which Ridgeway now dismisses as an encounter with a dolphin, and a 1965 North Pacific report of a mammal resembling the "sea-monkey" which Georg Wilhelm Steller reported observing in 1791.

Bright then tackles the giant octopus. He has gathered numerous accounts of such creatures, including recent reports from Bermuda. The events concerning the 1896 Florida carcass, *Octopus giganteus*, are recounted in detail.

Bright speculates that some other sightings may involve giant specimens of the gelatinous octopus *Allapossus.*

Moving in Chapter 6 to the giant squid, Bright has uncovered some eye-opening accounts I've found nowhere else. Two particularly startling reports involve squid killed or stranded on the Pacific coast of Canada in 1892 and 1922. Both cases involved animals whose long tentacles allegedly stretched about 100 feet (30 m). Bright's detailed review of what we know about the giant squid's physiology and behavior is a valuable bonus.

In Chapter 7, "What Are They?," Bright devotes surprisingly little space to pondering what still-unknown creatures might be lurking in the oceans. What he does do is present an excellent catalog of things which might be mistaken for sea monsters. He explores the maximum size, official and reported, for sharks, rays, and other large fish, as well as for seagoing reptiles and mammals. The author also reviews the puzzling carcasses and blobs which have turned up on the world's beaches. (Bright suggests the famous Tasmanian blob was a basking shark, but I must point out that no account of that carcass mentioned any indication of a skeleton, cartilaginous or otherwise.) Mirages and other visual errors contributing to the problem are also discussed.

When he does speculate on the remaining unknowns, Bright mentions the zeuglodon theory only in passing. He dismisses the idea of a giant, long-necked pinniped on the grounds that such creatures should have been spotted coming onto land to give birth. Two possible objections to this point are that the animals may have evolved aquatic birthing habits, or, more likely, that they give birth on ice floes in remote areas.

Bright is more favorably disposed to the idea of a giant frilled shark. He suggests the 25-foot (7.6-m) eel-like fish caught by Captain S. W. Hanna in 1880 was such a shark. Bright is also open—although more cautiously—to Karl Shuker's theory that some form of thalattosuchian, a Mezozoic-era marine crocodile, might have survived. Even if one or both of these creatures is accepted, however, Bright leaves unaddressed some solid reports of long-necked animals he presented in earlier chapters.

There are a few other shortcomings in this generally fascinating book. I can't help wishing Bright had provided footnotes: many references are given in the text, but such interesting stories as a Soviet helicopter crew's sighting of a monstrous squid (p. 146) are presented without sources.

In a few cases, Bright doesn't seem to have read the source material carefully. On page 186, he identifies the animal seen by scientists on the research ship *Challenger* in 1963 and the beast struck by the steamship *Santa Clara* as a huge oarfish, *Regalecus glesne.* However, Roy Mackal's more detailed account of the *Challenger* incident in his 1980 book *Searching for Hidden Animals* (p. 196) makes it clear the animal involved was a transparent invertebrate only 5 inches (12 cm) wide, while all accounts of the

Santa Clara collision describe an unidentified brown animal. Neither sighting is likely to be related to the distinctive silver oarfish with its red crest.

Students of cryptozoology will have a few other such quibbles, but they detract only marginally from the book's value. The only serious dissatisfaction I felt after reading the book was that it didn't feel complete. Bright's objectivity is certainly commendable, but, when an author has done this much work, I would be interested in reading his opinions on the remaining unsolved reports in more depth than he offers here.

None of these flaws should deter cyrptozoologists from searching out this valuable work. If Bright's book falls short of perfection, it still does a great service in bringing the "sea serpent" story up to date, and it provides thoroughly enjoyable reading at the same time. As a nice final touch, Bright recommends the International Society of Cryptozoology to readers who want more information. *There are Giants in the Sea* deserves a place on every cryptozoologist's bookshelf.

MATTHEW A. BILLE
802 Williamsburg Drive
Kokomo, Indiana 46902, U.S.A.

More Than a Myth: The Search for the Monster of Muskrat Lake. By Michael Bradley. Hounslow Press (124 Parkview Ave., Willowdale, Ontario M2N 3Y5, Canada). 1989. 225 pp. C$14.95 (p.).

The back cover of this book states, among other things: "Sonar contacts with large mysterious objects in the depths! . . . convincing evidence that a species of large unknown animal probably does inhabit Muskrat Lake 75 miles north of Ottawa . . . concise and accurate accounts of the research at Loch Ness, in the Soviet Union and in North America . . . Michael Bradley has written many critically acclaimed, best selling books . . . he has been called 'Canada's foremost independent thinker!' "

The book fails to live up to any of this praise. The coverage of Loch Ness and other places is perhaps concise, but it is far from accurate; for example, about St. Columba and Adamnan (p. 26), or that Alex Campbell had three sightings (p. 33). At times, his meaning is not even clear: "Loch Ness cannot sustain a complete food chain" (p. 30). The bibliography is skimpy (16 books), and the information it contains is not reliable either: for instance, Roy Mackal's 1976 Nessie book is ascribed the title *The Search at Loch Ness: The Evidence and What It Means* both in the text (p. 57) and in the bibliography; in actuality, the title is *The Monsters of Loch Ness.*

We are also told (p. 57) that NASA confirmed Robert Rines's estimate of the size of the flipper in the underwater photographs, and (p. 60) that the

flipper's shape "*exactly matches*" one species of plesiosaur (emphasis in the original). We learn (p. 100) that "the best sonar contacts at Loch Ness have always been obtained from sailing boats"; that (p. 150) dolphins are "perhaps a great deal more intelligent than *Homo sapiens*"; that (p. 151) "there is positive evidence . . . that Nessie apparently detected and reacted adversely to sonar beams in the 1960's and 1970's." And so on.

Such errors and lapses are present throughout the book. About half of the contents deal with Loch Ness and other background material, including the last chapter in which Bradley follows Ted Holiday in seeking connections between UFO's and lake monsters. The other half of the book describes the author's investigation of Muskrat Lake, a very cursory investigation indeed. The description of it is far too long: it contains, in 100 pages or so, at most a few paragraphs of material worth setting on paper for the use of other monster-hunters; it is, in fact, rather like an extended school essay on "What I did last summer."

I am quite sure that any serious cryptozoologist will be disappointed in this book; and since so much of what is said in it is plainly wrong, it cannot be recommended. However, it might well encourage people who are trying to get manuscripts published. Since this one was, surely almost anything can be.

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

Natural Mysteries: Monster Lizards, English Dragons, and Other Puzzling Animals. By Mark A. Hall. Published by the author (9215 Nicollet Ave. So., #104, Bloomington, Minnesota 55420). 1989. 90 pp. (Second revised edition, 1991. 96 pp.) $16.95 (p.).

Although the chapters in Mark Hall's *Natural Mysteries* may seem unrelated to one another, three of the four cryptozoological vignettes in this slim volume are loosely held together by their common connection to the Great Swamps, the theme of the lengthy introduction. Fully 26 of the 96 pages of the second (revised) edition of the book are devoted to an overview of the unfortunate history of this huge area of wetlands that once ringed the southern border of the Great Lakes.

Hall correctly points out that this area, including many large swamps and bogs stretching from central New York to Minnesota, suffered a tremendous reduction through the action of malaria eradication programs, agricultural

conversion, road-building, and other forms of development. An undercurrent through the remainder of the book is that the remnants of these wetlands may maintain populations of unknown animals, often of extreme phylogenetic age.

I have one major problem with this premise. The vast majority of the area in question was glaciated at some point during the Pleistocene. Thus, anything living in the area today must have invaded from the south in the relatively recent past, and could not have been maintained *in situ* over millions of years as the author suggests. This introduction, as well as the remainder of the book, suffers from uncritical analysis and a tendency towards the dramatic that seeks to turn even such well-understood phenomena as refugia into great mysteries. I found particularly alarming the anti-academic stance taken by the author. True enough, many academics are not receptive to most cryptozoological phenomena, but without bringing the scientific method to bear on the evidence, there is no way of convincing such persons; indeed, there is a danger of alienating the critical yet open-minded reader.

The first chapter deals with "monster lizards" of the Ohio Valley, and reviews Hall's findings obtained through newspaper accounts, interviews, and geographical observations. This chapter is full of inconsistencies. An eyewitness to the Canip monster lizard of Kentucky reported that the animal he saw was most like a monitor lizard (Family Varanidae), as indeed his description indicates. However, the conclusion is drawn that the animal responsible for this and the Ohio sightings of the 19th century was probably an amphibian. The axolotl, *Ambystoma mexicanum,* or a similar neotenic ambystomatid salamander, is cited as a likely model because its external gills might be mistaken for horns—as described by some witnesses. The fact is, however, that neotenic salamanders do not leave the water, and their gills are held flat against the side of the neck when they are removed from water. Alternatively, a number of very ancient early amphibians are also cited as possibilities. While I will not deny that almost anything is possible, I do not accept the approach that any slight similarity between the description of a putative cryptozoon (no matter what the source and no matter how vague, or uncorroborated) and a picture in a paleontology book can constitute the grounds for a working cryptozoological hypothesis.

The treatment of English dragons is certainly somewhat out of place given the U.S. Midwestern theme of the remainder of the book. Again, the choice of *Kuehneosaurus* as a model for flying dragons is not reasonable. These animals, like modern gliding lizards, could not fly in any case, and it seems highly unlikely that the modified ribs that formed the patagial support in this reptile could ever have evolved into jointed structures supporting flapping flight. The figure of the "Brentford Griffon" on page 47 also raises problems. I haven't tried to calculate the wing loading for this beast, but

even at a glance it is obvious that powered flight would be a mechanical impossibility. Also, while I can entertain thoughts that unknown animals survive "on the fringes of the modern world," I cannot bring myself to consider greater London as the fringes of anything except central London. Can serious cryptozoological investigators actually believe that flying vertebrates the size of dogs are living and breeding in Kew Gardens?

In "Big with Eight Legs," Hall again resurrects fossil forms, the sea scorpions, or eurypterids, to explain observations in Indiana and Kentucky, as well as more distant sightings in the Andes. These presumably extinct forms are held up as close matches to the sightings, although they would have to have evolved such non-arthropodan characteristics as tentacles, and to have forsaken—at least in the Andes—a goodly number of aquatic features in order to bask on land. Again, I am troubled by the anti-academic tirade. Hall dismisses any alternative solutions to unsolved sightings or explanations of local folklore that are not "mysterious" in nature. In effect, the author denies the many roles of mythology and folklore, except as records of actual creatures or events. However, there is strong evidence from many cultures that many folktales, myths, and legends are allegorical, and that the monsters involved are symbolic, reflecting societal fears, values, morals, and interpretations of the physical and spiritual world. Water monsters in cold, deep lakes may well be based on unknown animals, or they may have originated as a means to keep children from venturing too close to dangerous bodies of water. To deny either possibility *a priori* is clearly an inappropriate way to proceed in any scientific investigation.

The final chapter deals with Thunderbirds in Pennsylvania. Thunderbirds were the subject of a previous book by Hall (see review by Angelo P. Capparella in *Cryptozoology,* Vol. 9: 94–96, 1990). Aside from the fact that I live in Pennsylvania and have never seen a Thunderbird, I have some other arguments against the data presented. Pennsylvania is a densely populated state, surrounded by other densely populated states. There are thousands of bird-watchers and tens of thousands of others who spend time outdoors. Why are there so few records of diurnal birds with wingspans of up to 75 feet (ca. 23 m)!? The issue of wingspan is essential in establishing the facts. Flying objects are notoriously difficult to size because, in most cases, they are not assignable to a known frame of reference. Is an object in the field of view actually large but far away, or is it small but very close? The range of error of even careful observers under these conditions is sometimes immense. Expose average Americans to a bald eagle, an osprey, a turkey vulture, a great horned owl, or a heron at close range and most will remark that they didn't realize that the bird was so large. All of these birds occur in Pennsylvania, and all may be responsible for some of the sightings reported. Is this not a simpler explanation than that proposed?

The issue of mechanics also comes into play again. Some of the Thunderbird sizes and proportions reported are simply not compatible with powered flight, at least from a sitting take-off position. It is not my intention to claim that all reports of Thunderbirds (or any other of the cryptozoons discussed in *Natural Mysteries*) are unfounded or that all witnesses are unreliable. Rather, I advocate that all crytozoological data should be subject to scrutiny, and that the offhand dismissal of known phenomena or animals as the source of cryptozoological reports is irresponsible.

The book itself is heat-tape bound with paper covers, and the text is printed in Courier typeface. The second edition is liberally illustrated by 26 figures and 11 maps. Although the maps are generally useful and relevant to the text, the same cannot be said of the figures. These include many illustrations from the 1895 edition of *Johnson's Universal Cyclopedia,* virtually none of which are germane to the discussion. Of the more pertinent figures, a series of photographs relative to the monster lizards of Kentucky do not reproduce well xerographically, and thus lose some of their value. The reference section is divided into "Books about Wetlands," "Books about Owls and Giant Birds," and the end notes proper. The end notes themselves appear to be complete, although the number of primary sources cited is small.

Natural Mysteries makes interesting reading and does highlight some poorly documented cryptozoological problems, and in this light I can recommend it as a relatively inexpensive entrée into these topics, especially for those with special interests in the cryptozoology of eastern North America. The lack of critical evaluation of data and the offhand dismissal of geological and zoological constraints on possible interpretations, however, flaw the book beyond the point of its utility as a more significant reference for serious cryptozoologists.

Aaron M. Bauer
Department of Biology
Villanova University
Villanova, Pennsylvania 19085, U.S.A.

Mystery Cats of the World: From Blue Tigers to Exmoor Beasts. By Karl P. N. Shuker. Robert Hale, London, 1989. 256 pp. £12.95 (c.).

To expect discoveries of previously unknown species—or unsuspected populations—of small mammals seems only reasonable: their size alone enables them to remain hidden even though they may be relatively abundant, especially if they are trap-shy (example: the marsupial genus *Ningaui,* discovered in the 1970's), or very restricted in distribution (example: the bumble-bee bat *Craseonycteris*). For larger mammals, we expect any unknown

species to be herbivores, for surely large carnivores, at the top of the food chain, would hardly be able to maintain sufficient numbers for a viable population if restricted or otherwise rare enough to have remained undetected. Or does that follow?

Karl Shuker, for one, thinks it need not follow. Taking his definition of "cat" broadly, he surveys the world for reports of undescribed cat-like animals, turning up a remarkable array. It is a fascinating list, made immeasurably more authoritative by the author's calm approach. He rarely goes off the deep end, and there are none of the sarcastic remarks about experts ignoring the obvious, attended by rhetorical questions, that have characterised so many previous books on cryptozoology. Shuker is, in fact, a trained zoologist himself; it is refreshing to find an introductory chapter in which terms like "species" and "subspecies" are correctly defined, and a solid background on the cat family is laid down. (Two quibbles on this last matter: "feline" and "felid" are not, strictly speaking, adjective and noun respectively, but nouns—including nouns-in-apposition—representing vernaculars of the subfamily name Felinae and family name Felidae respectively; and the snow leopard, though it is a big cat and has the elastic ligament type of hyoid suspension, does not roar.)

I was surprised to find the degree to which there is actually solid evidence for out-of-place cats in the British Isles; pumas, jungle cats, leopard cats have all been captured or killed there, and are well documented. And the skull of a leopard (not a puma) was found on Dartmoor in 1988. All this is significant as illustrating the ease with which exotics can survive in a hostile environment, and enter local folklore. Whether breeding populations are ever established is another matter, and Shuker himself is duly cautious on the matter.

The Kellas cat, of course, gets an airing. Shuker considers a number of possibilities to account for this black, Scottish, wild-living cat, of which several specimens are known: feral domestic cat, wildcat × domestic hybrid, melanistic wildcat, and new species; on balance, he favors the second hypothesis, and I agree. Where an indigenous wild form has been widely eliminated, it is characteristically replaced by escapees from the conspecific domestic stock, and this happened when the true wildcat, *Felis sylvestris* was almost exterminated in Britain; when, finally, the remnant gets adequately protected, it reoccupies its former range, easily outcompeting the usurper, but its spread is preceded by a moving frontier of hybrids. And so we are bound to get Kellas cats, at least as a transitory phenomenon.

Many of the unknown cats, of course, really are simple color morphs of known species. In his introduction, the author gives us a table of cat color genetics (though he unfortunately refers to "genes" where he means "loci"), and by constantly referring back to this he is able to show that blue tigers, for example, are perfectly in accord with what we might expect of homologous mutations. He even essays this approach in the case of the king cheetah, though in deference to Paul and Lena Bottriell, who wrote the foreword for him, he hedges on this one: "More than a mere freak," he mutters, and hints darkly at "evolution before our very eyes." True, this is how Michael White and others did envisage sympatric speciation as occurring, but there is the little matter of Evidence; as I commented in my 1989 review of Lena Bottriell's book *King Cheetah: The Story of the Quest* (see *Cryptozoology,* Vol. 8: 87–92), the data are simply not adequate to sustain any such claim.

When he turns to Africa, Shuker unfortunately loses his cool in a few places. Before proposing Ethiopian tigers, sabertooth survivals, or even the (not implausible) range extension of the golden cat to the East African coastal forests, all other explanations ought to be thoroughly examined. For example, the depredations of the *mngwa* in Tanzanian coastal settlements strikingly recall those of the Leopard Men, a secret society widespread in West Africa, whose activities included gruesome ritual murder. Still, the constant claims of lion-leopard hybrids ought to be taken seriously; and the spotted lion of the Aberdares in Kenya should be relatively easy to track down (have any visitors to Treetops seen one?).

In the Americas, too, there are genuine problems to be solved. Outstanding is the Onza: as far as I know, work is still proceeding on the available material to try to determine if this is just an odd puma, or something quite different. And wildlife conservation concerns very visibly overlap with cryptozoology in the question of the survival of the Eastern puma.

Australia, too, has its share of "mystery cats." Some of these appear to be escaped pumas and the like, and the enormous feral domestic cats—13 lb (6 kg) or more—of the tropical north are so startling that one of these days they are going to be mistaken for a cryptozoon. Or have they already? Do feral domestic cats explain some of the sightings of the Queensland Tiger? Surely not all. The Queensland Tiger has always seemed to me to need further scrutiny: those reported fangs are suggestive of a specialized carnivorous marsupial, such as *Thylacoleo,* as indeed Shuker points out. But as the Tablelands and Daintree Rainforests get tamed and explored, yield up their last mammalogical secrets, and get invaded by feral cats, we may lose the chance to find out.

When the last rainforests have been logged, overrun by tourists, or dissected into tiny fragments, perhaps we will find a *Thylacoleo* skull on the mantelpiece of an old-timer, who will recount how his dogs killed the creature when he was a boy; and he will smile his enigmatic smile, and we will never know.

Colin P. Groves
Department of Archaeology and Anthropology
The Australian National University
Canberra, ACT 0200, Australia

They Stalk by Night: The Big Cats of Exmoor and the South-West. By Nigel Brierly. Yeo Valley Productions (The Old School, Newtown, Bishops Nympton, South Molton, North Devon EX36 3QR, England). 78 pp. n/p. (p.).

A growing segment of British cryptozoology in recent decades has been the question of supposed large, wild felids in the United Kingdom. Reports of such large cats have repeatedly and increasingly been made to newspapers, zoos, police stations, and other authorities.

As a schoolboy-naturalist in Surrey many years ago, I thought I knew, or knew of, every wild animal in Britain, including some rare forms which I caught, such as black adders and blue-spotted slow-worms (legless lizards). But I had yet to hear of the so-called Surrey Puma, and little did I realize at the time that the Surrey landscape I knew so well was soon to be the supposed abode of this mysterious felid. The Surrey Puma itself is now mainly forgotten, and the "big cat" phenomenon has since spread to almost all other parts of Britain, from Devon in southwestern England to the Loch Ness area of the Scottish Highlands—where I have actually interviewed witnesses.

One writer, Di Francis, believes that Britain harbors a native big cat from the Pleistocene which is still unknown to zoology. Most others believe that such reports are due to misidentifications of large dogs or other animals, or—and this is the growing hypothesis—to escaped or released "exotics" which may now be breeding in the wild. The American puma is the favored candidate.

Nigel Brierly's book covers this question in relation to one particular area of western Britain, Devon and Somerset, where the felid/s in question gained fame some years ago as the embodiment of the Beast of Exmoor. This booklet is complementary to two previous ones covering similar material, Trevor Beer's (1984) *The Beast of Exmoor: Fact or Legend?* (see review in Vol. 7 of *Cryptozoology*), and Andy Roberts' (1987) *Cat Flaps: Northern Mystery Cats* (see Cryptozoology Books 1987–1990, *The ISC Newsletter*, Spring, 1991).

Brierly covers his topic in 7 chapters, beginning with the Beast of Exmoor's depredations in the early 1980's, and the inability of the Royal Marines to shoot it. Almost 100 healthy sheep are said to have been killed on one farm alone. Brierly himself personally inspected 96 sheep-kills between 1983 and 1987. Photos of both sheep/lamb kills and cat tracks are presented. He reports having found, during the same period, numerous cat prints measuring 4 inches across. An adult American puma leaves tracks averaging 3.5 inches across, 4.5 inches at the very most; thus, the Exmoor tracks must have come from a very large puma—or some other species. Contrary to what many

people assume, however, an adult leopard's track is smaller than a puma's, measuring only 2.5 to 3 inches across.

Based on the evidence he has collected, the author believes that a single, large puma was covering all of Exmoor, an area of about 260 square miles. He attributes smaller tracks in the same area to females. The author also discusses his own interesting attempts at trapping one of the felids, first by actually growing catmint plants and attempting to produce catmint oil as an attractant, and second by designing and constructing large trap-cages.

The possible origin of such cats is, of course, a topic which confronts the author—and all others interested in such phenomena. Brierly believes that the 1976 Dangerous Wild Animals Act—which requires the licensing of "exotic" species ownership—resulted in irresponsible owners releasing their "pets." Some escapes also may have occurred. "Gradually," writes the author, "a breeding nucleus has been created which has spread throughout the country." Thus, the Act, in Brierly's view, has actually precipitated exactly what it was designed to prevent: the presence of large—and possibly dangerous—foreign animals in the British countryside. Even so, Brierly does not dismiss another, even more intriguing possibility, ". . . that pumas could have existed in small numbers in the wilder areas of the British Isles from as long ago as the 18th century."

Could such large cats have lived in Britain since the 18th century—or (according to Di Francis) since the Pleistocene? Pumas will eat most available foods, and rabbits were always plentiful. But things began to change after World War II. First, there was the rabbit myxomatosis plague of the 1950's. Then, as Brierly explains, "developments in agriculture . . . such as monoculture, the ploughing up of old grassland, drainage of marshland, and bringing marginal scrubland into cultivation have drastically cut down the hunting areas of wild animals and birds dependent on the rodent populations which these areas contained." These conditions could have placed a strain on any large, wild felids in Britain, which may have resulted in their more recent, bolder attacks on farm animals—and their increased observation by humans.

This leads us to a topic needing some discussion: that of reported coat color. Brierly states that he has collected 69 sighting reports, "the majority" of which describe jet-black cats. Despite popular belief, pumas are not known to be melanistic, and there are only one or two accepted cases (one a photo) of black or very dark pumas. Certainly, no specimen exists in any museum. Of significance here is the fact that many modern reports of the supposed Eastern puma in the U.S.A. describe black individuals, and the same kind of reports occur in Australia, where pumas are also believed to be breeding in a wild state.

In their natural range—at least in western North America—pumas have never been reported to be black. Why would they adopt a melanistic form

only in areas where they are not supposed to be at all? Could this have something to say about eyewitness reliability? Or could other large escaped or released felids, such as "black panthers"—melanistic Asian leopards—also be involved? At least for Britain, Brierly thinks not, stating: "There has never been any mention of the black color masking recessive spots. This recessive patterning would have been noticeable had the animal been a panther [leopard]."

If people really are seeing black pumas, one possibility is that the incidence of dark coloration increases dramatically in enclosed or wooded habitats, as may be found in the U.S. Northeast. This hypothesis may have merit—but what about the open terrain of Exmoor? And what about southern and western Australia? Also, the hypothesis fails to explain, conversely, why there are no reported black pumas in the enclosed Amazon region—a well known habitat of black jaguars.

Based on all the reports, including some involving children, Brierly concludes that the felids observed in Britain pose no physical danger. I would add a note of caution. Pumas are large, wild carnivores, and, given certain conditions, they would indeed attack humans. They have attacked children in North America on many occasions, and there are also confirmed reports—one quite recent—of fatal attacks on adults. If these felids—or some of them—happen to be black leopards, the danger to humans, especially children, is even greater—by far.

Before ending his book, the author describes his own fortune in actually seeing one of the mystery felids, a 7-footer—and a black one. He calls for the puma to be officially recognized as "an addition to our fauna," such as the American mink, which is now included in most modern British mammal guides.

I think it is still a little premature for such official recognition. But cats always seem to get their own way in the end.

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

In the Tracks of the Yeti. By Robert A. Hutchison. Macdonald, London, 1989. 286 pp. £13.95 (c.).

Perhaps the most wonderful feature about the Yeti is that, after a serious search for more than 100 years, no specimen is yet locked in a cage or

captured on film. Despite the non-capture, the search continues. Among all cryptozoological animals, the Yeti is perhaps—at least to the general public—the most attractive among hidden animals or "cryptids." Thus, when an author takes on the Yeti's discovery, at first it would seem that he has, perhaps, an easier task.

Having now read numerous Yeti books, I have concluded that writing about the Yeti is unusually challenging, holding exceptionally high standards. Because the Yeti is broadly viewed to be a myth, a writer must not in any way enhance the animal's mythical status. Readers will be vigilant for being sucked into false assertions.

Specifically, three pitfalls must be avoided: 1) passing along hearsay; that is, conveying as facts what are only reports of reports; 2) avoiding hard facts that cannot be brought back for public non-biased scrutiny; e.g., cameras not working when it is time to take the picture, not buying the conclusive artifact when it is offered for sale; and 3) making assertions such as: "In my heart I know it exists," or "I sat quietly and just knew it was there."

Further, it is essential that the author learn Yeti background: 1) the history of sightings and claims of the supposed animal; 2) Himalayan ecology, especially other relevant animals; 3) Himalayan human culture, especially how people view life, the spirit world, and wild animals. Finally, reading is more credible if the author has a sense of humor.

I have started with the above rather lengthy introduction because I think Robert Hutchison should be congratulated. His task was much harder than the now numerous adventure reports on the Himalaya—and his book is much more credible and readable because he succeeds so well with this complex task. Specifically, he has studied Yeti history and lore, Himalayan ecology, and local culture prior to his Yeti search. Furthermore, it is clear that, during his search, he was working exceptionally hard to learn more. Thus, whatever one thinks of Hutchison's Yeti discoveries, reading the the book is worthwhile for what is tucked into the pages in these other three areas. The facts are accurate and interesting.

Hutchison works hard to blend and balance an understanding of Western thought with an understanding of Himalayan thought. He avoids getting lost or becoming enraptured by Nepali or Sherpa culture, seeking regularly to cast them against some sort of Western backdrop—although his repeated use of the New York stock market does get tiring.

However, with regard to actual Yeti discoveries, Hutchison does not offer anything new. Clearly, he believes that the animal exists. He claims to have known (through what the reader assumes is extrasensory perception—ESP) that the Yeti was near him. Such perception is not trivial. Such sensations can (I now assert from personal experience) feel exceedingly strong and almost palpable. But there are no concrete artifacts presented. Two specific items of lost evidence are particularly unfortunate.

The first is a missed "photo opportunity" of a supposed Yeti as it ran away from a French assistant during a "Yeti drive." Hutchison recounts how he trailed a Yeti into a particular valley, then, believing it to be in a thicket, he set up a beat. The Yeti then reportedly fled past his waiting assistant, but the assistant had not been set up with cameras—despite the fact that the expedition was well equipped photographically. The second lost opportunity was in not having scientifically analyzed any of the Yeti scat which was found. Although feces are not conclusive proof, they can reveal a great deal. In particular, if shown to a seasoned Himalayan naturalist (I happen to know a number of good ones in Kathmandu—and one, Bijaya Kattel, lives just down the valley from were Hutchison was), at least it could have been determined whether the various alleged Yeti scats were indeed from a scientifically unknown animal.

A third, perhaps transforming opportunity was lost when Hutchison did not purchase a supposed Yeti foot when it was offered to him. On the two different expeditions that he undertook to Nepal, Hutchison had the opportunity to examine this desiccated foot. It is true that the requested $5,000 is a sum not normally found in one's pocket. However, it does not appear that Hutchison tried to trade for it from his expedition's equipment. Perhaps more critically, having seen the foot on the first expedition, he did not go back to a Western museum mammal collection and carefully examine all known mammal feet (the Asiatic black bear, *Selenarctos thibetanus*, being the most important), to determine whether the foot was indeed unique. If unique, then on the second expedition, knowing that such a specimen was available, he might have done well to avoid buying expensive photographic equipment, instead making the purchase of the unique specimen.

Indeed, from the non-critical assessment Hutchison makes of his performance on such missed opportunities, the reader wonders whether Hutchison himself was as convinced of the evidence as he claims to be. These are the main "hard" items to be found in Hutchison's narrative, and they deserve harder analysis.

In my judgment, Hutchison's book does not establish anything new about the Yeti. It does, however, contain a great many interesting one- and two-page vignettes of Himalayan life. Concerning little-known animals, the most informative among these descriptions is his good discussion of the musk deer, *Moschus*. For these vignettes alone, the book is worthwhile reading by those with an interest in the Hamalaya.

DANIEL TAYLOR-IDE
Institute for International Programs
The Johns Hopkins University
103 East Mount Royal Avenue
Baltimore, Maryland 21202, U.S.A.

Hunting the Gugu: In Search of the Lost Ape-Men of Sumatra. By Benedict Allen. Macmillan, London, 1989. 191 pp. £12.95 (c.).

In this book, the author tells the story of his travels hunting the elusive Gugu (better known in the cryptozoological literature as the *orang-pendek*). The Gugu reportedly dwells in Sumatra and on nearby islands (the Mentawi Islands, for example). The book is supposed to be non-fiction, but by the way it is written that is difficult to believe. It is not scientifically written nor thought out, and it does not stay focused long enough to be considered a scholarly work. For example, Allen is busy explaining the "unification of humanity" (p. 14), a subject worthy of discourse in itself, but what has this got to do with ape-men or monkey-men (he uses these terms interchangeably)? This discussion leads the reader astray from his major goal: to find the Gugu, the ape-man of Sumatra.

Theodore is a friend of Allen who wants them to go on an expedition to find the Gugu. At the last minute, Theodore decides not to go because of his age (80 years), so Allen carries on with the notes Theodore has made for him.

Allen seems to be completely self-involved rather than out on a real search for the Gugu. Although he dwells on finding "the loo" (p. 18), he does eventually provide us information (via Theodore) about the Gugu. The Gugu reportedly comes in two varieties: the one with the ginger-colored mane is friendly, while the Gugu with the black mane is larger and nasty (p. 25). On page 26, we learn the Gugu are about 4 feet, 6 inches (1.3 m) tall, some a bit larger; they walk with backward-pointing feet in order to prevent anyone from tracking them. Additionally, expeditioners are expected to give gifts to the Gugu, especially plugs of tobacco.

We learn of Allen's experience with opium during his travels. Again, what does this have to do with locating the Gugu? He finds a spiritual guide—in fact, several of them—to help him along the way. At one point, he comes upon several men covered with leaves hopping about the canopy, but they are clearly *Homo sapiens*. Two Catholic priests attempt to aid him in his travels, but his best guide is Telee, who tells him that there really are Gugu. Telee, from the island of Siberut, just off the coast of the main island of Sumatra, is sometimes knowledgeable, sometimes fearful. Telee seemed to "know" the jungle, and he took great pleasure in leading Allen through it. However, for an explorer who has written two other books on expeditions, Allen does not realize he has found gibbon apes instead of the Gugu. Certainly a scientist/naturalist would recognize gibbons.

Allen did not locate the Gugu, which one does not find out until the very end of the book. It is as though he is attempting to make the book "fun" to read; instead, it is extremely verbose in style and is very repetitive. In his

postscript (p. 187), Allen writes: "We are greater than matter and can even create a shadow of it ourselves . . ." This same phrase is repeated several times earlier in the 18 previous chapters. Perhaps Allen is trying to find himself?

He takes us through part of the Hmong culture, as well as other cultures which have no names for Western cultures, but he mainly deals with his personal experiences and reactions to not understanding languages, muddy paths, and hearing about the Gugu—but never seeing one.

In summary, the author should have been more economical with language. Some description is fine, but this volume has much too much.

ROSALIND RIBNICK
Humanities Division (Anthropology)
College of the Redwoods
Eureka, California 95501, U.S.A.

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.*

Cryptozoology, 11, 1992, 129–142

"EXCOMMUNICATIONS" SERVE NO PURPOSE

(Response to Bernard Heuvelmans, 1991, Other Definitions, Other Heresies, *Cryptozoology*, Vol. 10: 104–106)

I am sorry that Heuvelmans has rejected my definition of cryptozoology because I still think it is correct and serves the best interests of the discipline. What really sets a discipline apart is not words, not definitions, but deeds; i.e., methods which have a logic of their own. Heuvelmans is the "father" of cryptozoology *not* because he defined it, *but because he has worked out and convincingly introduced its methodology.* Therefore, anyone consistently applying these methods in zoological research, be it in Tasmania or the Eastern U.S.A., is, in fact, engaged in *cryptozoology.*

Surprisingly, instead of being proud of this, Heuvelmans is finding fault with the situation. Insisting that the search for the thylacine on mainland Australia is our business and on the island of Tasmania somebody else's, he doesn't explain what purpose is served by such a limitation and "excommunication."

In cryptozoology, we know of certain fossil, or living, or supposedly extinct forms, and find that certain cryptids more or less match these known forms. Accordingly, we formulate hypotheses, a normal procedure in science. Hence, all the talk of "living dinosaurs," "living gigantopithecines," etc. Incidentally, it was these hypotheses that immediately drew so much attention to the books written by Heuvelmans, and helped the emergence of cryptozoology.

Of course, a cryptozoologist can go further, and propose a name for the species or subspecies of the cryptid he is after. But that is part of cryptozoology's fun, not science, because the proof of the "pudding" is beyond the realm of cryptozoology. The proof only comes when a cryptid turns into an ex-cryptid by becoming a zoological accepted taxon.

The Tasmanian thylacine is both a known taxon and a cryptid until the hypothesis of its survival turns into a fact. The same logic applies to the Eastern U.S. puma. This means that a cryptid status is more or less temporary and hypothetical, like that of a suspect in a police investigation. Zoological suspects being secretive and elusive, we cannot deal with them directly most of the time, and are limited to studying the evidence they engender. The analogy between paleontology and cryptozoology is limited by the fact that the first seeks evidence of extinct animals, while the second seeks evidence of living animals. Obviously, the proof in the second case has to be different.

Lastly, my definition obviates the problem of size. Cryptozoology accepts a cryptid of any size, if one has *evidence* for its existence.

DMITRI BAYANOV
Relict Hominoid Research Seminar
Darwin Museum
Moscow 119 435, Russia

(Dmitri Bayanov has for many years been investigating the Almasty [wildman] problem in both Russia and the other former Soviet republics. Bernard Heuvelmans did not respond to Bayanov's comment.)

A COMMENDABLE REVERSAL

(Comment on Adrienne Mayor, 1991, Griffin Bones: Ancient Folklore and Paleontology, *Cryptozoology,* Vol. 1: 16–41)

I am delighted with Mayor's article, and would like to congratulate her on her work. This despite the fact that, in a sense, her paper is a reversal of the process of cryptozoology: the latter looks for a living animal behind a legend, while Mayor has brought us convincingly from legend to fossil animal.

What, then, is her paper's main import for cryptozoology? I see it in the author's treatment of folklore and ancient art. It turns out that the most fanciful and incongruous images of that realm can lead a dedicated researcher right to a *real animal,* no matter if extinct or extant. This is achieved through a process of "demythifying the content of received information," as recommended by Bernard Heuvelmans (1982, What is Cryptozoology?, *Cryptozoology,* Vol. 1: 11).

Mayor's work is of special significance to me for the following reason: Almost three decades ago, I embarked on my own path of collecting and demythifying items of folklore and ancient and medieval art pertaining to the problem of wildmen (or "relict hominoids," as we call them in Russia). Some items from my collection were later published in English (Dmitri Bayanov and Igor Bourtsev, 1976, On Neanderthal vs. *Paranthropus, Current Anthropology,* Vol. 17[2]: 312–18). The work proceeded smoothly, and it brought me much joy and satisfaction—except for those "damned griffins" which I saw depicted together with real animals and—for me—real wildmen, but which defied all my attempts at "rationalization." So it is a great relief for me to now learn that the nut has been cracked.

About 10 years ago, I wrote: "Ideally, 'realists' and 'folklorists' in hominology should sit down together and, without violating each other's territory, sort out the mountain of folklore on hominoids" (Dmitri Bayanov, 1982, A Note on Folklore in Hominology, *Cryptozoology,* Vol. 1: 46–48). By successfully combining folklore and paleontology in tracking down the origin of the griffin, Adrienne Mayor has given us all a fine example of how this should be done.

DMITRI BAYANOV

COMING TO GRIPS WITH THE *GRYPS*

(Comment on Adrienne Mayor, 1991, Griffin Bones: Ancient Folklore and Paleontology, *Cryptozoology,* Vol. 10: 16–41)

In a recent paper, folklorist Adrienne Mayor presents an argument linking the legend of the griffin (or *gryps*) with fossils of the extinct ceratopsian dinosaur *Protoceratops andrewsi.* The argument enumerates numerous resemblances between the imaginary griffin and the skeletal structure of *Protoceratops,* and then proceeds to establish that the origin of the griffin legend can be traced to Issedonian nomads who once searched for gold in places where *Protoceratops* fossils are abundant. Thus, the griffin is most likely a 2,700-year-old interpretation of an 80-million-year-old fossil.

The main tenets of Mayor's argument, as outlined above, are in harmony with dinosaur science. After all, there is nothing surprising about the idea that dinosaur fossils were once interpreted as the remains of still-living animals by people who knew nothing of dinosaurs, geologic time, or extinction. The relevance of Mayor's study to paleontology is primarily historical and anecdotal—it is part of the study of folklore, and presumably it is folklorists who will be most interested in her work.

It is, however, possible to critique at least one minor aspect of Mayor's argument on scientific grounds. Mayor seems to downplay the role of extant

animals in the formation of the griffin legend, yet there are aspects of the griffin which are clearly attributable to familiarity with living creatures. Mayor as much as admits this, but her emphasis on refuting the chimaeric nature of the griffin is, in places, unnecessarily strong. For example, she writes that "the *gryps* is not a simple hybrid or obvious composite like the half-human, half-animal Centaur, Minotaur, and Sphinx, or like Pegasus the flying horse." On the contrary, the griffin is indeed a "simple hybrid"; no vertebrate animal, living or extinct, possesses both wings and front legs, since the former evolved from the latter in all three known instances in their evolutionary history: birds, bats, and pterosaurs. The griffin is, after all, a legend, and as such it is bound to be characterized by zoological inaccuracies.

On a related note, Mayor's Fig. 3 shows two animals with striped tails coiled over their backs. Agamid lizards with exactly this sort of tail (some of the species in the genus *Phrynocephalus,* sometimes called "tail-rollers") are common over much of the Gobi Desert, and the "unknown animals" in Fig. 3 bear a strong resemblance to both lions and these lizards. To my eye, no detailed resemblance to *Protoceratops* is apparent. At least a year ago, I sent Mayor a photograph of one of these lizards, but she has so far declined to acknowledge their relevance to her work.

Having stated this, I feel compelled to admit that the foregoing discussion is not the reason I accepted the invitation to write a commentary on Mayor's paper. As a somewhat disillusioned former sympathizer with cryptozoology, I cannot help wondering why a relatively non-cryptozoological argument—that fossils of an extinct animal gave rise to an animal legend—should appear in the pages of a cryptozoological journal. After all, no claim is made that a *living* dinosaur was involved in the origin of the griffin legend.

The answer seems obvious to me, and it is apparent in the first sentence of Mayor's concluding paragraph: "Prehistoric remains of extinct animals are not the universal key to the origins of all legendary creatures, and certainly imagination and symbolism play important roles in the folklore of unknown animals." If cryptozoologists are to embrace Mayor's arguments as their own, perhaps they should examine this statement more closely. For Mayor, the alternative explanations for the grifin seem to be that it is either inspired by fossils or purely fanciful. For cryptozoologists, a different distinction is usually made—between beliefs inspired by living animals and those that are purely fanciful. But what if living animals are less likely than fossils to serve as inspiration for legendary animals? What if the dinosaur-hungry media now provides *us* with the substrate for folklore, just as the Gobi Desert once provided fossils for the Issedonian nomads?

In my view, at the heart of every cryptozoological hypothesis lies the assumption that folk beliefs are often based in reality. If the griffin legend can be shown to have an objective basis, then, by analogy, perhaps at least some other "'cryptids" (a puzzling term, which by the conventions of systematic zoology would suggest members of a family called the "Cryptidae") will turn out to be objectively real as well; or so it might seem.

The trick, as always, is proving that the non-scientific folk from whom the lore originates can muster a standard of objectivity comparable to that of real science. Just as testimony from so-called trained observers—policemen and the like—is often prominent in cryptozoological arguments, so Mayor takes pains to point out that the Greek scholar Herodotus distinguished between fanciful cyclopean men and the believably-real *gryps.* This argument seems unnecessary to me. Isn't it obvious that both are imaginary, that both are zoologically unsound, and that both are based on real animals (*Homo sapiens* and *Protoceratops andrewsi* respectively)?

Perhaps it is the connection with dinosaurs that makes the griffin idea appropriate for cryptozoological discussion. Cryptozoology seems prone to a sort of Lost Valley Syndrome, in which unexplored, primitive places are thought to harbor unknown, primitive animals. (Have two meanings of the word "primitive"—untouched by civilization on the one hand, and dating from the distant past on the other—been equivocally juxtaposed here in the public consciousness?) Intuitive support for this notion is easy to come by, since virtually every well-known unknown animal (an oxymoronic phrase if ever there was one, but the reader will see my point) has a paleontological counterpart. The Loch Ness Monster reminds us of plesiosaurians, Sasquatch brings to mind *Gigantopithecus,* and Mokele-Mbembe is remarkably like a sauropodan dinosaur. The belief in living monsters from the prehistoric past is a seductive one, and it seems to persist even in the absence of evidence. I'm sorry to appear pessimistic, but I've been waiting decades now for one of these animals to be discovered, and I now believe they are best understood in an anthropological rather than a zoological context. Belief in living prehistoric creatures is folklore in the flesh, and all cryptozoologists must surely struggle with the suspicion that they are at least partly self-deluded by this very sort of anthropological phenomenon.

The truth remains that our world is a systematic zoologists' dream, and that unknown animals are almost everywhere for the finding. Even with extinctions reaching an all-time high, the planet's undiscovered species still outnumber the known. Undiscovered taxa of fossil organisms also outnumber those that have been described. There are literally millions of "unknown animals" waiting out there for the right person to come across them, and the right person is usually a systematic zoologist. But the animals aren't dinosaurs or monsters—they are generally small, and generally unheard of prior to their discovery. I've even found a few unknowns myself—a couple of species of extant insects and a small mammal from the Paleocene period.

Sadly, while traditional naturalists are out finding real animals, monster-seekers waste much of their valuable time and enthusiasm in search of one or another version of the Lost Valley. If the story of the griffin has meaning

for cryptozoology, it is that behind every legendary animal one is most likely to find *not* a living prehistoric monster, but an imaginative human being.

JOHN H. ACORN
15714 86th Avenue
Edmonton, Alberta, T5R 4C4 Canada

(John Acorn is a biologist and free-lance science writer. He served as science consultant for The Dinosaur Project, a joint Canadian-Chinese venture coordinated by the Ex Terra Foundation of Edmonton.)

GRIFFIN FOLKLORE AND CRYPTOZOOLOGY

(Response to Bayanov and Acorn)

Bayanov's experience with griffins depicted along with real animals in ancient art strikes a chord with me. My first impression upon reading the ancient Greek authors' descriptions of the animal called *gryps,* or griffin, was a sense of "reality." The earliest depictions of griffins in sculpture and paintings reinforced the feeling that the creature was not being portrayed as mythological. There was something earthbound, substantial, and "real" about them despite their bizarre features. Unlike other Greek monsters, there were no myths about their "divine" origins, no legends of heroes battling grifins. Griffins were generic and plural, not singular oddities like the Minotaur or the Sphinx; they belonged to a specific geographical place, and they had mundane habits, such as making nests and defending their young.

Like Bayanov, I was intrigued by their inclusion with real animals. I wrote an essay about these early impressions (Adrienne Mayor, 1990, Hunting Griffins, *Southeastern Review,* Vol. 1 [No. 2]: 193–206), and decided to pursue griffins using a folkloristic approach (Adrienne Mayor and Michael Heaney, 1993, "Griffins and Arimaspians," *Folklore,* Vol. 104: 40–66). The combination of a beak and four legs pointed to prehistoric fossils rather than a living animal. The griffins' link to Scythian gold deposits suggested that the legend originated among miners in Central Asia.

As Bayanov points out, cross-disciplinary cooperation is essential in "sorting out the mountain of folklore" on unknown animals; my own work would have been impossible without the help of generous experts in classics, ancient art history, archaeology, classical folklore, geology, paleontology, as well as cryptozoology.

It is pleasing to know that Acorn deems my argument "in harmony with dinosaur science," but, contrary to his claim that I "downplay the role of extant animals in the formation of the griffin legend," much of my paper's discussion centered on the striking "naturalistic" aspects of the griffin. These aspects endow it with its decidedly non-mythological character, and it led ancient authors to compare and contrast it with familiar creatures—such as lions and eagles—in their efforts to describe it accurately.

The griffin cannot be regarded as a simple composite like the half-human, half-animal Centaur, Minotaur, or Sphinx, nor is it simply a lion with wings analogous to Pegasus. As I pointed out in my article, wings are specifically excluded in the earliest texts, and even when they are mentioned by later authors, griffins are not said to fly. Stereotyped "wings" may appear in artifacts to complement the beak and nests, to denote the creature's "mysterious" nature, or to account for the fossils' neck frills in profile. The ancient writers and artists strove to specify that the *gryps* had a beak *like* a bird, not that it had a bird's head; and that its body was *like* that of a predator mammal with four legs. They did not describe it as half-bird, half-lion.

The caption and the text clearly state that the two animals shown in Fig. 3 are included as examples of the many unidentified creatures that abound in Scythian art. Neither the text nor the caption relates them to griffins or to *Protoceratops.* The coiled tails of those animals may well have been inspired by the tail-roller lizard of the Gobi, but the identification of non-griffin animals is not at issue.

Herotodus' opinion *is* relevant because it shows that ancient writers distinguished between the imaginary and the zoologically possible. Acorn's comments about the "Lost Valley Syndrome" have no relevance to my approach—indeed, my work *rejects* the idea that humans and dinosaurs coexisted. His remarks seem to stem from his own "disillusionment" as a "former sympathizer with cryptozoology," as does his suggestion that a paper on ancient folklore and fossils (rather than papers by "self-deluded . . . monster seekers" on "living dinosaurs") is out of place in the journal *Cryptozoology.* In keeping with the oft-stated goals of the International Society of Cryptozoology to study unknown animal forms whether living or thought-extinct, this journal has published numerous articles about unknown animals of antiquity, such as: Michael D. Swords, 1985, On the Possible Identification of the Egyptian Animal-God Set (Vol. 4); Christine Janis, 1987, Fossil Ungulate Mammals Depicted on Archaeological Artifacts (Vol. 6); Charles Thomas, 1988, The "Monster" Episode in Adomnan's *Life* of St. Columba (Vol. 7); and Robert G. Tuck and Raul Valdez, 1989, Persepolis: Nilgai—Not Okapi (Vol. 8).

At the same time, ongoing discoveries of smaller, relatively unsensational animals, as well as of larger and exciting new, extinct, or thought-extinct species—or populations—around the world by both traditional zoologists and cryptozoologists are also reported consistently in the pages of *Cryptozoology* and *The ISC Newsletter* (examples: the Yemen monitor lizard, the ivory-billed woodpecker, the giant gecko, the megamouth shark, the onza,

the Nigerian gorilla, several smaller primates). It is this breadth that keeps cryptozoology vital.

ADRIENNE MAYOR
55 Aiken Avenue
Princeton, New Jersey 08540, U.S.A.

(Adrienne Mayor is a classical folklorist specializing in ancient Greek and Roman legends about natural history.)

MAINLAND THYLACINES

(Comment on Athol M. Douglas, 1990, The Thylacine: A Case for Current Existence on Mainland Australia. *Cryptozoology,* Vol. 9: 13–25)

As a keen follower of reports of Australian cryptids, I found Douglas's recent paper on mainland thylacines extremely interesting, but there are a number of issues I feel should be addressed.

1) *The Cameron photographs.* Douglas believes only the first shows a live animal. Now, it is obvious that the animal's posture and position are identical in both photos. It would be quite impossible for the animal to be shot and the body manipulated so that *rigor mortis* fixed it in exactly the same stance as when it was first photographed alive, and then repositioned in precisely the same setting relative to the nearby rocks—all without the wound being visible. The conclusion is inescapable: the animal was dead before any photographs were taken.

We must also ponder the photographer's possible motives. If fame and glory were the primary consideration, the production of an undoubted thylacine carcass would provide all he could hope for. But if the monetary value of his photographs was his main concern, he may have disposed of the carcass to keep it away from other photographers. However, a little thought would have convinced him that the most valuable picture would be a close up of the carcass, including the all-important head.

In short, all the indications point to a hoax. I do not think that it would be difficult to alter the carcass of a short-haired breed of dog to obtain the required results. The original color photos show an essentially gray animal (the darkness on the upper surface is a shadow effect) with fawn stripes which could easily be produced by bleach, dye, or even paint. If necessary, the fur of the tail could be trimmed. It should be noted that the hindquarters are not tapered like a real thylacine's. It is only the wide angle between hindquarters and tail which creates the illusion.

2) *The Mundrabilla Station specimen.* In the matter of the preservation and decomposition of carcasses, Douglas is an expert, and I cannot fault him. However, there are some aspects of his theory I would like to query.

He suggests that the thylacine died when it fell into the cave, and its body was swept into the lowest level by flood waters, which left it in a saline pool. It was then placed on an area of new limestone by persons unknown.

If this is the case, then the age of the limestone is irrelevant. The only question is whether the "pools heavily saturated in salt from dissolved salt stalactites" would be sufficient to retard decomposition for 4,500 years. Or, if we do not like the hypothesis of unknown visitors with even more mysterious motives, we may prefer an alternative: The animal died in the upper levels. Its head was raised either by muscular tightening or because it originally rested on something raised. It had been moved around the cave more than once, the last time being when a particularly high flood deposited it on the limestone. I cannot tell from Douglas's account whether the limestone was beyond the reach of all possible floods.

What I would particularly like clarified is the mechanism by which contamination by ground-water could produce an inaccurate C^{14} dating. A young specimen would have a high proportion of C^{14} relative to an old one. Whereas an old specimen might have its C^{14} level raised by saturation with water containing fresh CO_2, it is hard to see how the level could be lowered in a fresh carcass, especially as flood waters would be even younger. Perhaps Douglas, or an expert in radiocarbon dating, can clarify the matter. Unless this issue is answered satisfactorily, the age of the specimen must be considered problematical, and it cannot be used as strong evidence for extant mainland thylacines.

3) *Livestock and kangaroo killings.* No study has ever been done on the thylacine's hunting behavior. Comments made by me (Malcolm Smith, 1982, Review of the Thylacine [Marsupialia, Thylacinidae], *In* Michael Archer [ed.] *Carnivorous Marsupials,* Vol. 1, Royal Zoological Society of New South Wales, Mosman, Australia), and Eric R. Guiler (1985, *Thylacine: the Tragedy of the Tasmanian Tiger,* Oxford University Press, Melbourne) were based on "old timer" anecdotes, and the assumption that certain killings had been made by thylacines.

The most that can be deducted from the Western Australian killings is that they are not the work of canids. As Douglas himself admits, they are also characteristic of large cats. This is reinforced by other features, which were not mentioned, such as puncture wounds in neck vertebrae and claw marks on carcasses and trees. Both southwest and southeast Australia have for several decades been the center of alleged "puma" sightings (my personal files; David O'Reilly, 1981, *Savage Shadow: The Search for the Australian Cougar,* Creative Research, Perth—see my review of this book in *Cryptozoology,* Vol. 6: 89–91, 1986). They include such un-thylacine features as monochrome (tawny or black) pelage, short face, heavy hindquarters, and a long, flexible, tubular tail. Incredible as it may seem, we must seriously consider the possibility of a placental predator even more out of place on the mainland than the thylacine.

Under these circumstances, we must be very careful about attributing any kill to a thylacine. We must also be careful before accepting any report of a thylacine sighting. Dogs can easily mimic thylacines to the untrained eye, and I know from my own files that the lack of stripes does not prevent some people from making such a report.

From this it should not be assumed that I am a disbeliever. There are newspaper reports of sightings from both the southeast and the southwest which I have not been able to follow up, but which are very suggestive of thylacines. If Douglas would publish a paper detailing the sighting reports he has investigated, he would be performing a very useful function.

MALCOLM SMITH
No. 7, Twenty-Third Avenue
Brighton, Brisbane, Queensland 4017, Australia

(Malcolm Smith is a public servant who gained his M.Sc. degree by the study of koala behavior. He was also involved in reviewing the literature on dasyurids and the thylacine. See his new co-authored article elsewhere in this issue. Athol Douglas continues with investigations on the supposed mainland thylacine, but he declined to respond to Smith.)

ANALYSIS OF SIGHTINGS AT LAKE CHAMPLAIN

(Comment on Yasushi Kojo, 1991, Some Ecological Notes on Reported Large, Unknown Animals in Lake Champlain, *Cryptozoology,* Vol. 10: 42–54)

Kojo has presented an interesting and provocative analysis, in particular the comparison of sighting times between Champlain and Ness. Quite generally, I believe that such comparisons are a major improvement over what has been so commonly done, merely to compare observations with some *postulated, speculative* scenario.

Ideally, one would like to have sighting data also for known aquatic animals of various sorts, nocturnal and not, air-breathing and not. Does such data even exist anywhere? If not—as I suspect—then we have here another instance where cryptozoology—or the study of anomalies in general—serves the progress of knowledge by pointing to desired information whose lack would not otherwise be realized.

Another potentially fruitful sort of comparison would be of internal data for a given claim—for example, that the Loch Ness animals exist. One might compare the characteristics of *known* hoaxes with those of claimed sightings that seem most unlikely to be hoaxes and with those of sightings that turned out to be mistaken (of birds, boat wakes, etc.), to test whether or not these are drastically different sets of data. Now that computers are widely available

and extraordinarily fast and capacious, all that is needed is a great deal of person-time to carry out such analyses.

Finally, as we try to interpret results of any comparison or analysis, we need to allow for as many possibilities as we can conceive (while recognizing that there may well remain still more that we could not think of). In the present case, there might be reasons other than nocturnal behavior for sightings to become more frequent toward dusk and then decline sharply. For example, it is common for mornings to be quite calm and for winds to become stronger later in the day, only to die down again toward, or at, dusk. If sightings often result from wave effects, they might then well show the type of regularity in Fig. 1A of Kojo's article. Or, perhaps, the slanting light toward dusk makes wave effects more noticeable or enigmatic whereas similar effects around dawn are seen by fewer people. In making these latter suggestions, I do not mean to propose, of course, that they are the most likely.

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

(Henry Bauer is particularly interested in the interaction between science and scientific anomalies. He is the author of The Enigma of Loch Ness *[1986] and* Scientific Literacy and the Myth of the Scientific Method *[1992], both published by the University of Illinois Press.)*

THE VALUE OF MISIDENTIFICATION

(Response to Bauer)

I am grateful to Bauer for his comments on my article on the unidentified animals in Lake Champlain. I agree with him that, in order to strengthen my argument, sighting time data of aquatic animals whose behavioral patterns are already known would be helpful. However, such data, either published or unpublished, are not available to me—or Dr. Bauer. I would appreciate hearing from anybody who has such data.

I also agree on the importance of sighting data of known hoaxes or misidentifications in order to compare and contrast such data with those of the unidentified animals. It should be emphasized that, with respect to hoaxing or misidentification, such data are not completely detrimental or valueless. I hope that, in the future, such data are also published in addition to those of reliable sightings.

Finally, I also concur with Bauer that we need to consider as many pos-

sibilities as we can conceive when interpreting patterns discerned in sighting data. It seems unlikely, however, that the pattern of sighting time distribution of the animals in Lake Champlain is a product of misidentifications of waves. If most sightings of the animals were those of "humps" only, such a possibility would have been taken into account. However, many sighting reports also include witness descriptions of "heads" and/or "necks," which are unlikely to result from misidentifications of waves.

YASUSHI KOJO
Office for the Investigation of Buried Cultural Properties
Waseda University
3-4-67 Higashifushimi, Hoya City
Tokyo 202, Japan

(Yasushi Kojo recently obtained a doctoral degree in anthropology at The University of Arizona. He has conducted cryptozoological fieldwork at Lake Champlain in both summer and winter. See his new article on the subject elsewhere in this issue.)

THE LOYS "APE" AGAIN

(Comment on Marc E. W. Miller and Khryztian E. Miller, 1991, Further Investigations into Loys's "Ape" in Venezuela, *Cryptozoology,* Vol. 10: 66–71)

I was somewhat surprised to see that the de Loys "ape" is still considered an open file in the annals of cryptozoology. As far back as 1961, naturalist Ivan T. Sanderson, in his book *Abominable Snowmen: Legend Come to Life* (Chilton, 1961), published a detailed refutation of this photograph. Although I am not a professional primatologist, I have had occasion to observe spider monkeys at close quarters in the course of my work, and I find Sanderson's comments quite convincing. When he was alive, Sanderson was very interested in cryptozoological subjects, and he wrote and lectured extensively on the subject. His above-mentioned book, in fact, was dedicated to Bernard and Monique Heuvelmans.

I draw the reader's attention to a recent article by Michael T. Shoemaker (1991, The Mystery of the Mono Grande, *Strange Magazine,* April) which includes a detailed criticism of Sanderson's analysis of the Loys photo. After reading it, however, I still find Sanderson's argument more plausible. I would be glad to see a comment by the Millers or by others on Sanderson's remarks.

ROBERT A. CAMPBELL
490 Broad Street
Weymouth, Massachusetts 02188, U.S.A.

(Robert Campbell is a teacher and a laboratory animal technician. His main interest is herpetology. Marc Miller declined to comment on the Sanderson/Shoemaker analyses.)

TARICHA GRANULOSA: NOT A LIKELY SASQUATCH FOOD SOURCE

(Comment on James A. Hewkin, 1991. Sasquatch Investigations in the Pacific Northwest, 1991, *Cryptozoology,* Vol. 10: 76–78)

Hewkin reported his observation of a series of rocks pulled from a trail. He further observed a rough-skinned newt, *Taricha granulosa,* crawling under a rock along the same trail, and he suggested that such small animals under rocks would be a likely food source for a Sasquatch.

Whether or not his general conclusion is valid, it is unfortunate that Hewkin used *Taricha granulosa* as a specific example. Newts of the family Salamandridae are well known for their toxic secretions, and members of the genus *Taricha* are especially potent due to the high concentration of tetrodotoxin in their skin (Edmund D. Brodie, III and Edmund D. Brodie, Jr., 1990, Tetrodotoxin Resistance in Garter Snakes: An Evolutionary Response of Predators to Dangerous Prey, *Evolution,* Vol. 44: 651–59, and references therein). Skin toxin from *Taricha granulosa* is poisonous to a wide range of potential predators, including mammals (Edmund D. Brodie, Jr., 1968, Investigations on the Skin Toxin of the Adult Rough-Skinned Newt, *Taricha granulosa, Copeia,* Vol. 1968: 307–13); only one species of garter snake is known to be resistant (Brodie and Brodie, 1990, above).

All mammals that Brodie (1968, above) tested refused to eat rough-skinned newts, and Brodie himself experienced a severe burning sensation after handling newts and accidentally touching his fingers to his mouth. He suggested that predators may be able to recognize *Taricha granulosa* as distasteful by its bright ventral coloration, which is displayed by a reflex posture when the newt is threatened. Hence, it is unlikely that a predator as presumably sophisticated as a Sasquatch would use *Taricha granulosa* as a food resource.

PHILIP A. COCHRAN
Division of Natural Sciences
St. Norbert College
DePere, Wisconsin 54115, U.S.A.

(Philip Cochran is an ecologist especially interested in fishes, amphibians, and reptiles.)

Taricha granulosa: An Informative Evaluation

(Response to Cochran)

I concur wholeheartedly with Cochran on his response to my suggestion that the rough-skinned newt, *Taricha granulosa,* found under rocks may be a food source for Sasquatch. Cochran gives an informative evaluation of this common salamander, an evaluation that we should all be aware of in the field.

My real purpose was to point out that many small species of various animal forms may be found under rocks, including salamanders, lizards, snakes, insects, and rodents. To my knowledge, Sasquatch has been reported eating rodents, aquatic vegetation, and possibly even crickets. Eventually, we hope to learn much more about this.

As an afterthought, wouldn't it be amazing if we found out that Sasquatches have an immunity to some of the toxins that are poisonous to us?

James A. Hewkin
35237 Aubuckon Drive
St. Helens, Oregon 97051, U.S.A.

(James Hewkin is a wildlife biologist formerly with the Oregon Department of Fish and Wildlife. He has been investigating Sasquatch evidence for almost 20 years. See his new Field Report elsewhere in this issue.)

TALKS AND PRESENTED PAPERS SPONSORED BY THE INTERNATIONAL SOCIETY OF CRYPTOZOOLOGY 1982–1992

The International Society of Cryptozoology (ISC) was established in January of 1982 at a special two-day founding meeting of the Board of Directors hosted by the Department of Vertebrate Zoology, U.S. National Museum of Natural History, Smithsonian Institution, Washington, D.C. No membership meeting was held at that time, but since then the Society has sponsored annual meetings and one symposium at a separate international evolution congress. This compendium details all 96 ISC-sponsored talks from 1982 through 1992. Some talks led to subsequent publication—usually of expanded versions, and sometimes with different titles—in *Cryptozoology* or other publications; this is indicated where appropriate. (CZ = *Cryptozoology*.)

First Annual Membership Meeting (1982)
Department of Oceanography
The University of British Columbia
Vancouver, British Columbia, Canada
October 22, 1982

"In Search of Mokele-Mbembe," Roy P. Mackal, Chicago, Illinois, U.S.A. (Pub. CZ, Vol. 1.)
"Dermatoglyphic Evidence for Sasquatch," Grover S. Krantz, Pullman, Washington, U.S.A. (Pub. CZ, Vol. 2.)

* * *

Second Annual Membership Meeting (1983)
Department of Biology
New York University
New York, New York, U.S.A.
June 11, 1983

"Cryptozoology: The Past and the Future," Bernard Heuvelmans, Le Bugue, France.
"The ISC: Purpose and Plans," J. Richard Greenwell, Tucson, Arizona, U.S.A.
"Is There a Giant Octopus?," Joseph F. Gennaro, New York, New York, U.S.A.
"Searching for Mokele-Mbembe," Roy P. Mackal, Chicago, Illinois, U.S.A. (Pub. CZ, Vol. 1.)
"Sasquatch and the Walla Walla Evidence," Grover S. Krantz, Pullman, Washington, U.S.A. (Pub. CZ, Vol. 2.)
"Closing the Net on Nessie," Robert H. Rines, Concord, New Hampshire, U.S.A.

Third Annual Membership Meeting (1984)
Laboratory of Vertebrate and Human Paleontology
University of Paris VI
Paris, France
June 9, 1984

"The Aims and Methods of Cryptozoology," Bernard Heuvelmans, Le Bugue, France.
"Investigations into the Wildman of the Caucasus," Marie-Jeanne Koffmann, Moscow, U.S.S.R.
"Sasquatch and the Walla Walla Evidence," Grover S. Krantz, Pullman, Washington, U.S.A. (Pub. CZ, Vol. 2.)
"Results of the 1983 Mokele-Mbembe Expedition," Marcellin Agnagna, Brazzaville, People's Republic of the Congo. (Pub. CZ, Vol. 2.)
"Investigations into the Wildman of Kenya," Jacqueline Roumeguere-Eberhardt, Paris, France.

* * *

Fourth Annual Membership Meeting (1985)
Hubbs-Sea World Research Institute
San Diego, California, U.S.A.
May 25, 1985

"A Proposed Classification System for Cryptozoology," J. Richard Greenwell, Tucson, Arizona, U.S.A. (Pub. CZ, Vol. 4.)
"The Historical Background of the Giant Octopus," Forest G. Wood, San Diego, California, U.S.A.
"Histological and Amino Acid Analysis of the Giant Octopus Tissue," Roy P. Mackal, Chicago, Illinois, U.S.A. (Pub. CZ, Vol. 5.)
"The Ri Unmasked: A Lesson for Cryptozoology," Thomas R. Williams, Scotts Valley, California, U.S.A. (Pub. CZ, Vol. 4.)

* * *

Third International Congress of Systematic
and Evolutionary Biology (ICSEB III)
University of Sussex
Brighton, Sussex, England, U.K.
July 4–10, 1985

Symposium (July 7): Cryptozoology: The Search for Unknown or Supposedly Extinct Animals

"Splitting versus Lumping in Systematic Zoology and Cryptozoology," Bernard Heuvelmans, Le Bugue, France.
"A Classificatory System for Cryptozoology," J. Richard Greenwell, Tucson, Arizona, U.S.A. (Pub. CZ, Vol. 4.)
"The Case for a Linguistic Component in Cryptozoology," Piotr Klafkowski, Solberg, Norway.
"Histological and Amino Acid Analyses of *Octopus giganteus* Tissue," Joseph F. Gennaro, New York, New York, U.S.A., and Roy P. Mackal, Chicago, Illinois, U.S.A. (Pub. CZ, Vol. 5.)
"Fossil Ungulates in the Archaeological Record," Christine Janis, Providence, Rhode Island, U.S.A. (Read by Kathy Scott.) (Pub. CZ, Vol. 6.)
"The Onza as a Paleo-Cheetah: An Example of Possible Pleistocene Persistence," Helmut Hemmer, Mainz, Federal Republic of Germany.
"A Species Named from Footprints," Grover S. Krantz, Pullman, Washington, U.S.A. (Pub. 1986, *Northwest Anthropological Research Notes*, Vol. 19 [1]: 93–99.)

* * *

Fifth Annual Membership Meeting (1986)
Department of Biology
The University of Chicago
Chicago, Illinois, U.S.A.
June 14, 1986

"Possible Survival of Fossil Animals into Historical Times," Christine Janis, Providence, Rhode Island, U.S.A. (Pub. CZ, Vol. 6.)
"A Reconstruction of the Skull of *Gigantopithecus*, and Its Implications for Sasquatch Research," Grover S. Krantz, Pullman, Washington, U.S.A. (Pub. CZ, Vol. 6.)
"Preliminary Observations Resulting from the Acquisition of a Specimen of an Onza," J. Richard Greenwell, Tucson, Arizona, U.S.A.
"Results of the 1986 American Yeti Expedition," William Cacciolfi, Yellow Springs, Ohio, Marc C. Miller, Zanesville, Ohio, and Thukten Sherpa, Kathmandu, Nepal. (Pub. CZ, Vol. 5.)

* * *

Sixth Annual Membership Meeting (1987)
(Co-sponsored by the Society for the History of Natural History, London)
Department of Natural History
Royal Museum of Scotland/National Museums of Scotland
Edinburgh, Scotland, U.K.
July 25–26, 1987

Symposium (July 25): The Search for Nessie in the 1980's

"The History of the Loch Ness Monster," Richard Fitter, Oxford, England, U.K.
"The Biology of the Loch Ness Monster," Roy P. Mackal, Chicago, Illinois, U.S.A.
"Public Perception of the Loch Ness Monster," Henry H. Bauer, Blacksburg, Virginia, U.S.A.
"The Wilson Nessie Photo: A Size Determination Based on Physical Principles," Paul H. LeBlond, Vancouver, British Columbia, Canada. (Pub. CZ, Vol. 6.)
"Recent Fieldwork by the Loch Ness and Morar Project," Adrian J. Shine, London, England, U.K.
"A Review of Research Contributions to Date of the Academy of Applied Science at Loch Ness," Robert H. Rines, Concord, New Hampshire, U.S.A.
"Three Decades of Nessie Hunting: A Personal Odyssey," Tim Dinsdale, Reading, England, U.K.

(Expanded versions of these symposium papers were subsequently published in the special centennial issue of the journal *The Scottish Naturalist* in 1988 as "Proceedings of the Symposium on the Loch Ness Monster: The Search for Nessie in the 1980's." The paper by Tim Dinsdale was not included because of his death prior to its completion. A slightly different version of the paper by Paul H. LeBlond was also published in *Cryptozoology*.

Symposium (July 26): Some Cats of Cryptozoology

"The Case for the British Big Cat," Di Francis, Newmill, Keith, Banffshire, Scotland, U.K.
"The Kellas Cat: An Overlooked Felid from Scotland," Karl P.N. Shuker, West Bromwich, West Midlands, England, U.K. (Pub. CZ, Vol. 9.)
"The King Cheetah: A New Race in the Making?," Lena and Paul Bottriell, Great Missenden, Buckinghamshire, England, U.K.
"The Onza: Its History and Biology," J. Richard Greenwell, Tucson, Arizona, U.S.A., and Troy L. Best, Albuquerque, New Mexico, U.S.A.
"The Queensland Tiger-Cat: Evidence for the Possible Survival of the Marsupial Lion, *Thylacoleo*, into Recent Times," Victor A. Albert, Providence, Rhode Island, U.S.A.

* * *

Seventh Annual Membership Meeting (1988)
Department of Zoology
University of Maryland
College Park, Maryland, U.S.A.
May 14, 1988

"Searching for Cryptic Deep Sea Sharks," Eugenie Clark, College Park, Maryland, U.S.A.
"Techniques Used in the Search for Eastern Cougars," Robert L. Downing, Clemson, South Carolina, U.S.A.
"Do Ursid Characteristics Bear on the Yeti Question?," Daniel Taylor-Ide, Franklin, West Virginia, U.S.A.
"Applying Modern Technology to Monster Hunting at Lake Champlain," Joseph W. Zarzynski, Wilton, New York, U.S.A.
"Sea Serpent Sightings off the Eastern Seaboard Since the U.S. Civil War," Malcolm Bowman, Stony Brook, New York, U.S.A., and Gary S. Mangiacopra, Milford, Connecticut, U.S.A.
"A Chronology of Significant Chessie Events in Chesapeake Bay," Michael A. Frizzell, Baltimore, Maryland, U.S.A.

* * *

Eighth Annual Membership Meeting (1989)
Department of Anthropology
Washington State University
Pullman, Washington, U.S.A.
June 24–25, 1989

Symposium: Sasquatch Evidence: Scientific and Social Implications

"Academic Problems with Anomalous Research," Geoffrey L. Gamble, Pullman, Washington, U.S.A. (Read by Donald E. Tyler.)
"Sasquatch: An Historical Overview," John Green, Harrison Hot Springs, British Columbia, Canada.
"Some Comments on Recent Critics of Dermal Ridge Evidence," Grover S. Krantz, Pullman, Washington, U.S.A.
"Sasquatch: Extraordinary Claims Require Extraordinary Proof," Danny Perez, Norwalk, California, U.S.A.
"The Twisted Tree: Additional Tangible Evidence for the Existence of Bigfoot, with an Overview of Bigfoot in Florida," Bruce R. Davis, Archer, Florida, U.S.A.
"A Sasquatch Ethos: The Consequent Difficulties Documenting Evidence," Jack Lapseritis, Roseburg, Oregon, U.S.A.
"Investigating Sasquatch Evidence and Problems in Distinguishing It," James A. Hewkin, St. Helens, Oregon, U.S.A.

"Morphological Analysis of Possible Sasquatch Hair Recovered from the Blue Mountains of Washington State," Lonnie Somer, Pullman, Washington, U.S.A.
"Investigating Sasquatch Reports in Alberta," Thomas Steenburg, Calgary. Alberta, Canada.
"The Case for a Legal Inquiry into Sasquatch Evidence," John Green, Harrison Hot Springs, British Columbia, Canada. (Pub. CZ, Vol. 8.)
"The Significance of Zoological Classification of a Sasquatch: Scientific, Philosophical, and Sociological Relevance," Mark Francis, Twinsburg, Ohio, U.S.A.
"Diffusion of a Large Bipedal Hominoid in Asia and North America During the Pleistocene and After," R. Pennington Smith, Baltimore, Maryland, U.S.A.
"The Iceman: The Original Perspective," by Terry J. Cullen, Milwaukee, Wisconsin, U.S.A.
"Searching for the Yeti in the Khumbu Region of Nepal," Robert Hutchison, Leysin, Switzerland.
"Some Ape-Like Figures and Stone Engravings in the New and Old Worlds," Vladimir Markotic, Calgary, Alberta, Canada,
"Bigfoot in the Blue Mountains," Paul Freeman, Walla Walla, Washington, U.S.A.

* * *

Ninth Annual Membership Meeting (1990)
(Co-Sponsored by the Folklore Society, London)
University of Surrey
Guildford, Surrey, England, U.K.
July 20–22, 1990

Conference: Fabulous Beasts: Fact and Folklore

"The Connection Between Cryptozoology and Folklore: Case Histories from the Maori and Basotho Peoples," Aaron M. Bauer, Villanova, Pennsylvania, U.S.A., and Anthony P. Russell, Calgary, Alberta, Canada.
"The Metamorphosis of Unknown Animals into Fabulous Beasts and of Fabulous Beasts into Known Animals," Bernard Heuvelmans, Paris, France. (Pub. CZ, Vol. 9.)
"Greek and Roman Monsters," William M.S. Russell, Reading, Berkshire, England, U.K.
"Was Satan a Giant Squid?— Or the Pedigree of the Basilisk," David Heppell, Edinburgh, Scotland, U.K.
"Dragons and Serpents in Japan," Isao Uemechi, Inukai, Koudera, Japan.
"The Dragon," Claire Russell, Reading, Berkshire, England, U.K. (Read by William M.S. Russell.)

"Soviet Research into the Abominable Snowman and the Mythology of Cryptozoology," Michael Heaney, Oxford, England, U.K.
"The Morris Beast," Phil Underwood, Camberley, England, U.K.
"Linguistics and Cryptozoology," John Colarusso, Hamilton, Ontario, Canada. (Read by Aaron M. Bauer.)
"Large Bipedal Hominids as Reported by Spokane and Colville Indians," Ed Fusch, Riverside, Washington, U.S.A.
"Mystery Cats in France," Veronique Campion-Vincent, Paris, France. (Pub. 1992, *Folklore,* Vol. 103[2]:160–83.)
"Real Dragons," Jeremy Hart, Ewell, Surrey, England, U.K.
"The Origin of the Griffin," Adrienne Mayor, Bozeman, Montana, U.S.A. (Pub. CZ, Vol. 10; 1993, with Michael Heaney, *Folklore*, Vol. 104[1/2]: 40–66.)
"Werewolves Raw and Cooked: Taxonomy and Evolution of a Mythical Hybrid," Caroline Oats, London, England, U.K.
"Animal Mates and Frog Princesses," Barbara Fass Leavy, Flushing, New York, U.S.A.
"Fabulous Beasts of our Times," Jean-Paul Debenat, Nantes, France.
"Swallows, Amazons and Basilisks: Thoughts on the Ancestry of Ransome's Nibthwaite Serpent," J.B. Smith, Bath, England, U.K.
"The Horned Hare: Fact, Fiction, or Philosophy?, David Heppell, Edinburgh, Scotland, U.K., and Peter Dance, Carlisle, Cumbria, England, U.K.
"The Great Lake Monster of Sweden Discussed by a Folklorist," Jan-Ovind Swahn, Lund, Sweden.

* * *

Tenth Annual Membership Meeting (1991)
Marine Mammal Research Program/Department of Marine Biology
Texas A & M University at Galveston
Galveston, Texas, U.S.A.
April 20, 1991

"Cryptozoology: A Scientific Paradigm of an Age-Old Problem," Bernd Würsig, Galveston, Texas, U.S.A.
"Flying Reptiles in Namibia? Report of an Expedition," Roy P. Mackal, Chicago, Illinois, U.S.A.
"Investigating the Wildman in China," J. Richard Greenwell, Tucson, Arizona, U.S.A. (Pub. CZ, Vol. 8.)
"Nessie: An Endothermic Plesiosaur?," John S. Buckley, Austin, Texas, U.S.A.
"The Giant Oriental Salamander *Andreas*: Did a Miocene Form Persist into Historical Times?," William E. Evans, Galveston, Texas, U.S.A.

* * *

Eleventh Annual Membership Meeting (1992)
Division of Biology and Medicine
Brown University
Providence, Rhode Island, U.S.A.
May 16, 1992

"Footprints of the Marsupial Lion?: A Cautionary Tale," Christine Janis, Providence, Rhode Island, U.S.A.

"ISC: Reviewing the First Decade," Roy P. Mackal, Chicago, Illinois, U.S.A.

"Rediscovery of 'Extinct Species': Case Histories from a Field Biologist," James D. Lazell, Jamestown, Rhode Island, U.S.A.

"The Eastern Panther in the 1990's," Ted B. Reed, Exeter, New Hampshire, U.S.A.

"High Tide and an East Wind: The Life and Times of Bruce Stanley Wright," Jay W. Tischendorf, Fort Collins, Colorado, U.S.A. (Read by J. Richard Greenwell.)

"The Tasmanian Tiger: Recent Evidence for the Survival of the Thylacine," James D. Lazell, Jamestown, Rhode Island, U.S.A.

"A Social History of the Giant Gecko in New Zealand," Aaron M. Bauer, Villanova, Pennsylvania, U.S.A., and Anthony P. Russell, Calgary, Alberta, Canada.

"A Decade of Loch Ness Fieldwork by the Academy of Applied Science," Charles W. Wyckoff, Needham, Massacusetts, U.S.A.

"Champ—The Lake Champlain Monster: Reviewing Ten Years of Field Research," Joseph Zarzynski, Wilton, New York, U.S.A.

"Przewalski's Horse: A Case Study of DNA Karyotyping in the Identification of Cryptozoological Species," Michael J. Manyak, Washington, D.C., U.S.A.

Grover S. Krantz; *A Previously Unreported "Sea Serpent" Sighting in the South Atlantic* by Paul H. LeBlond; *Vertical Flexure in Jurassic and Cretaceous Marine Crocodilians and Its Relevance to Modern "Sea Serpent" Reports* by Eric Buffetaut; *Further Notes on the Role of Folklore in Hominology* by John Colarusso

Research Reports
Attitudes of Biological Limnologists and Oceanographers Toward Supposed Unknown Animals in Loch Ness by James E. King and J. Richard Greenwell

Field Reports
Results of the First Congolese Mokele-Mbembe Expedition by Marcellin Agnagna; *Further Investigations Into the Biological and Cultural Affinities of the Ri* by Roy Wagner, J. Richard Greenwell, Gale J. Raymond, and Kurt Von Nieda; *LCPI Work at Lake Champlain: 1983* by Joseph W. Zarzynski

Book Reviews
Les Bêtes Humaines d'Afrique [The Human Beasts of Africa] (Bernard Heuvelmans) by Pascal Tassy; *Aliens Animals* (Janet and Colin Bord) by Ronald M. Nowak; *A Geo-Bibliography of Anomalies: Primary Access to Observations of UFOs, Ghosts, and Other Mysterious Phenomena* (George M. Eberhart, comp.) by Marcello Truzzi; *Incredible Life: A Handbook of Biological Mysteries* (William R. Corliss, comp.) by J. Richard Greenwell; *Topsell's Histories of Beasts* (Malcolm South, ed.) by David Heppell; *The Magic Zoo: The Natural History of Fabulous Animals* (Peter Costello) by M. Justin Wilkinson

Comments and Responses
David Heppell, Leigh M. Van Valen, Frank E. Poirier, John R. Sibert, James G. Mead, Ron Westrum, William R. Corliss, Roy P. Mackal, Maurice Burton, Wayne Suttles

VOLUME 3 (1984)—160 pp.

Articles
The Birth and Early History of Cryptozoology by Bernard Heuvelmans; *The Search for Cougars in the Eastern United States* by Robert L. Downing; *"Seileag": The Unknown Animal(s) of Loch Shiel, Scotland* by Joseph W. Zarzynski; *The Orang-utan in England: An Explanation for the Use of* Yahoo *as a Name for the Australian Hairy Man* by Graham Joyner

Research Reports
Morphological Analysis of the Jiulong Mountain "Manbear" (Wildman) Hand and Foot Specimens by Zhou Guoxing

Field Reports
Activities of the Academy of Applied Science Related to Investigations at Loch Ness, 1984 by Robert H. Rines, Harold E. Edgerton and Robert Needleman; *A Field Investigation Into the Relict Hominoid Situation in Tajikistan, U.S.S.R.* by Dmitri Bayanov; *LCPI Work at Lake Champlain, 1984* by Joseph W. Zarzynski; *An Attempt to Obtain a Specimen of Sasquatch Through Prolonged Fieldwork* by Mark E. Keller; *Testing an Underwater Video System at Lake Champlain* by Richard D. Smith

Book Reviews
The Guinness Book of Animal Facts and Feats (Gerald L. Wood) by F. G. Wood; *On the Track of the Mystery Animal: The Story of the Discovery of the Okapi* (Miriam Schlein) by Wade C. Sherbrooke; *Loch Ness Monster* (Tim Dinsdale) by Roy P. Mackal; *Monstres des Lacs du Québec: Mythes et Troublantes Realites* [Monsters in Quebec Lakes: Myths and Troublesome Realities] (Michel Meurger and Claude Gagnon) by Gerard Leduc; *Monsters Among Us* (Brad Steiger) by

Daniel Cohen; *The Encyclopedia of Monsters* (Daniel Cohen) by J. Richard Greenwell; *The Bigfoot Casebook* (Janet and Colin Bord) by Charles A. Reed; *A World-Shocking Theft* [in Chinese] (Zhou Guoxing) by Paul H. LeBlond and Lichen Wang

Comments and Responses
Bernard Heuvelmans, Colin P. Groves, Peter F. Brussard and Janet Wright, Jack Lapseritis, Frank E. Poirier, Dmitri Bayanov, Michael Heaney, Michael J. Shields, Rene Dahinden, Grover S. Krantz, Ashley Montagu, Pascal Tassy, Glen J. Kuban, Marcellin Agnagna, Christine M. Janis, John R. Sibert, Richard Ellis, Kelvin M. Britton, Roy Wagner, J. Richard Greenwell, Jon-Erik Beckjord, Elizabeth C. Smith, Ron Westrum

VOLUME 4 (1985)—116 pp.

Articles
A Classificatory System for Cryptozoology by J. Richard Greenwell; *On the Possible Identification of the Egyptian Animal-God Set* by Michael D. Swords; *Towards an Etymology of Maori* Waitoreke by John Becker; *The Case of the Pygmy Gorilla: A Cautionary Tale for Cryptozoology* by Colin P. Groves; *Sole Pads and Dermatoglyphics of the Elk Wallow Footprints* by Susan Cachel

Research Reports
Estimating the Probability of Non-Detection of Low Density Populations by David C. Guynn, Jr., Robert L. Downing, and George R. Askew

Field Reports
Identification of the Ri Through Further Fieldwork in New Ireland, Papua New Guinea by Thomas R. Williams; *LCPI Work at Lake Champlain, 1985* by Joseph W. Zarzynski; *Investigation in the Lake Champlain Basin, 1985* by Richard D. Smith

Book Reviews
Cat Country: The Quest for the British Big Cat (Di Francis) by Lena G. Bottriell; *The Loch Ness Mystery Solved* (Ronald Binns) by Adrian Shine; *Mysteries: Encounters with the Unexplained* (John Blashford-Snell) by J. Richard Greenwell; *Monsters: A Guide to Information on Unaccounted-for Creatures, Including Bigfoot, Many Water Monsters, and Other Irregular Animals* (George M. Eberhart, comp.) by William R. Corliss; *Living Wonders: Mysteries and Curiosities of the Animal World* (John Michell and Robert J. M. Rickard) by Jerome Clark; *Mysterious America* (Loren Coleman) by George W. Earley; *Wildman: Yeti, Sasquatch and the Neanderthal Enigma* (Myra Shackley) by Susan Cachel

Comments and Responses
Robert J. Meier, Roy P. Mackal, Rainer H. Brocke and Fred G. VanDyke, Robert L. Downing, Michel Raynal, John Becker, Dmitri Bayanov, Graham C. Joyner, Frank E. Poirier, Michael K. Diamond, J. Richard Greenwell

VOLUME 5 (1986)—152 pp.

Articles
Annotated Checklist of Animals with Which Cryptozoology is Concerned by Bernard Heuvelmans; *Investigating Sasquatch Evidence in the Pacific Northwest* by James A. Hewkin; *The Likelihood of Persistence of Small Populations of Large Animals and its Implications for Cryptozoology* by Peter F. Brussard; *The Yahoo, the Yowie, and Reports of Australian Hairy Bipeds* by Colin P. Groves

Research Reports
Biochemical Analyses of Preserved Octopus Giganteus *Tissue* by Roy P. Mackal

Field Reports
First Photos of the Yeti: An Encounter in North India by Anthony B. Wooldridge; *LCPI Work at Lake Champlain, 1986* by Joseph W. Zarzynski; *Results of the New World Explorers Society Himalayan Yeti Expedition* by Marc E. Miller and William Cacciolfi; *Investigations and Systems Tests in the Lake Champlain Basin, 1986* by Richard D. Smith

Book Reviews
Savage Shadow: The Search for the Australian Cougar (David O'Reilly) by Malcolm Smith; *Search for the Tasmanian Tiger* (Quentin Beresford and Garry Bailey) by J. Richard Greenwell; *Seeungeheuer: Fabeln und Fakten* [Sea Monsters: Fables and Facts] (P. Werner Lange) and *Fabelwesen des Meeres* [Fabulous Creatures of the Sea] (Sonnfried Streicher) by Herman Reichenbach; *Champ: Beyond the Legend* (Joseph W. Zarzynski) by Henry H. Bauer; *The Great Sea-Serpent Controversy: A Cultural Study* (Paul Lester) by Charles Thomas; *The Evidence for Bigfoot and Other Man-Beasts* (Janet and Colin Bord) by John Green; *The Sasquatch and Other Unknown Hominoids* (Vladimir Markotic and Grover S. Krantz, eds.) by Roderick Sprague

Comments and Responses
Zhou Guoxing, Benoit Grison, Jean-Jacques Barloy, Jean-Paul Debenat, Bernd Würsig and Greg Silber, Nikolai Spassov, J. Richard Greenwell, Ingo Krumbiegel, John W. Olsen, Michael D. Swords, Grover S. Krantz, Susan Cachel, James D. Lazell, David C. Guynn and Robert L. Downing and George R. Askew, Di Francis, Roderick Moore, Lena Bottriell, Edward B. Winn

Volume 6 (1987)—152 pp.

Articles
Why Cryptozoology? by Dmitri Bayanov; *Fossil Ungulate Mammals Depicted on Archaeological Artifacts* by Christine Janis; *A Reconstruction of the Skull of* Gigantopithecus blacki *and Its Comparison with a Living Form* by Grover S. Krantz; *The* tzuchinoko, *an Unidentified Snake from Japan* by Michel Dethier and Ayako Dethier-Sakamoto; *Cloning Extinct Genes* by Rif S. El-Mallakh

Research Reports
The Wilson Nessie Photo: A Size Determination Based on Physical Principles by Paul H. LeBlond and Michael J. Collins

Field Reports
New Signs of Sasquatch Activity in the Blue Mountains of Washington State by Lonnie Somer; *LCPI Work at Lake Champlain, 1987* by Joseph W. Zarzynski; *Observations of Two Lines of Sasquatch Tracks in Oregon* by James A. Hewkin; *Investigations and Sonar Testing at Lake Champlain, 1987* by Richard D. Smith and William L. Konrad

Book Reviews
Les Survivants de l'Ombre [Survivors of the Shadows] (Jean-Jacques Barloy) by Eric Buffetaut; *Quaternary Extinctions: A Prehistoric Revolution* (Paul S. Martin and Richard G. Klein, eds.) by J. Richard Greenwell; *Les Félins-Mystère: Sur les Traces d'un Mythe Moderne* [The Mystery Felines: On the Track of a Modern Myth] (Jean-Louis Brodu and Michel Meurger) by Jean-Paul Debenat; *Curious Encounters: Phantom Trains, Spooky Spots and Other Mysterious Wonders* (Loren Coleman) by Raymond D. Manners

Comments and Responses
Thomas Tomasi, Michel Raynal, Christine Janis, Victor A. Albert, Bernard Heuvelmans, Dmitri Bayanov, Graham C. Joyner, Colin P. Groves, Charles A. Reed, Daniel Taylor-Ide, Anthony B. Wooldridge, J. Richard Greenwell, Frank E. Poirier, Michael Heaney, Jean-Paul Debenat, Gunter G. Sehm, Thomas R. Williams, Lorna E. Lloyd

Volume 7 (1988)—136 pp.

Articles
The Sources and Method of Cryptozoological Research by Bernard Heuvelmans; *Osteological Evidence for the Prior Occurrence of a Giant Gecko in Otago, New Zealand* by Aaron M. Bauer and Anthony P. Russell; *The "Monster" Episode in Adomnan's* Life *of St. Columba* by Charles Thomas; Waitoreke, *The New Zealand "Otter": A Linguistic Solution to a Cryptozoological Problem* by John Colarusso

Research Reports
A Mathematical Analysis of "Snowman" (Wildman) Eyewitness Reports by Valentin B. Sapunov

Field Reports
The First Japanese-Congolese Mokele-Mbembe Expeditions by Tokuharu Takabayashi; *LCPI Work at Lake Champlain, 1988* by Joseph W. Zarzynski

Book Reviews
Naturalized Mammals of the World (Sir Christopher Lever) by J. Richard Greenwell; *Kadimakara: Extinct Vertebrates of Australia* (Pat V. Rich and Gerard F. Van Tets, eds.) by Aaron M. Bauer; *Thylacine: The Tragedy of the Tasmanian Tiger* (Eric R. Guiler) by Malcolm Smith; *The Beast of Exmoor: Fact or Legend?* (Trevor Beer) by Karl P. N. Shuker; *The Enigma of Loch Ness: Making Sense of a Mystery* (Henry H. Bauer) by Robert H. Rines; *The Loch Ness Monster: The Evidence* (Steuart Campbell) by Richard Fitter; *Sticking My Neck Out! By Nessie* (Edward H. Armstrong) by Jack A. Gibson

Comments and Responses
Pascal Tassy, Nikolai Spassov, Michel Raynal, Christine Janis, John S. Buckley and Sally Y. Shelton, Grover S. Krantz, Aaron M. Bauer and Anthony P. Russell, Michel Dethier and Ayako Dethier-Sakamoto, Roy P. Mackal, Steuart Campbell, Paul H. LeBlond, Hugh H. Trotti, Eric Buffetaut, Graham Joyner, J. Richard Greenwell, Colin P. Groves, Dmitri Bayanov, James A. Hewkin, Richard D. Smith

Volume 8 (1989)—160 pp.

Articles
Reminiscences of the Discovery of the Coelacanth, Latimeria chalumnae *Smith* by Marjorie Courtenay-Latimer; *Paleocryptozoology: A Call for Collaboration Between Classicists and Cryptozoologists* by Adrienne Mayor; *Analysis of the Australian "Hairy Man" Data* by Malcolm Smith; *The Case for a Legal Inquiry into Sasquatch Evidence* by John Green; *Sasquatch Footprints: A Proposed Method of Fabrication* by Donald Baird

Field Reports
Further Investigations into the Reported Yeren—*The Wildman of China* by J. Richard Greenwell and Frank E. Poirier; *AAS Underwater Elapsed Time Camera Silhouette Photography Experiments at Loch Ness, 1989* by Harold E. Edgerton, Charles W. Wyckoff, Robert H. Rines, Robert Needleman, and Justice C. Rines; *Results of Chimpanzee Pheromone Use in Snowman (Wildman) Field Investigations* by Valentin B. Sapunov; *LCPI Work at Lake Champlain, 1989* by Joseph W. Zarzynski; *Continuing Sasquatch Investigations in the Pacific Northwest* by James A. Hewkin; *BCCC Report on Okanagan Lake, 1989* by John Kirk

Book Reviews
An Odd Bestiary (Alan James Robinson, illus., and Laurie Block, comp.) by J. Richard Greenwell; *The Southern Ark: Zoological Discovery in New Zealand 1769–1900* (J.R.H. Andrews) by Aaron M. Bauer; *King Cheetah: The Story of the Quest* (Lena Godsall Bottriell) by Colin P.

Groves; *A Living Dinosaur? In Search of Mokele-Mbembe* (Roy P. Mackal) by Michael Morales; *Monster Wrecks of Loch Ness and Lake Champlain* (Joseph W. Zarzynski) by Alastair Boyd; *Ogopogo: The True Story of the Okanagan Lake Million Dollar Monster* (Arlene Gaal) by Paul H. LeBlond

Comments and Responses
Michel Raynal, Edward B. Winn, Bernard Heuvelmans, Aaron M. Bauer, Ingo Krumbiegel and Gunter G. Sehm, John Colarusso, Thomas R. Williams, Stephen L. Zegura, Valentin B. Sapunov, Steuart Campbell, Paul H. LeBlond, Graham C. Joyner, Colin P. Groves, J. Richard Greenwell, Michael D. Swords, Robert G. Tuck, Jr. and Raul Valdez

Volume 9 (1990)—140 pp.

Articles
The Metamorphosis of Unknown Animals into Fabulous Beasts and of Fabulous Beasts into Known Animals by Bernard Heuvelmans; *The Thylacine: A Case for Current Existence on Mainland Australia* by Athol M. Douglas; *The Kellas Cat: Reviewing an Enigma* by Karl P.N. Shuker; *Scientific Discovery and the Place of the Yahoo in Australian Zoological History* by Graham C. Joyner; *A More Appropriate Procedure for Naming Sasquatch* by Michael Heaney

Field Reports
An Investigation into the orang-pendek, *the "Short Man" of Sumatra* by Deborah Martyr; *Recent Advances in the Search for the Living Giant Gecko of New Zealand* by Aaron M. Bauer and Anthony P. Russell; *The Eastern Panther on Film? Results of an Investigation* by Jay W. Tischendorf; *LCPI Work at Lake Champlain, 1990* by Joseph W. Zarzynski; *Sasquatch Investigations in the Pacific Northwest, 1990* by James A. Hewkin; *BCSCC Report on Okanagan Lake, 1990* by John Kirk

Book Reviews
Exotic Zoology (Willy Ley) by Aaron M. Bauer; *Mystery Animals of Britain and Ireland* (Graham J. McEwan) by J. Richard Greenwell; *Thunderbirds: The Living Legend of Giant Birds* (Mark A. Hall) by Angelo P. Capparella; *Mysterious Lake Pend Oreille and its "Monster": Fact and Folklore* (James R. McLeod) by Roy P. Mackal; *Champ: Beyond the Legend (Updated Edition)* (Joseph W. Zarzynski) by John Kirk

Comments and Responses
Ann Harnwell Ashmead, David S. Reese, Adrienne Mayor, Christine Janis, Stephen F. Kredel, Graham C. Joyner, Malcolm Smith, Grover S. Krantz, Mike Pincher, W. Ted Ernst, Jr., Barry Vogel, Peter Jaszi, John Green

Volume 10 (1991)—140 pp.

Articles
The Musk Ox in Eurasia: Extinct at the Pleistocene-Holocene Boundary or Survivor to Historical Times? by Nikolai Spassov; *Griffin Bones: Ancient Folklore and Paleontology* by Adrienne Mayor; *Some Ecological Notes on Reported Lagre, Unknown Animals in Lake Champlain* by Yasushi Kojo

Research Reports
Physical and Morphological Analysis of Samples of Fiber Purported to be Sasquatch Hair by Edward B. Winn

Field Reports
Further Investigation into Loys's "Ape" in Venezuela by Marc E. W. Miller and Khryztian E.

Miller; *BCSCC Report on Okanagan Lake, 1991* by John Kirk; *Sasquatch Investigations in the Pacific Northwest, 1991* by James. A. Hewkin

Book Reviews
Mysterious Creatures (The Editors of Time-Life Books) by Roy P. Mackal; *Mystiske Dyr: En Guide til Information om Soslanger, Havuhyrer, Afskyelige Snemaend og Andet Godt* [Mysterious Animals: A Guide to Information on Lake-Monsters, Sea Serpents, Snowmen, and Others] (Lars Thomas, comp.) by Henry H. Bauer; *Prodigious Birds: Moas and Moa-Hunting in Prehistoric New Zealand* (Atholl Anderson) by J. Richard Greenwell; *The Search for Nessie in the 1980s* (J. A. Gibson and David Heppell, eds.) by Aaron M. Bauer; *Big Footnotes: A Comprehensive Bibliography Concerning Bigfoot, the Abominable Snowman and Related Beings* (Danny Perez, comp.) by John E. Wall; *Tom Slick and the Search for the Yeti* (Loren Coleman) by Henry H. Bauer

Comments and Responses
Dmitri Bayanov, Bernard Heuvelmans, Hugh H. Trotti, Jr., Wes Sumerlin, James A. Hewkin, Mark A. Hall, Angelo P. Capparella, Errol Fuller, J. Richard Greenwell, Gunter G. Sehm

Volume 11 (1992)—164 pp.

Articles
Cryptophidion annamense, *a New Genus and Species of Cryptozoic Snake from Vietnam (Reptilia: Serpentes)* by Van Wallach and Gwilym S. Jones; *Large Peruvian Mammals Unknown to Zoology* by Peter J. Hocking; *Some Unpublicized Australasian "Sea Serpent" Reports* by Paul Cropper and Malcolm Smith; *Is There a Large, Unknown Primate in China? The Chinese Yeren or Wildman* by Frank E. Poirier and J. Richard Greenwell

Research Reports
Distributional Patterns of Cryptid Eyewitness Reports from Lake Champlain, Loch Ness, and Okanagan Lake by Yasushi Kojo

Field Reports
An Investigation of the Duende and Sisimite of Belize: Hominoids or Myth? by Mark Sanborne; *An Unmanned Motion-Sensitive Automatic Infrared Camera Tested in a Pacific Northwest Quest for Possible Large Primates* by Charles W. Wyckoff, Duane Marshall, Robert H. Rines, Justice C. Rines, and Patrick Brogan; *Champ Quest at Lake Champlain, 1991–1992* by Richard A. Deuel and Dennis J. Hall; *Sasquatch Investigations in the Pacific Northwest, 1992* by James A. Hewkin

Book Reviews
There are Giants in the Sea (Michael Bright) by Matthew A. Bille; *More Than a Myth: The Search for the Monster of Muskrat Lake* (Michael Bradley) by Henry H. Bauer; *Natural Mysteries: Monster Lizards, English Dragons, and Other Puzzling Animals* (Mark A. Hall) by Aaron M. Bauer; *Mystery Cats of the World: From Blue Tigers to Exmoor Beasts* (Karl P. N. Shuker) by Colin P. Groves; *They Stalk by Night: The Big Cats of Exmoor and the South-West* (Nigel Brierly) by J. Richard Greenwell; *In the Tracks of the Yeti* (Robert A. Hutchison) by Daniel Taylor-Ide; *Hunting the Gugu: In Search of the Lost Ape-Men of Sumatra* (Benedict Allen) by Rosalind Ribnick

Comments and Responses
Dmitri Bayanov, John H. Acorn, Adrienne Mayor, Malcolm Smith, Henry H. Bauer, Yasushi Kojo, Robert A. Campbell, Philip A. Cochran, James A. Hewkin

THE ISC NEWSLETTER

Back Order Listing

All back issues of *The ISC Newsletter* are available for US$3.50 (or £2.50) each, postage included ($4.50 or £3.00 to institutions). A discount of 10% will be granted on all publications orders between $33 and $100 (or £23–£69), 20% on orders between $101 and $200 (or £70–£138), and 30% on orders of $201 (or £139) or more. Newsletter and journal orders may be combined to qualify.

To order, make a copy of this listing, circle the desired newsletters (or prepare your own list), and mail with your payment to the ISC Secretariat, P.O. Box 43070, Tucson, Arizona 85733, U.S.A. All orders must be prepaid. Only institutions will be invoiced.

Volume 1, No. 1 (Spring, 1982)
Formation of the Society; *Congo Expeditions Inconclusive*; *Message from the Editor*; *"Mystery Cats" Stalk Again*; *"Extinct" Bird Found*; *Hoax Claimed for Ape Canyon Incident*; *Neanderthal Survival Proposed*; *Aquatic Animal Puzzles Ohioans*; *Recent Scientific Literature 1981–1982*; *Cryptoletters, Cryptoquote*

Volume 1, No. 2 (Summer, 1982)
Lake Champlain Monster Draws Worldwide Attention; *That* Is *Incredible*; *Canadian "Lake Monsters" in the News*; *Message from the Editor*; *Sasquatch in Washington State: New Reports Involve Footprints*; *Chesapeake Bay Monster Filmed on Videotape*; *Goodyear Blimp Joins Search for Nessie*; *Cryptotrips, Cryptoletters, Cryptoquote*

Volume 1, No. 3 (Autumn, 1982)
Walla Walla Casts Show Dermal Ridges; *Champ Photo Analysis Supports Animal Hypothesis*; *Board of Directors Meets in Vancouver*; Cryptozoology *Editorial Board Established*; *Message from the Editor*; *Honorary Members Elected*; *Cryptoletters, Cryptoquote*

Volume 1, No. 4 (Winter, 1982)
Log Ness Monster?; *Gray's Harbor Update*; *Walla Walla Update*; *Message from the Editor*; *Sea Monster Exhibit at the Seattle Aquarium*; *Mini-"Lost World" at 8500 Feet*; *Society Expeditions Mechanism Established*; *Sustaining Members*; *First Issue of* Cryptozoology *Published*; *Cryptotrips, Cryptoletters, Cryptoquote*

Volume 2, No. 1 (Spring, 1983)
Interview (Paul H.
LeBlond and Forrest G. Wood); *Nessie's 50th Birthday*; *Message from the Editor*; *Champ Passes New York Assembly*; *Chessie Videotape Analysis Inconclusive*; *Cryptoletters, Cryptoquote*

Volume 2, No. 2 (Summer, 1983)
New Guinea Expedition Observes Ri; *Board of Directors Meets in New York*; *First Society Membership Meeting*; *Message from the Editor*; *Cryptozoology Books—1978–1983*; *Erastus Corning 2nd* (obituary); *Cryptotrips, Cryptoletters, Cryptoquote*

Volume 2, No. 3 (Autumn, 1983)
Interview (Roy P. Mackal); *Message from the Editor*; *The Beast of Exmoor*; *News & Notes*; *Cryptoletters, Cryptoquote, Wood's Animal Facts*

Volume 2, No. 4 (Winter, 1983)
Congolese Biologist Observes Mokele-Mbembe; *Ness Teams Crowd Loch*; *Sustaining Members*; *Message from the Editor*; *News & Notes*; *"Sea Serpents" Seen Off California Coast*; *Cryptoletters, Cryptoquote, Wood's Animal Facts*

Volume 3, No. 1 (Spring, 1984)
Evidence for New Bear Species in Nepal; *Lloyds of London to Insure Ogopogo*; *Message from the Editor*; Cryptozoology *in* Nature; *Second Volume of* Cryptozoology *Published*; *ISC Membership Meeting*; *Lake Champlain Update: 1983*; *Cryptoletters, Cryptoquote, Wood's Animal Facts*

Volume 3, no. 2 (Summer, 1984)
Proposed Sasquatch Hunt Stirs New Controversies; *New ISC Board Decisions*; *Membership Meeting in Paris*; *Message from the Editor*; *Special Interview* (Marcellin Agnagna); *ISC Journal Criticized Again*; *Cryptoletters, Cryptoquote, Wood's Animal Facts*

Volume 3, no. 3 (Autumn, 1984)
Interview (Bernard Heuvelmans); *Controversial Sasquatch Hunt Unsuccessful*; *1985 Membership Meeting Scheduled*; *ISC Secretariat for Europe Established*; *Message from the Editor*; *ISC Policy Statement*; *Cryptozoology Symposium to be Held in Brighton*; *Cryptoletters, Cryptoquote, Wood's Animal Facts*

Volume 3, No. 4 (Winter, 1984)
Retouching of Nessie Flipper Photo Claimed—Denied; *Hoax Claimed for Wilson Photo*; *Message from the Editor*; *San Diego Meeting Details*; *Brighton Symposium Reminder*; *"Fantastic Zoology" to be Addressed in Germany*; *Evolutionist Simpson Criticizes Cryptozoology*; *George Gaylord Simpson, 1902–1984*; *Sustaining Members*; *Cryptoletters, Cryptoquote, Wood's Animal Facts*

Volume 4, No. 1 (Spring, 1985)
New Expedition Identifies Ri as Dugong; *New Nepal Bear Now in Doubt*; *Second Megamouth Found*; *Prank of Mammoth Proportions*; *Message from the Editor*; *North Idaho Cryptozoology Club*; *New Appointments to Editorial Board*; *Brighton Symposium Program*; *1984 Journal Published*; *Cryptoletters, Wood's Animal Facts*

Volume 4, No. 2 (Summer, 1985)
Interview (Rene Dahinden); *CSICOP Publishes Further Nessie Criticisms*; *ISC Board Meets in San Diego*; *San Diego Membership Meeting*; *Message from the Editor*; *Membership Meeting for 1986 Set*; *News & Notes*; *Cryptoletters, Wood's Animal Facts*

Volume 4, No. 3 (Autumn, 1985)
Giant Octopus Blamed for Deep Sea Fishing Disruptions; *1986 Meeting*; *ICSEB III Cryptozoology Symposium*; *Message from the Editor*; *News & Notes*; *Cryptoletters, Wood's Animal Facts*

Volume 4, No. 4 (Winter, 1985)
Thylacine Reports Persist After 50 Years; *Two New Onza Skulls Found*; *Stafford Lake Monster Caught*; *Message from the Editor*; *Sustaining Members*; *Groves Joins Editorial Board*; *Final Chicago Program*; *Cryptoletters, Wood's Animal Facts*

Volume 5, No. 1 (Spring, 1986)
Onza Specimen Obtained—Identity Being Studied; *Jared Diamond Tackles Cryptozoology*; *Message from the Editor*; *News & Notes*; *Cryptoletters, Wood's Animal Facts*

Volume 5, No. 2 (Summer, 1986)
Interview (Arlene Gaal); *Ivory-Billed Woodpecker Found Alive in Cuba*; *Chicago Membership Meeting*; *ISC Board Meets in Chicago*; *Message from the Editor*; *Society Foundation Group Formed*; *Clark, Heppell Join Board of Directors*; *Loch Ness Yields One Secret*; *Cryptoletters, Wood's Animal Facts*

Volume 5, No. 3 (Autumn, 1986)
Mokele-Mbembe: New Searches, New Claims; *Giant Fish Reported in China*; *Bluff Creek Remembered*; *Message from the Editor*; *1987 Meetings Scheduled*; *Cryptoletters, Wood's Animal Facts*

Volume 5, No. 4 (Winter, 1986)
First Yeti Photos Spark Renewed Interest; *Message from the Editor*; *1987 Meeting*; *Sustaining Members*; *News & Notes*; *Cryptoletters, Wood's Animal Facts*

Volume 6, No. 1 (Spring, 1987)
Close Encounter in Lake Okanagan Revealed; *Sasquatch Given Fossil Name*; *Raiders of the Lost Auk*; *Würsig, Zug Join Editorial Board*; *David James, 1919–1986*; *Message from the Vice President*; *Final Edinburgh Program*; *Cryptoletters, Wood's Animal Facts*

Volume 6, No. 2 (Summer, 1987)
Interview (Grover S. Krantz); *Memphré Christened, Given Dual Citizenship*; *Message from the Editor*; *The Tabloids That Time Forgot*; *Cryptoletters, Wood's Animal Facts*

Volume 6, No. 3 (Autumn, 1987)
Cryptozoology Books 1980–1987; *Message from the Editor*; *News & Notes*; *Cryptoletters, Wood's Animal Facts*

Volume 6, No. 4 (Winter, 1987)
Nessie Symposium Highlight of Edinburgh Meeting; *1988 Membership Meeting*; *Giant Bear Sought by Soviets*; *Message from the Editor*; *Sustaining Members*; *John Napier, 1917–1987*; *New Honorary Members, Wood's Animal Facts*

Volume 7, No. 1 (Spring, 1988)
World's Largest Gecko Discovered; *Nessie Survives Deepscan Sonar Probe*; *Tim Dinsdale, 1924–1987*; *Message from the Editor*; *Cryptoletters, Wood's Animal Facts*

Volume 7, No. 2 (Summer, 1988)
Interview (Marie-Jeanne Koffmann); *Report: Maryland Meeting*; *Sasquatch Symposium Planned*; *Wood, Groves Join Board of Directors*; *Message from the Editor*; *Gorillas Rediscovered in Nigeria*; *Cryptoletters, Wood's Animal Facts*

Volume 7, No. 3 (Autumn, 1988)
Bermuda Blob Remains Unidentified; *Soviets Form Cryptozoology Society*; *Sasquatch Symposium*; *Message from the Editor*; *Society for Scientific Exploration*; *Cryptoletters, Wood's Animal Facts*

Volume 7, No. 4 (Winter, 1988)
Florida "Giant Penguin" Hoax Revealed; *Third Megamouth Found*; *Onza Identity Still Unresolved*; *Message from the Editor*; *Best, Capparella Join Editorial Board*; *Sustaining Members Continue to Increase*; *Cryptoletters, Wood's Animal Facts*

Volume 8, No. 1 (Spring, 1989)
(Special 16-page Coelacanth 50th Anniversary Issue)
The Coelacanth—50 Years Later; *Special Interview* (Hendrik Goosen); *Special Interview* (Marjorie Courtenay-Latimer); *Message from the Editor*; *Selected Coelacanth Bibliography*; *J.L.B. Smith Institute*; *Society for the Protection of Old Fishes*; *Coelacanth Conservation Council*

Volume 8, No. 2 (Summer, 1989)
Interview (John Green); *Message from the Editor*; *Note to Historians*; *1990 Meeting Planned for England*; *Cryptoletters*; *Wood's Animal Facts*

Volume 8, No. 3 (Autumn, 1989)
The Eastern Puma: Evidence Continues To Build; *Message from the Editor*; *Nessie Symposium Proceedings Published*; *Guildford Meeting*; *Obituaries*; *Cryptoletter*; *Wood's Animal Facts*

Volume 8, No. 4 (Winter, 1989)
Pullman Symposium Reviews Sasquatch Evidence; *TV Show Leads to Reptile Discovery*; *Message from the Editor*; *Sustaining Members, 1989*; *British Columbia Cryptozoology Club*; *Sir Peter Scott, 1904–1989*; *Guildford Conference: Final Reminder*; *Cryptoletter*; *Wood's Animal Facts*

Volume 9, No. 1 (Spring, 1990)
New Evidence Supports Existence of Pygmy Elephant; *Message from the Editor*; *Harold E. "Doc" Edgerton, 1903–1990*; *Capt. Goosen Dies*; *New Field Medical Advisor*; *Cryptoletters*; *Wood's Animal Facts*

Volume 9, No. 2 (Summer, 1990)
The Nessie Debate: A Panel Discussion on the Loch Ness Monster; *Message from the Editor*; *Good News for UK/European Members*; *First Journal Issue Reprinting*; *Back Publications Discounts*; *Best Named Mammal Journal Editor*; *New Chinese Wildman Investigation*; *Cryptozoological Sonics on CD*; *Cryptoletters*; *Wood's Animal Facts*

Volume 9, No. 3 (Autumn, 1990)
Folklore and Cryptozoology Subject of Joint Conference; *Yemen Monitor Described*; *Message from the Editor*; *Fieldwork Fails to Ferret Out Mysterious Mustelid*; *1991 Meeting Program*; *Cryptoletters*; *Wood's Animal Facts*

Volume 9, No. 4 (Winter, 1990)
Search for Giant Gecko Intensifies; *Message from the Editor*; *Cryptids on Canadian Stamps*; *Nessie Bibliography Available*; *News & Notes*; *Membership Survey*; *Sustaining Members, 1990*; *European Secretariat Closed*; *Cryptoletters*; *Wood's Animal Facts*

Volume 10, No. 1 (Spring, 1991)
Cryptozoology Books 1987–1990; *Message from the Editor*; *Membership Survey*; *Cryptoletters*

Volume 10, No. 2 (Summer, 1991)
Megamouth VI Caught Alive and Studied; *Highlights of Galveston Meeting*; *1992 Membership Meeting to be Held at Brown University*; *Message from the Editor*; *10th Anniversary Fundraising Drive*; *Ingo Krumbiegel, 1903–1990*; *Cryptoletters*

Volume 10, No. 3 (Autumn, 1991)
The Bigfoot Debate: A Panel Discussion on the North American Sasquatch; *Iranian Gecko Cut Down to Size*; *Tabloid Writers Sleeping Well* (editorial); *Andre Capart, 1914–1991*

Volume 10, No. 4 (Winter, 1991)
The Bigfoot Debate—Part II: A Panel Discussion on the North American Sasquatch; *The* Danta *and the Horse-Bear* (editorial); *Sustaining Members Reach 300*; *Cryptoletter*

THE
EASTERN COUGAR
CONFERENCE,
1994

A meeting of those interested
in the history, mystery,
current status and future
of
the Eastern Puma
the Ghost Cat of North America

June 3, 4, 5, 1994
Gannon University
Erie, Pennsylvania

Organized and sponsored by:

American Ecological Research Institute
— AERIE

Department of Biology, Gannon University

Friends of the Eastern Panther

Eastern Puma Research Network

International Society of Cryptozoology

Special Topics

The USFWS/Clemson Project * The Bruce S. Wright Story * Folklore and the Catamount Federal Perspectives * The Canadian Cougar Recovery Team * Florida Panther Update Black Cats and Circus Trains * Biopolitics and Recovery * Tracks and Sign Great Plains Cougars * Latest Evidence Skins, Skulls, and Subspecies

For Details Contact:
Jay Tischendorf
American Ecological Research Institute (AERIE)
P.O. Box 380, Fort Collins, Colorado 80522

INSTRUCTIONS TO AUTHORS

Conditions

It is a condition of publication in *Cryptozoology* that submitted manuscripts have not been previously published in other journals, and will not be simultaneously submitted or published elsewhere. The author/s agree/s that copyright is transferred to the Society if and when the manuscript is accepted for publication. The copyright covers the exclusive right to reproduce and distribute the published work and/or its illustrations in any form, and in translation into any other language.

Manuscript Submissions

All manuscripts must be *letter-quality typed and double-spaced*. The last name/s of the author/s must appear in the top, right-hand corner of every manuscript page. All pages must be numbered.

Authors are requested to submit, together with the manuscript, a 3.5-inch or 5-inch IBM-compatible computer disk containing a file of the complete text readable by WordPerfect or WordStar programs. Such disks permit more efficient editorial work at the ISC Secretariat, and avoid expensive typesetting labor at the printers. Authors who do not have access to computer facilities may submit manuscripts without such accompanying computer disks. Articles and Research Reports are reviewed by two referees for scientific content, originality, and clarity of expression, and the Editor may suggest deletions or revisions before acceptance.

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 mandatory, and 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, maps and tables are welcome, but original artwork and black and white photographs are required (color slides are not acceptable). All such material should be labeled as numbered "Figures" or "Tables," which must be cited in the text. On a separate sheet following the References Cited, the author/s should provide the figure and table captions. 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.

Research Reports

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 mandatory, and must conform to the referencing instructions appearing below. Manuscripts should detail specific research findings which can be quantified. Illustrations, tables, and graphs are welcome, but original artwork and black and white photographs are required (color slides are not acceptable). All such material should be labeled as numbered "Figures" or "Tables," which must be cited in the text. On a separate sheet following the References Cited, the author/s should provide the figure and table captions. Subheadings should be: *Introduction* (which should give some background on the problem in general and the case in question in particular), *Method*, *Results*, and *Discussion*. Manuscript length is left to the discretion of the author/s, although a minimum of 1,000 words is expected.

Field Reports

These manuscripts should report on cryptozoological fieldwork. 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 complete 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 or others in the same geographic region should also be mentioned); *Narrative Description* (in which the field activities are described; e.g., lake surveillance, equipment used, 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). All such material should be labeled as numbered "Figures" or "Tables," which must be cited in the text. On a separate sheet, the author should provide the figure and table captions. Manuscripts should be limited to a maximum of 1,500 words (longer manuscripts will be considered in special circumstances).

Book Reviews

Reviews of cryptozoological books or monographs, or books on scientific topics which have a direct bearing on cryptozoological matters, may be submitted unsolicited. It is recommended, however, that authors first contact the Editor to ensure that the book is not already being reviewed. Only one manuscript copy need be submitted. Manuscript length is left to the discretion of the author. Authors are requested to examine the journal for book review format.

Comments and Responses

Readers wishing to critique or comment on works previously published in the journal may do so. Comments not relating to works previously-published in the journal will not be accepted (such comments may be submitted in the form of letters to *The ISC Newsletter*). Authors wishing to respond to comments on their previously-published works may do so. The length of Comments and Responses is left to the discretion of the author/s, but may be shortened by the Editor if they are considered too lengthy. Two manuscript copies should 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 complete 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*. Comments and Responses should be titled, but subheadings should not be included. The name/s and address/es of the author/s should be followed by a line space and then a brief statement, italicized and in parentheses, describing specialties or interests (e.g., "John Smith is a mammalogist with a special interest in the evolution of bats").

Referencing (Articles and Research Reports Only)

The last name/s of the author/s being cited, followed by the year of publication, should be placed in parentheses within the text itself. If the authors already are mentioned in the text, only the year need appear in parentheses. At the end of the manuscript, starting on a *new* page and under the capitalized heading of References Cited, the manuscript's formal references should be listed in alphabetical order by author/s (note that only references actually cited in the text should be listed). If several publications by the same author/s are cited, these should be listed in chronological order with the oldest publication appearing first. Both the authors' complete first (given) and second names *should be spelled out*, and the year of the publication should be set off under the author's name. The names of journals, popular magazines, and books *should be completely spelled out and unabbreviated*. Volume numbers (in Arabic) and pages should be included or dates in the case of newspapers and popular magazines), and book titles should be followed by the city of publication, a colon, and the name of the publisher.

Notes and footnotes should *not* be included. Authors should attempt to include such comments within the text itself. Contributors are urged to consult an issue of the journal and/or consult the Editor when in doubt.

INTERNATIONAL SOCIETY OF CRYPTOZOOLOGY

Society Purpose and Policy: The International Society of Cryptozoology was founded in 1982 in Washington, D.C., and is incorporated and operates under the laws of the District of Columbia. It is also recognized by the U.S. Internal Revenue Service as a tax-exempt, non-profit scientific organization. The Society serves as a focal point for the investigation, analysis, publication, and discussion of all matters related to animals of unexpected form or size, or unexpected occurrence in time or space. The Society also serves as a forum for public discussion and education, and for providing reliable information to appropriate authorities. The Society takes no position on which of these supposed animals may actually exist. Opinions may be expressed by individual members, but they are personal ones, and do not reflect any official or unofficial Society policy. Likewise, the Society takes no position concerning the authenticity of any given cryptozoological evidence or events.

Memberships and Subscriptions: Membership and subscription inquiries should be addressed to the ISC Secretariat. Membership is US$32 or £22 a year. Payment may be made by personal check if drawn against a U.S. or U.K. bank. Persons donating any additional amount become Sustaining Members. Membership includes the receipt of *The ISC Newsletter* quarterly and the journal *Cryptozoology* annually. Couples may take out a joint membership for US$37 or £25 (only one set of publications is sent). Institutions such as corporations, zoological parks and aquariums, and libraries may obtain institutional subscriptions to the Society's publications for US$45 a year. There are no additional fees for memberships or institutional subscriptions outside of the U.S.A. Although payment by non-U.S./U.K. members is preferred in US$ or £ Sterling (by bank draft drawn against a U.S. or U.K. bank, or international postal money order), individuals in Canada, France, Germany, Holland, Ireland, Italy, and Switzerland may pay by personal cheque in their own currencies provided the equivalent of US$32 (using the exchange rate current at the time) is sent. Members in other European countries may pay by Eurocheque in £ Sterling provided that £22 is sent. Eurocheques in other currencies cannot be accepted.

Honorary Members: Marjorie Courtenay-Latimer (South Africa); John Green (Canada); The Lord Hunt of Llanfair Waterdine (U.K.); Marie-Jeanne Koffmann (Russia); Theodore Monod (France); Robert Titmus (Canada).

Benefactors: Rolf Auster (U.S.A.); G. A. Buder, III (U.S.A.); Robert C. Dorion (Guatemala); Michael T. Martin (U.S.A.); Gale J. Raymond (U.S.A.); Hugh H. Trotti, Jr. (U.S.A.); Kurt Von Nieda (U.S.A.); Edward B. Winn (Switzerland); Bette Wolfskill (U.S.A.); Count F. C. Zedlitz (Argentina).

Corporate Sponsors: Academy of Applied Science, Concord, New Hampshire, U.S.A.; The Conservation Agency, Jamestown, Rhode Island, U.S.A.