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THE CALIFORNIA GRIZZLY and the ORIGIN OF A MARITIME ECONOMY

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THERE HAVE BEEN MANY postulated origins of the maritime culture of the Southern California coast. Wallace (1955) and Meighan (1959) have presented an evolutionary sequence from littoral collecting to hunting of sea mammals and the eventual full exploitation of the marine environment characterized by deep-sea fishing. Warren's (1968) analytical approach interpreted the sequence similarly, using environmental pressure as the agent of change. Kroeber (1939) suggested possible Polynesian influence, and D. B. Rogers (1929) and the Harrisons (1966) considered the maritime economy to have resulted from migration of maritime people down the California coast to the channel area. The Harrisons, ignoring similarities in assemblages with Pinto Basin people (Spanne 1969: 494), suggested the origins to be Cape Krusenstern and the Chukchi Sea in western Alaska. The current study presents ecological hypotheses which, like Warren's, rely on environmental stress and avoid speculative and relatively untestable reference to maritime immigration.

There have been many instances in which lower

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faunal species have applied pressure on man, forcing him to modify his behavior: large areas of Africa are uninhabited and systematically avoided by man due to the prevalence of the tsetse fly and its resultant sleeping sickness; certain tropical areas are also avoided when the malaria-carrying anopheles mosquito is in abundance; and cyclical invasions of locusts have rendered entire regions incapable of supporting human life. The purpose of this study is to suggest that the California grizzly bear (*Ursus arctos californicus*) likewise had a profound effect on the aboriginal population of the Santa Barbara Channel area: 1) the presence of large numbers of grizzlies resulted in the human inhabitants' adoption of a largely maritime substantive economy, or 2) the presence of large numbers of grizzlies *at least* affected aboriginal settlement patterns, or both. Substantiation and modification of these hypotheses will be presented in the following pages.

The grizzly is one of the largest and most dangerous animals in North America. Storer and Tevis (1955:41) report an average weight of 500 pounds for females and 600 pounds for males, with the maximums being twice those figures. Mills (1919: 251-252) writes, "Few grizzlies weigh more than 700 pounds, though exceptional specimens are known to have weighed more than one thousand . . . It may be that years ago, when not so closely hunted, the grizzly lived longer and grew to a larger size . . ." The first recorded dimensions of a grizzly come from the diary of Fray Juan Crespi (Bolton 1926: 168-169): During the summer of 1769 in what is currently San Luis Obispo County the soldiers of the Portolá expedition killed a bear which ". . . measured fourteen spans [approximately 10 feet, 6 inches] from the soles of its feet to its head . . . and it must have weighed 375 pounds." Although the grizzly was large it was capable of remarkable dexterity, especially when employing its forepaws which were equipped with claws 2.4 to 3.7 inches long (Storer & Tevis 1955: 33). Thus, combining bulk, agility and substantial weaponry, the grizzly could rise on the hind feet to an erect posture of over 10 feet in height with excellent balance. This he did when reaching for food or offering combat — an ominous sight indeed.

Although extinct since the 1920s, most of California

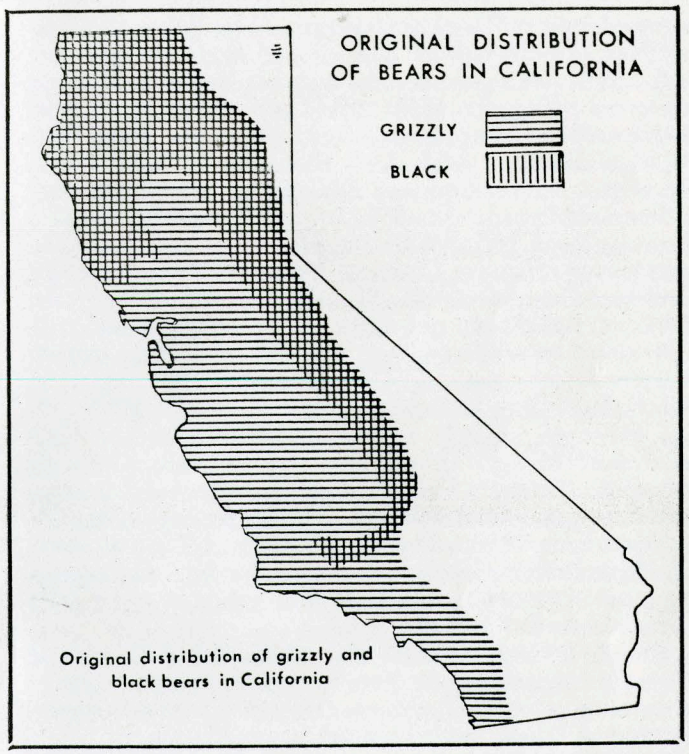

Figure 1. (After Storer and Tevis 1955).

was at one time the domain of the grizzly (see Figure 1). Newberry (1857: 47) refers to the black bear as ". . . the bear of the forest, while the grizzly is the bear of the chaparral." Though preferring the latter, grizzlies exhibited high adaptability to the many environmental zones they occupied throughout the state. Storer and Tevis (1955: 21) suggest that this adaptability may have been a major factor in their attaining such a high level of population.

Grizzlies achieved their greatest density in the low altitude areas south of San Francisco Bay — specifically in the chaparral, ". . . the most characteristic plant association for all but the desert areas of Southern California" (Aschmann 1959: 38). The first historical suggestion of a large bear population was again

reported by the Portolá expedition. Near San Luis Obispo they saw "troops of bears," and found large areas of land plowed up where the animals had been digging for roots (Teggart 1911: 59-61). Concerning a ride between San Marcos and Santa Ynez in 1834 Don Agustin Janssens said, "All the way we saw bears, for it was winter and . . . the acorns were dropping" (Ellison & Price 1953: 25). In 1840 two men counted ". . . eighteen grizzlies in one afternoon . . . under the oaks eating acorns in Cholame Valley," San Luis Obispo County (Grinnell 1937: 88). Ramón Ortega, *mayordomo* of Rancho Sespe, claimed that he counted over 100 grizzlies while riding from Mission San Buenaventura to the ranch (Cleland 1940: 105). Also in the channel area George Nidever (Grinnell 1937: 49-51) killed 45 in 1837 and estimated that he had slain a total of 200 grizzlies in the state. Finally, John C. Fremont, during a U.S. military invasion of Mexican territory, reported killing 12 grizzlies in one thicket in the San Luis Obispo Valley (Fremont & Emory 1849: 27). Even after making allowances for fictional reporting one is forced to conclude that grizzlies were once abundant in California.

Joseph Grinnell (1938: 75) attempted a numerical estimate: assuming one bear per "twenty square miles of suitable territory," and one third of the state occupied in that density, he suggested a population of 2,595 adults for the period prior to 1830. Storer and Tevis (1955: 26) have included many more sources than the previous estimate and they consider the figure of 10,000 — the bulk of which would have apparently roamed the chaparral of the southern coast — to be a conservative estimate.

Storer and Tevis (1955: 56) compare the omnivorous grizzly to man in that it ate virtually anything that was available; certainly this contributed to the great adaptability of both species, but the similarity is closer yet, specifically in the geographical area in question. It appears that in the channel area both species, man and grizzly, maintained the same preferences for subsistence. The bears relied primarily on berries, rodents, small game, fish and acorns. Since Alaskan grizzlies regularly fish the inlets for salmon (Holzworth 1930: 297) it is reasonable to assume that

the California species exploited similar resources in its area. Although Storer and Tevis (1955: 58) consider it ". . . unlikely that grizzlies regularly killed the agile herbivores," they feel that occasional surprise attacks and prey upon slowed or injured individuals did occur. This is certainly reasonable considering the many cattle lost to grizzlies during the mission period. Also, Storer and Tevis report many historical accounts of bears feeding on whales which had been washed ashore.

More accounts mention acorns than any other food; apparently the oak provided the staple for both the grizzly and the aboriginal populations wherever available. Even in the historic period both species would migrate to the local oak groves during the fall. Aside from shellfish consumption by Indians the only apparent differences between grizzly and human diets were related: 1) historical accounts mention that the later human inhabitants occasionally kept bear cubs, possibly for ritual feasts; 2) grizzlies were known to supplement their diet with an occasional Indian. These differences assume that the aborigines, like the grizzlies, were not cannibalistic. It is clear that in the Santa Barbara Channel area man engaged in a hunting and gathering economy was in direct competition with grizzly bears for the same ecological niche.

It is generally accepted that the mass of vegetation in an area does not reflect the mass of animal life that it can support. Aschmann (1959: 56) points to the faunal abundance of many grasslands as the prime example. Two factors are involved: the proportional content of the vegetable matter (cellulose *vs.* starches, sugars and protein), and the mineral content of the soil. Aschmann maintains that the "pronounced" seasonality of vegetative growth in Southern California, which is determined largely by winter and early spring rains, combined with an "adequate supply" of minerals, has resulted in favoring plants which invest much of their energy in storing concentrated food in their reproductive parts. These plants, in turn, are capable of maintaining a relatively rich fauna.

Even assuming the significant carrying capacity of the local energy sources, a closer analysis will amplify the competition between man and bear. Kroeber (1939:

131-181) estimates the prehistoric Indian population in California to be 133,000, 35,000 to 40,000 of which lived in Southern California; the figure becomes approximately 30,000 if inhabitants of non-grizzly areas are excluded. Assuming 5,000 to be a conservative estimate of the number of grizzlies living in the same area, one finds the ratio of six Indians per bear. Furthermore, if the average body weight of the aboriginal inhabitants was approximately 100 pounds (adults and children combined), and the average weight of the California grizzly was 600 pounds, the result is a one-to-one ratio of bio-mass — with both species exploiting the same energy sources. It can also be viewed as if there were twice as many Indians (in bio-mass) than actually existed in the area. This estimate implies, for purposes of illustration, that one grizzly required the equivalent caloric-intake of six Indians — in fact, due to their great bulk and hyperactivity, they would have required much more. These estimates are admittedly based on compounded speculation. However, combined with the indications of local seasonal food shortages (Landberg 1965: 85), they probably reflect the proper magnitude of competition.

This competition was not limited to the abstract and impersonal pursuit of two species for a finite amount of energy; it often took the more concrete form of violent confrontation between man and beast. Since only the latest aboriginal inhabitants possessed adequate weapons to protect themselves from grizzly attack man spent the greater part of California prehistory in perpetual fear of his competitor. This is reflected in the recorded attitudes of Indians towards grizzly bears. A Shasta reported: "The biggest man is scared of a grizzly . . . If you hear one, it scares you to death. You may not know you are shaking until you light your pipe . . . Nothing else has that power" (Holt 1946: 311).

In 1841 Dr. Pickering of the U.S. Exploring Expedition wrote that Indians ". . . kept to the hills and other high ground, very carefully avoiding the favorite resorts of this animal" (Cassin 1858: 14). William Kelly (1851: Vol. 2: 93) mentioned that Indians wanted to remain with his exploring party all night because they were afraid of being attacked by the bears which were

in abundance in the area. It was also reported that in 1772 at Mission San Luis Obispo bears had caused much destruction and ". . . not a few of the Indians showed that they had been lacerated and maimed by their terrible claws" (Hittell 1885: 347). Finally, in a report to the Spanish government, the fathers of Mission Santa Ynez wrote that the Chumash Indians ". . . in gathering their fruits and similar wild seeds . . . were continually in danger of being attacked by the bears" (Engelhardt 1932: 15). These attitudes and numerous instances of fatal attacks substantiate a level of intense competition and frequent contact between the local Indian and grizzly populations.

Aschmann (1959: 34) maintains that geologic evidence indicates no major climatic changes in Southern California for the past 10,000 years. However, since most of the area is either arid, semi-arid or subhumid, even minor climatic fluctuations would have a significant effect on the local flora and consequently the animal populations supported by it. By studying the growth rates of the ancient California sequoias scientists have been able to estimate prehistoric climatic change for most of North America, and California in particular. A rapid increase in rainfall around 1200 B.C. was preceded by a period of maximum aridity; the same is again monitored for approximately 1000 A.D. (see Figure 2).

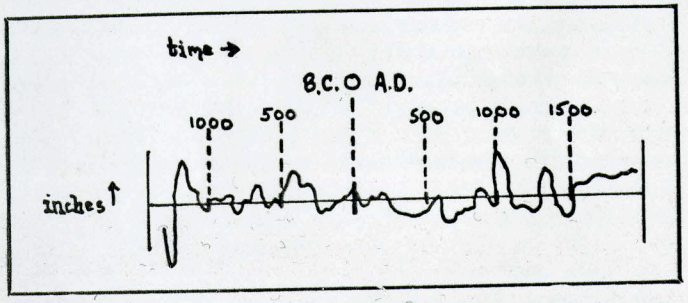

Figure 2. Relative variations of rainfall in U.S.A. (After Brooks 1949: 343).

In a modification of the basic hypothesis the current study proposes that the "Hunting People" of the Santa Barbara Channel area were merely another species of

organism in a delicately balanced ecology. When a period of inordinate rainfall (approximately 1000 A.D.) indirectly caused a rapid increase in the population of a competitor with whom the Indians could not effectively deal they were forced to choose between constant confrontation with grizzly bears and a shift in subsistence emphasis. The archaeological record indicates that the latter was the choice.

The test implications of this hypothesis are listed below:

1) We would expect to find later adoption of a maritime economy in adjacent areas with less rainfall and fewer bears. This is apparently the case. Wallace (1955: 226) mentions that although the late period sites (maritime culture) ". . . can be placed within a time span of from about 1000 A.D. to contact times . . . there appears to have been a definite cultural lag in the southern part of the region."

2) We would expect to find less reliance on maritime resources in areas where hypothesized competition with grizzlies was less severe. Warren (1968: 7) mentions that ". . . the importance of the sea mammal hunting becomes progressively less toward the south along the coast," and the maritime influence ". . . becomes progressively less strongly felt." This decline in influence coincides with the estimated progressive decrease in grizzly bear density.

3) We would expect to find a tool kit which lacks the appropriate weapons to successfully combat grizzlies. In a description of Canaliño cultural assemblages Wallace (1955: 225) refers only to "small, stemless concave and convex-base" projectile points; and Aschman (1959: 47), in a fine example of subtle social commentary, remarks that "The technology of the California Indians never has received a very good press from the white man, perhaps because the implements that might be used for war were undeveloped." It has also been suggested (Richardson 1959: 57) that fire was the aboriginal inhabitants' only effective weapon against the grizzly.

4) We would expect to find more grizzly bones *per capita* in the archaeological remains at the time of increase than before.

5) We would expect to find rainfall fluctuations affecting existing bear populations (specifically under analogous climatic conditions).

6) We would expect to find that the paths from the coast to the inland settlements were located in relatively bear-free areas.

The last three implications are untestable with the available literature but are well within the realm of possible analysis. An alternate hypothesis which may initially appear more plausible is presented:

The original or "Oak Grove" inhabitants lived on the coast, employing a simple technology in pursuit of a primarily gathering economy. Their tool kit, although containing weapons capable of killing large animals, certainly did not encourage confrontation and therefore did not allow these early inhabitants to compete successfully with grizzlies; they remained on the coast, gradually extending their sphere of exploitation to shore fish and sea mammals. The technology developed for the latter food source, combined with the increasing population density resulting from it, preadapted these early maritime "hunting people" to inland hunting. In other words, they stayed on the coast in relative safety until they had the tools and the impetus to shift their subsistence emphasis inland.

Test implications:

1) We would expect not to find large projectile points in early (Oak Grove) sites. Wallace (1955: 220) summarizes under the heading "Oak Grove Projectile Points": "*Few*, large and crude." Warren (1962: 2) reports that "projectile points are *rare*, crudely made and rather large, suggesting the use of darts, rather than bow and arrow" (my emphasis).

2) We would expect not to find evidence of large land mammals in early sites. Warren (1968: 6) reports for the "Encinitas Tradition" (Oak Grove) ". . . plentiful remains of shellfish," but that fish and mammal bones are rare.

3) We would expect to find some evidence of large land mammals along with sea mammals at "Hunting People" sites. Rogers (1929: 358) reports bones of the following animals for Hunting People sites: deer, puma, black bear, seal, and smaller animals.

4) We would expect to find only small (if any) Oak Grove sites in the interior.

5) We would expect to find later sites in the interior (the critical element would be a more sophisticated tool kit).

Although some positive evidence is aavilable, the last two test implications require further research and excavation of the inland area.

A final hypothesis which would apply for all stages of Channel area prehistory is also presented:

Aboriginal inhabitants lived in areas of low grizzly bear concentration.

Test implication:

1) We would expect not to find sites in areas of historically recorded dense bear populations. Storer and Tevis (1955: 111) summarize many accounts which would prove useful in a test of this implication; *e.g.*, in May of 1772, short of food, the governor and 13 soldiers marched from Monterey to the *Cañada de los Osos* (Valley of the Bears) near San Luis Obispo. In a period of three months they had sent back 25 loads, or about 9,000 pounds, of jerked bear meat to help support Missions San Carlos and San Antonio. It was also reported that Indians avoided this valley for obvious reasons.

In addition to being an exercise in the method of multiple hypotheses testing the purpose of the present study is to stimulate more concern for the possible influences of ecological factors on human behavior. Man has never achieved full control of his environment — not in prehistoric California, and certainly not now.

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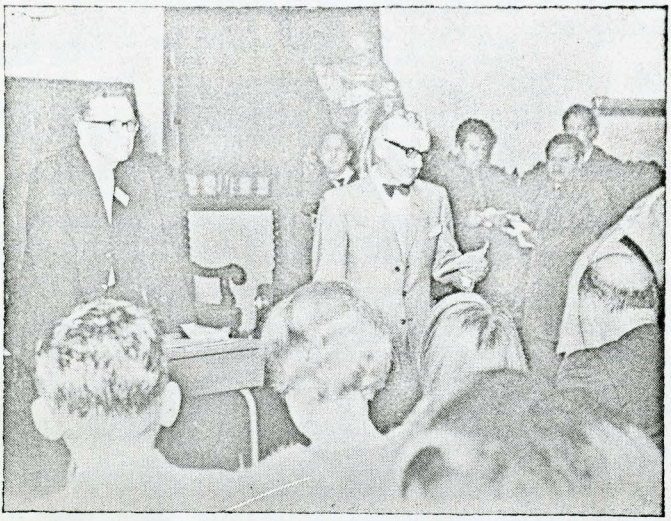

Hasso von Winning, Southwest Museum, is seen at right introducing Professor Thomas S. Barthel at the recent Congress of Americanists in Lima, Peru.

DECIPHERMENT OF INCA WRITING REPORTED

One of the highlights of the International Congress of Americanists, held in Lima, Peru, August 2-9, 1970, was the presentation of the "First Results in Deciphering the Inca Writing", by Prof. Thomas S. Barthel, of Tübingen University, Germany. Until recently it was taken for granted that writing systems did not exist in Precolumbian America outside of Mesoamerica, and therefore Prof. Barthel's discoveries elicited much interest and were given worldwide news coverage.

Hasso von Winning, representing the Southwest Museum, had the privilege to chair this Symposium of the Congress which included several other important contributions on the subject of Native Writing Systems.

RE MOJAVE SHAMANS

To clarify a footnote in Dr. K. M. Stewart's paper, "Mojave Indian Shamanism," which appeared in a recent issue of THE MASTERKEY, Professor George Devereux writes from Paris:

> Professor K. M. Stewart (MASTERKEY 44: 17, note 4) states that I mention "non-specialist shamans" among the Mojave. My sentence reads: "... shamanistic specialists, non-specialist shamans and laymen sometimes describe the symptoms of a given illness in a variety of ways," etc. The key

GRIZZLY BEAR LECTURE

Saving Our Large Carnivores

Intro: Support and personnel working on project

There has always existed a direct conflict between man and the large carnivores. They have been man's hereditary enemy - the object of hate, terror, and superstition.

Primitive man had his problem with the saber tooth tiger and for centuries the cultivators of India have been in mortal fear of the tiger.

The African aborigine and the lion competed for dominance; with the lion having the edge in this age-old conflict.

The American Indian feared and respected the Grizzly. Before the coming of the Europeans, the big bears rather than man dominated the scene. They had little fear of any living creature and were at the top of the food chain.

This fear was passed on by the Indians to the early trapper and settler. They learned first hand of the grizzly's savageness and took every opportunity to kill him.

As land-use became intensive and as population density increased the conflict between man and grizzlies became more acute. Grizzly numbers dwindled. Man dominated the scene. Conflict will increase in the future -- man can and will exterminate the grizzly unless more constructive action is taken to preserve them.

Today the puma or mountain lion, the wolf, and the grizzly bear are endangered species. Even the coyote is hard put to hold its own.

What is needed to assure them protection, to prevent them from going down the road to extinction?

1. Wilderness habitat - National Parks and forests - we must fight to hold these against competing land uses.

2. More biological and ecological information.

3. An educational program - biological facts to replace tales of hate and terror.

Early History

Let me briefly outline some salient facts in the short history of the Grizzly bear. White men have known of his existence for 420 years. Scientists have known him for only 2 life spans (15~~5~~ 7 years). He could leave the scene before we have even become biologically acquainted.

1974
1540
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Coronado was probably the first among the early explorers to see grizzly bears. West Central New Mexico - 1540.

The party of Sebastian Vizcaino observed grizzlies feeding on dead whales along the coast of Monterey, California, 1602.

1690 Henry Kelsey was probably the first white man to describe the grizzly and to kill one.

Samuel Herne gave an account of hides of grizzlies he had seen in the Canadian Arctic, 1771.

Lewis and Clark - 1804-06. - collected them and wrote a scientific discription.

Hugh Glass. - Early Western history.

Hunter, trapper, settler, all took a toll of grizzlies.

The grizzly has disappeared from Texas, Kansas, Arizona, New Mexico, Oregon, Utah, and the Dakotas. In California where it was once numerous, there has been no record of a grizzly for ~~38~~ 40 years. It has been estimated (Storer and ~~Tracey~~ Trevis) that California supported 10,000 grizzlies at one time.

Rough estimates indicate the number of grizzlies left in the United states, excluding Alaska, may lie between 500 and 1,000. Thus there is need for detailed ecological studies of the grizzly throughout its present range if it is to be preserved and intelligently managed.

In 1959 we began a long-term research project in Yellowstone National Park. We have been supported by the U. S. Fish and Wildlife

Service, the National Park Service, the National Geographic Society, the Wildlife Management Institute, and the National Science Foundation.

Short Range Objectives

1. To determine population density and the carrying capacity of the range in Yellowstone National Park.
2. To determine present population level and structure and the effect this may have, if any, on reproduction.
3. To observe and record breeding behavior of marked individuals in a population.
4. To determine mortality rate of adults, yearlings, and cubs, and relate this to habitat condition and population density.
5. To record movement and territorial behavior of marked individuals and of family groups.

Long Range Objectives

1. Determine with marked known-age animals the breeding age of males and females.
2. Observe behavior and follow the fate of marked family groups over a period of years.
3. Attempt to develop age criteria from a collection of known-age specimens.
4. Obtain growth and development rates from marked known-age animals.
5. Gather food habits data and attempt to evaluate the role of the grizzly as a predator.
6. Record age-specific mortality and set the stage for eventually determining longevity of individuals and population turnover.
7. Relate habitat conditions to population size and structure.
8. Make management suggestions based on data obtained.

First Magazine

slide

1. It is readily apparent why the grizzly bear received the scientific name of Ursus horribilis.
2. A large boar weighs more than a large lion or tiger. This one would tip the scales at 6 or 700 pounds. Some weigh over 1000 pounds. A large black bear will weigh 500 to 600, the Alaskan brown 14 to 1500.
3. The grizzly was a creature of the open plains and river bottoms.
   a. early days - Lewis and Clark.
   b. present day.

   The breeding season is from mid-June to mid-July. Boars and sows travel together at this time.
4. Fierce battles ensue during the breeding season.
   a. boar vs. boar
   b. sow vs. boar
5. This old boar shows the scars of battle - an ear missing from an earlier encounter - a raked face from a formidable challenger.
6. Characteristics of the grizzly.

   Old boars and sows without families travel alone.
7. It is characteristic of the grizzly.

   Such a sight would have stirred the blood of a mountain man.
8.
9.
10.
11.
12.
13.
14. Bear grazing.

    Approximately 80% of their food is vegetation.
15. Bear congregated - Have habit of congregating where food is abundant.

16. Elk thistle - a favorite plant food.

Like other animals bears have food preferences. "The beast that walks like a man." -- The beast that eats like a man. Bear and Indian competed for the same food. Competed directly for many food items.

17.

18.

19.

20.

21.

22.

23.

24.

25. Cones - In fall he turns to the bright orange berries of the Mt. Ash and pine nuts. Especially the white bark and limber pine. He seeks them while they are still green and eats nuts and cone alike.

26. Buffalo -

Although the grizzly is a vegetarian by necessity he has the carnivore's lust for meat and will eat it either fresh or putrid. With no aversion to eating one of his own kind when opportunity offers. No land mammal was too large for him to kill. Buffalo weakened by a hard winter were easy prey.

27.

28. Bear on elk.

The end of a titanic struggle. A 700 lb. bear and an 800 lb bull elk. Behavior at kill.

29.

30. Dig hole - This is the animal we wanted to study.

31. To gain new knowledge we had to have this formidable creature in hand where we could measure, weigh and mark him.

A tasty morsel is irresistable to most bears. We captured them in culvert traps.

32. Shooting bear.

A more sporting proposition and also effective was immobilizing free-roaming bears with drugs. A drug-loaded propulsive syringe dart is fired into the bear at close range.

33. Large bear at stream.

Grizzlies cover great distances in search of food, their keen noses directing them in their foraging.

34.

35. Bear in trap - through bars.

Some submissive, some violent.

One tore three bars out of this trap. The bars are ½" steel.

Second Magazine

1.

2. Frank putting dart in gun.

3. Describe succinyl choline chloride - It is a short-acting muscle relaxant. Chemically it is di-acetyle choline. It substitutes for acetyl choline in the body. . . .etc. Not an anesthetic.

4.

5. Describe effects of succinyl choline on bear.
Jaws and forelimbs first to be effected. Then hind limbs, intercostal muscles and diaphragm. Respiration slowed. May become depressed with overdose.

6. Raise the gate with trepidation.

7. Nembutal is an anesthetic and puts the bear in a deep sleep. Loses sensory perception, respiration becomes depressed. Affects the cerebrum.

8. Hauling bear out - Careful to give bear enough drug but not too much.

9. Examples:

10. Some come out head first.
Aver. dose sucostrin - 1 mg. to 3-5 lbs of body weight.
Aver. Dose nembutal - 1 c.c. (250 mg. per c.c.) per 16-18 lbs of body weight.

11. 3 bears in 2 traps -- story of how we processed them.

12.

13.

14. Bear coming out of drug.
a. Can hold them for a while if sucostrin is used.
b. Dangerous with nembutal.
Multiple doses: Circumstances when used -- cautions.

15. We have trapped, marked and immobilized 77 grizzlies.

16.

17. Bear's mouth - 42 teeth; 12 inc., 4 canines, 16 pre-molars, 10 molars. Many mammals can be aged by tooth wear and tooth replacement. The procedure in the past has been to kill the animal and study his dentition at leisure and in safety.

Bears were too rare to kill for this purpose.

18. We solved the problem by making dental casts while the bear was asleep. Used geltrate for the impressions.

19. And dental stone to pour the casts.

20.

21.

22.

23. Many scientists are collaborating with us on various aspects of the study. As much information as possible is squeezed out of each bear -- and this includes the milk. Oxytrocin.

The ~~demise~~ chemical composition of mammalian milk is proving a key to phylogenetic relationships. Dr. Jennes, University of Minnesota.

24.

25. Cub nursing sow - Strange happenings occur.

This cub decided he had prior rights on mother's milk. Story of cub nursing anesthetized mother.

(Cardiograph)

26. We are in an age of instrumentation and we have carried it to space before we have begun to apply it freely on terra firma. Dr. Braun and Dr. Pfiefer.

27. We plan to track grizzlies and follow their movements with radio.

28. Details of method and affixing ~~during~~ dummy transmitter.

29. Sequence of bear charging

A little disinfectant on the ears and the bear is ready to go -- sometimes he jumps the gun.

30. And sometimes he decides to come instead of go.

31. A little unsteady - yes, but with nearly full command of his tremendous power.

32. A second to size up the situation.

33. He is upon us and we seek safety in vehicles and trees.

34. He was really going not coming and we happened to be in his way. When one really changes and several have -- there are no pictures taken.

Third Magazine

1. Cubs - color variation.
2. Cubs known-age data.
3. Cubs " " "
4. Cubs were captured by shooting them at night at the sides of their mothers. Working on them with the sow and other bears nearly always was risky business.
5. The young man is supposedly on guard, should an angry sow enter the circle of light.
6. It was safer to hold cubs overnight and work on them in daylight. After a period of struggle and bawling, they settle down and rapidly become friends if there is food in sight.
7. Weighing -- Bob Howe's question.
   Answer - we told Bob we had taken care of that. When we get areally big mean bear we changed attire putting on a ranger hat and coat.
8. The world looks beautiful to a released cub, but he soon joins mother and appears to promptly forget his experience. She smells him thoroughly, accepts his strange markings and then rolls on her back to let him nurse.
9.
10.
11.
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15.
16.

17. Too heavy a dose of drug causes depressed respiration, lack of O_2. Artificial respiration is remedy. Mouth to mouth technique is not recommended.

18. Resusitator

O_2 is administered by tracheal catheter.

19. Retrap - Value of retrapped bears.

Only 12 different bears retrapped.

Wt. changes - Bear No. 1 weighed 200 lbs when captured in 1959. Weighed 520 lbs when re-captured 427 days later in 1960. Weight and growth gain of 320 lbs - a 160% increase over former weight. Averages over 7/10 lbs. per day for 427 days.

20. Photographing from inside trap.

21. Recognizable bears - scars, markings etc.

22.

23.

24.

25.

26.

27.

28.

29. Inge.

30. Bears in water feeding.

31. This is just the beginning of a long-range study. We have done the ground work and perfected techniques that will now begin to show results. Slowly they will yield the information we need.

32. What are some of the things we have learned to date:

1. We know from our counts, from retrapping and from ratios of marked to unmarked animals observed in the population that

there are a minimum of 165 bears in Yellowstone National Park.

33. That the ratio of sub-adults to adults is about 1 to 1, that the sex ratio ~~of the same~~ is 1 to 1 and that the annual increment is about 15 to 20 percent.

34 and 35. We are learing a lot about behavior of individual bears, behavior of family groups and the population unit as a whole. Daily and seasonal movements are taking on a pattern. This is showing us what bears require in the way of habitat.

36. Most important, we have convinced ourselves at least, that old silvertip is worth saving, that conflict between man and bear can be minimized. And that when we know enough to practise intelligent management. It can be live and let live. There is room for both man and bear. There is room for man and the other large carnivores.

History of Grizzly

F.C.C. early lecture notes

Learning the Ways of Grizzly Bears (manuscript, Science Year)

page 3

Ref at end of paper

The Saskatchewan Natural History Society

AN ORGANIZATION OF NATURALISTS AND CONSERVATIONISTS

Publishers of
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A JOURNAL OF NATURAL HISTORY AND CONSERVATION FOR SASKATCHEWAN AND ADJACENT REGIONS

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P.O. BOX 1121,
REGINA, SASKATCHEWAN,
CANADA

December 9th
~~July 27th~~, 1971.

Dr. Frank Craighead,
Moose, Wyoming, U.S.A.

Dear Dr. Craighead:

It was my pleasure to make your acquaintance on our visit to Moose in July and I wish to thank you for the time you took in discussing grizzly bears.

I enclose a number of photographs in which you indicated that you would be prepared to offer an opinion. I also enclose a copy of the Blue Jay which gives a little background information. Since this publication, we have accumulated a very substantial amount of historic information on the status of the grizzly in Saskatchewan and I believe that the situation could be summarized by saying that the grizzly was widespread through the province up to a century ago and that there is the possibility that a small group of grizzlies have remained in the Pasquia Hills which is a wild and inaccessible area, relatively undetected. The first bear was shot in a trap, and the large picture of it lying on its back supplements those in the magazine. The head-on picture is of a bear which was shot by Mr. Stonehouse in 1954 when it charged him at his trapper's cabin.

There are two different sets of tracks. In the black and white photo taken in 1967, the knife measures three and six-tenth inches, and the scale is more obvious in the other photographs taken in 1969.

I have enclosed some slides of plaster casts taken of a female bear who was accompanied by two cubs in 1970. It left two toes and two claws in a bear trap which it had carried nine times across the Pepiquan River. Dr. Youngman, Curator of Mammals at the National Museum of Canada, has said that he is 95% certain that these toes and claws are those of a grizzly.

My experience in dealing with experts in general is that they can give a definite opinion on the basis of a skull but they fall back on generalizations when it comes to either tracks or photographs of shot bears. I would be most grateful if it were possible for you to give me an opinion on any of these photographs and I will be even more grateful if any of them could be considered 100% certain.

..... 2.

July 27th, 1971.

I enjoyed making your acquaintance this summer and the aluminum casts of your grizzly bear tracks make an interesting feature in our living room and a talking point for years. We are having the N.A. Whooping Crane Association meeting in Regina next year and it would be a pleasure to reciprocate your hospitality should you be passing through Regina.

Yours truly,

Tom White.

Tom White,
Chairman of the Conservation Committee.

January 15, 1972

Mr. Tom White
Post Office Box 1121
Regina, Saskatchewan
Canada

Dear Mr. White:

Since receiving your letter, I have compared the photographs you enclosed with color transparencies of numerous grizzlies, as well as black bears. On a basis of these comparisons, and my research work involving the handling of hundreds of grizzlies and years of closely ovserving both grizzlies and blacks, I would say that almost certainly the bear shot in 1937 as well as the one in 1954 are both grizzly bears. The head and face of the '54 bear has all the characteristics of a grizzly. Also, the right paw shows the long front claws adapted for digging as opposed to the shorter recurved ones of the black bear. The same characteristics are revealed in the 1937 bear, although the length of the front claws are not as well illustrated. However, they are whitish in tint, which is often but not always a characteristic of many grizzly bear claws.

Tracks vary so with the imprint conditions that they are often quite difficult to identify in the field, and even more so in photographs. The picture of the track with the knife beside it looks very much like that of the front foot of the grizzly. In soft mud I would not expect to see any greater indication of the elongated claws.

Judging from the pictures you sent me, I feel quite certain that you have, or recently have had, grizzly bears in the Pasquia Hills. Although you would like a definite statement, I don't think that any sincere scientist could say on the basis of photographs alone, that you have grizzly bears. However, based on your pictures and my experience with

both grizzlies and blacks, I feel quite certain that these are grizzly bears.

If the dead bears were not the last of a small grizzly bear population, it will certainly be interesting to know just how many still exist and how few grizzlies can live in an area and still maintain a population.

Sincerely,

Frank C. Craighead, Jr.

FCC,Jr.:mr

Returned photographs (22)