THE ENERGETICS OF

SUBSISTENCE-ASSURANCE RITUAL IN NATIVE CALIFORNIA

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Tribes and Territories of California Indians

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INTRODUCTION

Within the ecologically diverse natural environments of aboriginal California, variable methods of resource exploitation characterized native cultural groups. Kroeber (1925: 523-526), Beals and Hester (1960: 73-83), Baumhoff (1963), and others have commented upon the diversity of hunting, gathering, fishing, and flood-plain agriculture subsistence techniques and strategies which integrated human populations into stable ecological systems. Within these systems, natural complexity of food resources established the general nature of California resource technology:

> "The California Indian, then, secured his variety of foods by techniques that were closely interrelated, or where diverse, connected by innumerable transitions. Few of the processes involved high skill or long experience for their successful application, none entailed serious danger, material exposure, or even strenuous effort. A little modification, and each process was capable of successful employment on some other class of food objects. Thus the activities called upon were distinguished by patience, simplicity, and crude adaptability rather than by intense endeavor and accurate specialization; and their outcome tended to manifold distribution and approximate balance in place of high yields or concentration along particular but detached lines" (Kroeber, 1925: 525).

In proposing models of human populations in solar energy-based systems, Odum typifies cultural response of hunting and gathering peoples:

> "...culture in such a system must include a great knowledge of species properties, of seasonal cycles, and of the network in which he is embedded. Medicinal herbs, poisons, building materials, and animal products are available in great biochemical diversity, but in small quantities, so that considerable gathering energies are required" (1971: 105).

Several interactive ecological and energetic factors were operative in determining subsistence patterns in native California. The transitional adaptability of subsistence technology, when applied to a biological diversity

of resources such as acorns, pinyon nuts, mesquite beans, herbaceous seed and root plants, fish, and game animals, precluded major input or direction of energy by native societies into the ecosystems of which they were an integral part. The low-level energetic potential of subsistence techniques thus prevented major disruption through over-exploitation of environmental resources. It has been proposed that the broad application of a basic inventory of methods simultaneously conferred a great degree of ecological efficiency upon native economies (Kroeber, 1925: 524-525; Jones, 1951: 89). Adaptation of hunting and gathering strategies to the complexities of resource diversity in California (in particular, emphasis on the acorn economy) appears to have been sufficiently advanced to have supported aboriginal populations of greater density than native North American agriculturalists, and perhaps discouraged the acceptance of cultivated crops which were suitable to California climates (Heizer, 1958: 20-21).

However, a correlative hypothesis concerning the interaction of cultural and environmental factors in promoting the extractive efficiency of native economies must also be considered. An essential aspect of the diversity of major aboriginal food resources was the highly seasonal nature of their abundance. Efficient maintenance of an abundant and storable resource base required accurate organization and direction of maximum human energy potentials into subsistence pursuits at appropriate, and often critical seasonal intervals, when, for example, acorns and other tree crops ripened, herbaceous annuals matured, salmon runs began, and deer, antelope, or rabbit populations reached maximum density.

Whereas the broad adaptation of material technology to the efficient exploitation of food resources has been discussed and documented at length in the ethnographic literature, the importance of ideational systems such as world view and ritual in response to environmental systems of native California has received little attention, due to the generally non-analytic nature of much of the ethnographic data.[1] The large volume of ethnographic information does provide evidence that various aspects of world view and ritual behavior functioned to organize and adapt human cultures to the ecological permutations of subsistence in California. The present study is aimed at an examination of a specialized aspect of the relationship between world view and environment: the functions of specific ritual specialists (such as shamans, secret society headmen, ceremonial leaders, and formulists) in aboriginal systems of resource utilization.

An energetic systems approach, based on the analysis and reconstruction of an energy flow complex in native societies involving ritual regulation of gathering, fishing, and hunting activities, indicates a central

1 Notable exceptions are more recent examinations of culture-environment interaction in Native California by White (1963) and Bean (1972).

role of the ritual specialist in organizing subsistence behavior. Ritual personalities occupied a distinct, modular position within native societies, reinforced by world view and operating in the context of stereotypic ceremony which attributed social power to those individuals who internalized or ritually mediated the supernatural forces of nature. This potential for organization and regulation of subsistence energetics (especially of high level input by communal groups in response to seasonal availability of resources) was a significant factor in economic activity.

The hypothesis that adaptation of relatively unspecialized hunting and gathering societies to the ecological conditions of the California environment included a system of ritual "control" functions over subsistence behavior, requires consideration of specific questions concerning important areas of ethnographic data:

(1) The Ideational Context:
What features of world view in native California supported and socially sanctioned an ecologically manipulative role of shamans and other ritual specialists? How did belief in supernatural or ceremonial modes of control over natural process reinforce the overt, socially structured regulatory powers of ritual leaders?

(2) The Operational Context:
What were the cultural and environmental contexts in which these ritual control functions were performed? What aspects of rituals concerned with the acquisition of plant foods, fish, and game animals defined them as regulatory or managerial mechanisms?

(3) The Functional Context:
How may the functional role of the supernatural or ritual specialist be modeled to provide qualification of his position in aboriginal California societies with respect to subsistence energetics? Did the ritual direction of large-scale productive behavior serve to organize large groups at important seasonal intervals, and facilitate distribution of food resources? Was the energetic structure of subsistence ritual adaptive to the variable availability of food resources in California environments?

The analysis of the ideational and operational aspects of world view and ritual, which established a special complex of regulatory roles assumed by shamans and other ritual specialists in native California, provides basic perspectives concerning special adaptations of cultural systems to environmental pressures. An energetics model of ritually enforced control mechanisms directly relating to subsistence further emphasizes the general principles by which hunting and gathering societies maintained effective channels of energy transfer between food resources and human populations. Ritual regulation of environmental relationships in widespread cultural contexts, may have been a uniquely unifying response by native populations to the biological and energetic complexities of subsistence in California.

The Ideational Context: World View and the Ritual Specialist in Environmental Relations.

Of preliminary importance to understanding the regulation of ecological and energetic systems by shamans and other ritual specialists is a general discussion of those aspects of world view which ideologically supported ritual control mechanisms. In establishing the central position of the ceremonial personality within the complex of environment-culture interactions, several concepts relating to the cognitive organization of the native world require brief review: (1) the natural world was composed of supernatural, spirit-beings who controlled environmental process; (2) man was an integral part of the natural system, and was held accountable for the propriety of his actions toward the animate world; and (3) the abstract supernatural "power" and favor of spirit forces could be acquired and internalized by shamans, or otherwise mediated and obtained, for the benefit or the entire community, by the activities of ritualists in public ceremonies designed to insure the continued availability and abundance of natural resources. The integration of these concepts, common to world view systems of native California, provides the philosophical basis by which ritual systematized land-man relationships.

All native peoples of California manifested some fundamental belief in the animistic nature of the world. A basic theme of animism as a religious concept proposes that all biotic and abiotic phenomena are controlled by spirit forces possessing supernatural power and intelligence. The "spirit" world, as dichotomously distinct from the empirical reality of the "physical" world, was composed of an ordered assemblage of animate beings largely invisible in the normal activities of daily life:

> "Everything in this world talks, just as we are now, the trees, the rocks, everything. But we can't understand them, just as the white people

> do not understand Indians " (Nomlaki informant; in Goldschmidt,1951: 348).
>
> "Who's tending this sun, moon? Who moves them around? There must be somebody to look after this world..." (Nisenan informant; in Beals, 1933: 380).

Mythological traditions concerning the origins of human culture established the basis for the animate composition of the universe. In the beginning, superhuman beings (often animal culture-hero characters) inhabited the first world, ultimately creating men, women and the natural resources for their sustinence, while designating the cultural practices (technological and ritual) by which people could live and maintain proper balance with an animate natural environment. Plants, animals, mountains, springs, wind, rain, clouds, thunder, and numerous other entities comprised a mythically empowered system of supernatural agency, also capable of human rationality and emotion in reacting to the actions of men:

> "An Indian trapper in Nevada found his traps empty except one which held a large coyote. When the trapper was about to shoot, the coyote told him to stop and said in Paiute: 'My friend, we as people have found it necessary to warn you against trapping us, taking from our bodies our skins, and selling them for your happiness...'" (Owens Valley Paiute informant; in Steward, 1933: 310).

Within a supernaturally animate world, where natural process was governed by spirit -controllers of powerful dimensions, man and his culture were properly viewed as a small subsystem in an infinitely larger complex of interacting forces. As an integral part of nature, man played an important role in the supernatural causality of the world. The degree of ritual attention paid to the natural environment by its human inhabitants integrated and stabilized the relationships between the supernatural and "normal" dimensions of existence. The idealized ecosystem was a set of "feedback" interactions between man and supernatural forces, such that proper ritual conduct toward natural resources, for example, insured positive response from spirits who controlled the abundance or availability of animal and plant foods. This concept of reciprocity of natural process is exemplified in the widespread belief that the animate spirit of hunted animals (either an omniscient species-representative or a super-human "master of animals") must be ritually assuaged to provide abundant game. Drucker has noted the commonality of this concept in Northwestern California.

> "The spirit of the animal, salmon, deer , or whatever it might be, was induced to allow himself to be captured by performance of the proper ritual. Only if the flesh were properly handled 'with respect'...as informants say, would the spirit resume animal form and allow himself to be taken again" (Drucker, 1937a: 260).

A further example is found among the Southern Maidu in rabbit-hunting ritual:

> "The head hunter and the other hunters planned the hunt. It was necessary for them to speak in a whisper lest the rabbits hear them. When the first rabbit was killed, the head hunter picked it up, and pressing it tenderly against his chest, petted it and spoke soft words to it. All hunters sighed while he was going through this performance" (Faye, 1923: 40).

Thus, native world view implied that man was held strictly accountable for his behavior toward the natural world by supernatural sanction. If he did not give sufficient ritual support or respect to the animate forces of nature, he was upsetting the idealized system of interactions upon which the stability of the world depended. The resultant "negative feedback" from the spirit world in response to human negligence, which might be manifest in floods, earthquakes, disease, failure of food resources, and other potentially harmful phenomena, served to remind man of the ultimate homeostatic principles involved in the operation of the universe.

Within in a world of wilful supernatural forces, native world view incorporated the corollary premise of shamanistic power:

> "...namely, the belief that certain men, through communication with the animate supernatural world, had the power to accomplish what was contrary to, or rather above, the events of daily, ordinary experience, which the latter, in so far as they were distinguished from the happenings caused by supernatural agencies, were of natural, meaningless, and as it were, accidental origin" (Kroeber, 1907: 319).

Shamanism may be succinctly defined as the special, individual control of supernatural process through a personally acquired power of direct communication

with the spirit world. In California, the shaman was universally regarded as an individual who possessed an inordinate amount of supernatural power, which allowed him to have communication with and control over forces in the natural world, usually for benevolent social ends. While most persons might hope to acquire "luck" in daily pursuits through customary personal observances of material offering, prayer, and ritual restriction, the social and religious prominence of the shaman stemmed from his continuous relationship with personal "guardian" spirits, who communicated to him the methods by which he could effect cures of disease, manipulate climatic conditions, or control the availability of plant foods and game animals.

The variable nature of this "guardian spirit, " and the means by which it was acquired by the shaman have been previously summarized by Kroeber (1907: 327-334), Spier (1930: 245-265), and Park (1938: 75-88). In most cases, the shaman's spirit allies were animals; mammals, birds, reptiles, or fish, but often abiotic entities such as mountains, springs, clouds, or thunder served this purpose as well. Power might also be secured from anthropomorphic dwarfs, culture-hero characters of mythology, spirits of the dead or, as peculiar to Northwestern groups, special intrusive "pains" controlled within the body of the shaman. Acquisition of these spirit powers was everywhere a personal activity of the shaman, potentially accomplished within several broad categories of cultural practice: dreams, in which the supernatural form appears and establishes a dialogue with the shaman-to-be; involuntary visions, in which the shaman receives power in a conscious or semi-conscious state through a sudden encounter with a supernatural apparition; the vision quest, whereby the prospective shaman deliberately seeks communication with supernatural forces in isolated locations; or inheritance of power, techniques, or paraphernalia from another shaman, usually an immediate relation.

Within the complex of beliefs surrounding spirit sources and methods of acquiring supernatural powers, several philosophical concepts basic to shamanism in native California emerge. As previously discussed, the shaman possessed supernormal abilities, based on special communicative or control relationships with spirit forces encountered in dreams or visions, and is in all societies differentiated from the community at large as a religious or ritual specialist by virtue of his supernatural power. Relationships with these special supernatural forces were strictly the prerogative of the shaman, who alone might acquire and use them (Benedict, 1923: 68). Finally, in obtaining his supernatural ability, the shaman internalized the powers attributed to his guardian spirits, and was ipso facto regarded as a supernatural controller of process in the natural world.

As a culturally patterned embodiment of supernatural ability, the shaman occupied a unique position in native world view; his presence acted as a "control device" between the reciprocally functioning realms of normal and supernatural existence. The ritual obligations and activity of the shaman were undertaken to avert supernatural catastrophe and insure the stability and positive operation of interactions in the animate world. Although Kroeber (1922: 299) has remarked that shamanistic practice in California was more narrowly concerned with the causation, prevention and prediction of disease and death than elsewhere in native North America, influence upon ecological factors and the availability of natural resources was also largely attributed to shamanistic powers of integration and control, as among the Southern Maidu:

> "O'cpe or ho'cpe are a kind of doctors... They neither cure nor direct dances, but 'sing for luck.' In spring in the dark dance house, they sing night after night to make acorns, seeds, fish, ducks grow in abundance" (Nisenan informant; in Kroeber, 1929: 275).

and the Cahuilla:

> "He (the shaman) was able to 'create' food. When there was a scarcity of food, or when there was a prediction of scarcity, the puul (shaman) drew a miniature food-producing tree such as an oak from his hand during a public performance, thereby magically ensuring that the season's acorn crop would be plentiful" (Bean, 1972: 111).

The idealized principles of shamanistic power appear to have been further conceptually enlarged into a basic mechanism for the effective control over the complexity and uncertainty of the external world (i.e. the ecosystem) as reflected in DuBois' remarks concerning Wintu shamans:

> "The shamans as a sociological factor must not be minimized too much. In their hands lay the transmission and molding of speculative thought... Their reputation for knowing all that transpired exerted a deterring influence... They were called upon to predict the outcome of hunts, to restrain inclement weather, and in different ways allowed to direct and shape social undertakings" (1935: 118).

The interrelated elements of animism and shamanism in native world view have been briefly reviewed to preface the idea that the socially-sanctioned prerogatives and powers of shamans were a potential means of structuring social and economic activity. With particular reference to the idealized supernatural role of the shaman in determining the availability of natural resources, and the directive influence he exerted over the community by virtue of his supernatural ability, the shaman, as will be seen, often organized and ritually regulated important aspects of subsistence activity. However, in addition to the shaman, a large and culturally varied group of non-shamanistic personalities with specific regulatory powers over subsistence behavior must also be considered. By virtue of their institutionalized powers to initiate and enforce ritual behavior and place restrictions upon collection and/or consumption of food resources during periods of maximum seasonal availability, headmen, chiefs, formulists, and other personalities entered into ritual management systems, deriving cognitive support similar to that of the shaman. As "ritual specialists" responsible for mediation of nonempirical forces in public ceremonies (i.e. periodic rituals of the "first harvest" type) or in the actual direction of subsistence activities in ritual contexts, these individuals were also largely regarded as integrative forces who had socially defined regulatory powers.

Thus, of basic interest to the following discussion are the ceremonial duties assigned to both shamans and other ritualists which overtly structured the human ecology and energetics of subsistence in native California. The data to be presented indicate the extreme variability of the cultural and environmental situations in which this ritual organization took place. It will be noted that ritual regulation of subsistence activity in native California functioned at three main levels of organization:

(1) the activities of the shaman alone as the exclusive regulating force,

(2) the activities of the non-shamanistic specialist, such as the Cahuilla neʔ, the Yuma kwoxot, the salmon formulist of Northwestern California, or the Washo rabbit boss, who may similarly direct subsistence activity in <u>ritual</u> contexts; or,

(3) the co-operative efforts of shamans and other ritualists in the organization of economic behavior.

It has been previously postulated that native cultures regarded ritual as a means of maintaining "balance" in an animate universe. The ritual organization of subsistence, involving the regulation of large-scale

economic activities by specific ritual functionaries, was perhaps the basic process by which energetic equilibrium between human populations and resources was achieved.

The Operational Context: First Fruits Rites for Acorns and other Plant Foods; Formulism and other First-Fish Rites; Hunting Ritual.

In quantifying population-environment relations in native California, Baumhoff (1963: 161) has remarked that within the great diversity of food resources utilized by aboriginal peoples, acorns, salmon, and large game animals may be characterized as those resources which were procured and stored in sufficient quantities to be considered "ecological determinants." With this appraisal in mind, examples (for which sufficiently detailed ethnographic data are available) of first-fruits rites for acorns and several other plant foods of regional importance, salmon ritual, and hunting ceremony will be briefly described. Particular attention will be paid to the organizational role assumed by the central ritualist(s) in each case.

First Fruits Rites for Acorns and other Plant Foods: Some Selected Examples

The acorn is generally regarded as having been the basic staple of native populations in California; oak species of the genus Quercus are widely distributed across the state in all but high altitude and desert regions, and Lithocarpus densiflora is found throughout the Coast Ranges north of Santa Barbara, most abundantly in Mendocino and Humboldt counties. Within areas of dense distribution, the oak provided a prodigious potential resource for exploitation. But the annual acorn crop presented a major energetic problem to aboriginal groups, in that it matured over a brief, two to three week interval in October or November, when the necessity for harvest was critical. Within this limited period of abundant potential yield, maximum community energies were necessarily directed toward gathering pursuits, which might include large population movements over considerable distances to harvest and transport the acorns. Optimal quantities of acorns were collected before they fell from the trees, and the entire harvest lasted a variable number of days or weeks, depending upon the size of the groups and the resource at hand. Synchrony of rapid, efficient gathering activity with the onset of the mature crop was essential; as natural competition from numerous birds, mammals, and insects, and the potentially destructive effects of rainfall or frost were ever-present factors which might reduce the harvest (Wolf, 1945: 19).

The organization of the community for the collection and distribution of acorns was often the ritual prerogative of the shaman, and

the importance of his role is exemplified in Maidu society of North Central California. Among the foothill Maidu, the huku, or secret society headman, who according to Dixon (1905: 267,272) was an extremely influential shaman and political leader, located the most favorable sites for acorn gathering, announced them to the public, and negotiated payment for the crop if the trees belonged to another village (Kroeber, 1925: 74). A similar function was assigned to the Valley Maidu Kuksu headman (yeponi), and the details of ritual involved are recorded by Voegelin (1942: 175). The yeponi located and tested acorns for ripeness, then returned and informed the community of their availability. His wife then went out to the productive site and secured one pack-basketful of acorns. Within six days, she dried and prepared two baskets of acorn mush, and took them to secret society members in the assembly house where the mush was prayed over and ritually consumed. After this ceremony, the entire community was allowed to gather the acorn crop. Premature harvest or eating of acorns before the rite was strictly forbidden by ritual (and therefore supernatural) sanction. Among Mountain Maidu groups, the ritual eating of acorns appears to have been a public rite after the initial period of gathering. A large amount of acorn soup was prepared from the first crop collected, over which a shaman prayed, then distributed portions to all present. After this ritual consumption, each family was allowed to cook and use its own acorn mush separately, an activity which had previously been forbidden. In these Maidu examples, the shaman appears to have assumed major control over the schedule of harvest activities, including the times and places at which the acorns were to be collected, distributed, and consumed.

In the context of the Kuksu dance cycle, Central Miwok groups also ritualized the acorn harvest, but the ritualist of note was not the shaman, but rather the secret society "chief" (hayapo), who was the head of the dancers and dance organization, and owned the costumes necessary for the impersonation performances. As such, the hayapo was the most powerful political and ceremonial figure in the community, possessing assistants and messengers through whom instructions for subsistence activities during celebrations were made known to the public. Among smaller groups, the hayapo himself might deliver these instructional orations from the dance house, detailing the various tasks and behavior to be followed by the community (Gifford, 1955: 263-265). "Little time" ceremonies, known as "uwetu" (from uwe--"to eat") were celebrated over four days of gathering activity in the fall. Before the first acorns could be eaten, the "yahuha" (a Kuksu ceremony described by Gifford, 1955: 293-294) dance was always organized and danced around a basket of mush in the ceremonial house. After this dance, the acorns might be processed and used by the community at large.

Also coinciding with autumnal conditions of acorn resources was the Bear Dance ritual of Yokuts and Western Mono tribes. This ceremony marked the end of the acorn harvest and the ritual first-use of acorns by specific moieties (Gayton, 1946: 257; 1948a: 39-40, 120-121). Central Foothills Yokuts, for example, performed the ceremony under the supervision of both shamans and moiety chiefs, the shamans performing the dance ritual, and the moiety chief calling together the community members involved. Gayton (1930: 410) has previously commented that "orderly social activity" was maintained by a combination of : (1) the traditional legal authority of the chief; and, (2) the belief in the supernatural abilities of the shaman to enforce adherence to ritual behavior. The regulation of subsistence activity by the bear dance ceremony appears to be no exception. The acorn crop would be gathered and stored by the people of one moiety (in this case the Bear lineages were ritually associated with the acorn), and after a shamanistic performance, the chief supervised a feast where acorns were prepared and served to other members of the community. The Bear lineages, having accomplished the successful harvest, were also allowed to partake of the acorns, which had been otherwise previously forbidden. A similar ceremonial practice is mentioned for the Western Mono by Gayton (1948b: 283) and Aginsky (1943: 398-399, 403). In establishing and enforcing traditional economic duties of specific lineages, to be accomplished before the entire moiety could utilize gathered resources, Yokuts and Western Mono shamans and chiefs performed a functional role, which ostensibly encouraged efficient harvesting, preparation, and distribution of acorn resources.

In Southern California, ritual regulation of the acorn harvest was developed around a central, social and ceremonial pragmatist (corresponding to a "chief") with well-defined economic powers; and the shamans, who provided supernatural support to the harvest procedure. The Cahuilla termed this chief the "net," and as a ceremonial leader, he was responsible for the maintenance of ritual conduct, and for the care of the sacred bundle (maiswat) and the ceremonial house (kis?amna?a), the latter in which he lived in aboriginal times (Strong, 1929: 106; Bean, 1972: 104-105). Bean (1972: 113) has also noted that the net was usually also a shaman, belonging to an interactive association of other supernaturally oriented individuals who acted as community leaders. The net presided at all ceremonies, scheduled their occurrence, and maintained the oral tradition of songs and legends. Most significant, however, were the ritualized economic powers of the office. Based on his precise knowledge of community resource areas, he directed food gathering quests, determining when and where various crops were to be procured, and storing goods collected from community members for future distribution and use. The basis of his organizational power was the administration of the

first-fruits ritual for vegetable products, of which the acorn rite was most important. When the acorns were considered ready for collection and preparation, the net sent a representative to gather a small amount, which was brought back to the ceremonial house and consumed in ritual portions by members of various lineages (Bean, 1972: 143-144). In the "old days," it was customary for the net himself to eat the first product (Strong, 1929: 106). The accompanying ceremony, for which participants brought additional food to be shared by all, lasted three days and nights, and included singing by men and women, and dancing by shamans (puvalam) to ensure continuing positive response from supernatural forces in control of food (Drucker, 1937b: 41). The supernatural abilities of the puvalam were utilized to "create" an abundant crop of acorns and restrain unfavorable climatic conditions. Collection of acorns prior to completion of the entire first-fruits ritual would cause sickness or death by supernatural agency, and observance of this restriction was socially enforced. The ceremony completed, the net declared the gathering season "open" and advised community members as to the practical details of the harvest.

Of further note concerns data presented by White (1963: 123) on the Luiseno "tchumu' tushnakut," a ritual chief who supervised the gathering and distribution of vegetal resources from collectively-owned areas with the assistance of specifically empowered shaman (pul). White quotes Fr. Boscana on this aspect of subsistence organization:

> "The captain (chief) was authorized to decide upon...the hunting of game and the collection of grain...they had a pul...who knew...the time to celebrate the feasts. In the same manner was made known the time to collect grain and to hunt; but he who advised the captain, was one originally endowed with the power of providing their game, herbs, etc...on such occasions, all turned out in quest of food--men, women, boys, and girls... the greater part of their acquisitions was deposited with the captain; who took care of the same for the feast..."

The collection of acorns was undertaken according to this procedure. Men and women, as well as the shamans, danced for several nights in the ceremonial house for the first-fruits (Drucker, 1937b: 41). Distribution of the acorns to the community by the tchumu' tushnakut took place over a protracted time period after completion of the harvest rite. As sickness would result if any acorns were eaten before the ceremony, the pul was held socially responsible for the performance of

his supernatural duties, and his abilities were deemed a "property belonging to the rancheria as a whole."

This brief summary of several regulatory rites is by no means a complete survey of acorn ritual in California, but serves rather to emphasize the more detailed ethnographic examples concerning the central position of ritual specialists in the direction of work on the fall harvest. But as additional examples of tree-crop ritual, the similarities of restricted seasonal abundance, staple importance, and pronounced ritual regulation, necessarily include the fall pinyon pine-nut harvest of the Washo and Serrano as cultural and ecological analogs of the elsewhere more prevalent acorn rite. The pinyon pine (Pinus monophylla) is distributed widely over the east slope of the Sierra Nevada, and the nuts were a more common food for the Washo than the acorn (Kroeber, 1925: 572). The production and harvest of the pinyon pine-nut in autumn was of critical importance to Washo winter survival. Downs (1961: 382) emphasizes the crucial nature of the seasonal crop in relating an old Washo informant's account of the four-day, first pinyon-nut ritual, regulated by a ritualist of definite shamanistic caste:

> "This prayer-fella (Captain Jim) lived at Double Springs all year round. He would have a dream telling him to have a meeting. He was what you would call a religious man. He would get someone he could trust and send out a long, tanned string of hide with knots in it. For everyday until the meeting there was a knot so the people would know how many days they had until the meeting.
>
> "All the men came and hunted for four days, and all the women would start gathering pine-nut. They would hang up the game to let it dry.
>
> "The prayer wouldn't eat meat during those four days, but he could drink cold water and some lady would cook him pine nut. Every night they would have a dance.[2] On the fourth day everybody would bring the food they had and put it in front of the prayer, and then he would pick some man who was just (fair) and the food was divided a little before sunrise. If you have a small

2 Identified by Steward (1939: 415-416) as the "circle dance," commonly performed to ensure abundance of seed plants, pinyon nuts, rabbits, deer, and spring rains.

> family you get less, if you have a big family you get more.
>
> "Then the prayer makes a prayer something like this: 'Our father I dream that we must take a bath and then paint. Even the childrens... (We must) wash away the bad habits so we won't get sick from the food we have in front of us!'
>
> "Then everybody go to the river...no matter if there was a little ice on the water, and take a bath. If they was not near the river, they bathed the kids from baskets at Double Springs. The prayer, he prayed for pine nut, rabbit, and deer."

The pinyon-nut harvest was accomplished in Southern California typically under the ritual supervision of an hereditary chief and his ritual assistant. Serrano groups (the eastern-most of which depended upon the pinyon nut as a substitute for the acorn) possessed a ceremonial leader (kika) who like the Cahuilla net, lived in the ceremonial house and kept the "sacred bundle" from which his ritual authority stemmed. He was also a nominal owner of the wild-food tracts of the community, over which his authority extended (Drucker, 1937b: 28). His ritual assistant (paha) had direct personal powers to conduct tribal ceremonies, and act as a messenger from the kika to the community (Kroeber, 1925: 618). The kika accompanied the community on the seasonal collecting trip, and all individuals were required to contribute provisions for this communal venture; the goods to be re-distributed by the paha. The first pinyon nuts gathered were given to the kika, and used for the annual feast which took place in the ceremonial house upon return from a successful harvest (Benedict, 1924: 391-392).

Apart from tree crops such as Quercus sp. and Pinus monophylla which were principle resources in their respective areas of distribution, other plant products of regional importance were collected and distributed in ritual contexts. Several examples of first-fruits ceremony, connected with herbaceous root and seed plants, and mesquite bean harvests of Yuman groups on the Colorado River, provide further perspective concerning control mechanisms in which a ritual specialist played an important role.

In Northeastern California, important spring plant resources included the bulbs of Calochortus sp. (such as the star tulip and the Mariposa lily), and the roots of "ipos," Perideridia sp. (Munz, 1968: 1012). Among the Atsugewi, spring first-fruits rites were held for these species when they matured (Voegelin, 1942: 176). In May, the first roots gathered by groups of women were sung over by the shaman, who then examined them in order to predict the future health of the female population. If the shaman predicted impending illness or disease, he instructed all the women to return to the collecting grounds and dig roots for an entire day. The harvest

accomplished, shamans sang for half a night over the roots to ensure the general well-being of all women in the community. Upon completion of the ceremony, each woman was allowed to take the roots she had collected, leaving a supply for the shaman who cooked and ate them. A variation of this ritual also occurred in which the shaman himself dug the requisite first roots, then supervised a general community feast to which women contributed "ipos" and men brought a late-spring fish catch.

Spring first-fruits rites, known as "witi lonu' iwis" ("little party") were engaged in by Yokuts divisions around Tulare Lake (Chunut, Tachi, and Wowol), and pertained primarily to berries and seeds which were "moiety-owned," as mentioned previously for the acorn crop (Gayton, 1948a: 40). The moiety associated with the food product would gather a supply when it first became available, and ritually present them to the other moiety. Consumption of the collected food by the associated lineages before the rite would cause their children to break out "with berries all over their bodies." Reciprocal services between moieties, ritually supervised by moiety chiefs, were observed for most seasonal foods requiring major collecting efforts in the spring. Chiefs might have informally directed the movements of village inhabitants during the collecting season (Gatyon, 1949: 258), but as a pervasive feature of Yokuts social organization, shamans appear to have entered into schemes of social regulation through the use of their supernatural abilities. The seed growing dance, (known in Chunut as the "magic dance") was held each year by one or two shamans "who had the ability" to perform this prophetic ritual (Gayton, 1948a: 40). In late winter or early spring, the shamans who were to perform this dance did not consume any quantities of new seasonal food, such as tule roots or herbaceous annuals. About the middle of February, the shamans gave individual dance performances lasting all night and accompanied by a singer who sang songs "about birds and animals." During the might, a sleight-of-hand display was performed, in which the shaman caused the seeds of food plants to appear on the floor of the dance house by the fire, or by stamping on the ground, caused growing plants to materialize. The plants and seeds thus "produced" might just as suddenly disappear from view. The most significant aspect of this ritual, however, is the interplay between the shaman and the assembled participants:

> "During this display the people would query the shaman about the crops of wild seeds for the coming season. 'Where were the seeds going to grow?' He would point in certain directions, or even reply that they would be prolific near a specific person's seed-gathering place" (Gayton, 1948: 40).

In establishing a supernatural basis for the productivity of resource areas to be harvested in the immediate future, the shaman ritually reinforced the eventual direction of communal groups into these areas by moiety chiefs when spring resources became available. This interactive system of "control" functions by shamans and ritually empowered moiety chiefs, as had been previously noted, appears to have been basic to efficient ecological behavior in Yokuts society.

The organization of the first-fruits rite was a function assumed by the tribal and spiritual leader of the Colorado River Yuma, known as the "kwoxot." Forde (1931: 118, 133-138) has provided a basic description of his supernatural and social powers:

> "Kwoxot can be understood by all living creatures, by animals and plants. He can control them, so he can drive out sickness and prevent it from attacking people. He has the biggest powers of any man, is strong and happy, and tells the people what they must do to remain healthy. Kwoxot might sometimes cure diseases, but as a rule he did not, he used his powers to keep everybody well" (p. 136).

Kwoxot was a voluntary position of assumed responsibilities; the source of his power coming in dreams or visions of an ancestor or animal guardian. As a rule, supernatural spirits conferred the full powers of a kwoxot upon one man at a time, thus usually only one individual held this position. As an embodiment of supernatural power in the community, the kwoxot indeed approaches shamanistic dimensions. Significantly, he was expected to organize singings and feasts in harvest seasons and redistribute goods provided by the community to those in need. Of the plant collecting activities under his supervision, the harvest of the mesquite bean (Prosopis sp.) and the associated ritual were particularly important. Trippel (1889: 6) notes that the mesquite bean was the chief article of food for the Yuma and stored in quantity for winter use. When the bean pods ripened in early summer, large quantities were collected at favorable locations by men, women and children, soaked in water for several days, and the entire "sticky mass" removed and stacked in piles. The bundles of mesquite bean were placed in a ceremonial enclosure, arranged in sets corresponding to each district attending the feast. Games, dancing, singing, and discussion of community affairs occupied the evenings. On the last day, participants gathered outside the ceremonial enclosure and on a given signal, all the people rushed in to procure their share of the harvest. The celebration completed, the bundles were shouldered and all departed for home.

In the general examples detailed in this first section, a variety of situations have been described in which ritual specialists, such as shamans, secret society headmen, and ceremonial leaders such as the Cahuilla net, the Serrano kika, and the Yuma kwoxot regulated the gathering and distribution of essential plant food resources in the context of special, community-based and socially sanctioned ritual. In continuing an analysis of the regulatory functions of these ritual personalities and the systems of ritual restriction which acted to encourage the ecological efficiency of communal subsistence activities, formulistic ritual surrounding the first-salmon rites of Northwestern California, and first-fish ceremony elsewhere in Native California form the next topic of discussion.

First-Fish Rites: Formulistic Ritual of Northwestern California and other First-Fish Ceremony.

Fish were undoubtedly an important food resource to native Californians. The seasonal upstream movements of anadromous fish, of which the distinct spring salmon run was most prolific, were events of great importance to many aboriginal subsistence economies. Stimulated by winter rains in the North Coast Ranges, and early snow melt in the Sierra Nevada, which provided appropriate water levels and headwater temperatures for spawning, annual or semi-annual fish resources were available in numerous freshwater river systems of Northwestern and North Central California (Rostlund, 1952: 20, 30). Fish of major importance were the Pacific species Oncorynchus tschawytscha (king salmon), Oncorhynchus kisutch (silver salmon), and the steelhead trout (Salmo giardnerri), which spawn in freshwater and soon after birth swim out to sea to grow to maturity. After four to six years they return to the freshwater rivers to spawn upstream (Baumhoff, 1963: 170).

The ecological significance of the seasonal spawning runs to aboriginal resource economies lay in the fact that the runs carried fish in significant numbers over a limited period of time, so that a concentrated, well-organized fishing effort at the appropriate seasonal interval gave a comparatively great return. In the brief analysis of the ritual practices surrounding freshwater fishing among particular culture groups of Northern and Central California, the various tribes utilizing anadromous fish resources will be divided into the two following classes:

(1) Those groups, in North Coast Range drainages, for whom the salmon constituted the main bulk and dietary staple in the annual food economy, and who performed a formulistic ritual coinciding with the onset of the spring runs. The Yurok, Karok, Hupa, and Tolowa will be considered as examples of this class, designated as inhabiting the "Lower Klamath province," where salmon runs are of the greatest annual reliability (Baumhoff, 1963: 171);

and (2) those interior groups of the Sacramento and San Joaquin drainages, for whom the salmon was a secondary food resource of equal or supplementary importance to other foods, and who engaged in shamanistic or other first fish rites distinct from the formulism of Northwestern California. The Maidu and Yokuts tribes will be considered as brief examples from this class, designated as inhabiting the "California province," where annual salmon yields were more irregular and subject to marked cyclic fluctuations in in quantity (Baumhoff 1963: 171).

The spring salmon run was most intensely ritualized in Northern California, occurring at a time when winter food stores were low and maximum community

energies were focused upon fishing efforts. A central core of northwestern tribes (Yurok, Karok, and Hupa) practiced the formulistic first-salmon rite, each group undertaking one spring ceremony at a specific location. Although superficially similiar in initial ritual procedure to the protracted series of Jumping and Deerskin dances of the biennial World Renewal celebrations, the first-salmon ceremonies appear to have been held independent of these public display dances (Kroeber and Gifford, 1949: 105). The salmon ritual, among all these groups, incorporated common features which defined them as regulatory rites. The "first" spring salmon was always procured and ritually eaten by a priest or his assistant, who fasted, prayed, and sweated for a prescribed period of time. Fresh salmon were not to be consumed by the community until this ritual eating was performed, under pain of supernaturally induced illness or death. Throughout the period of days over which the ceremony was performed, the oral delivery of esoteric formulae, intended to induce and renew an abundance of salmon, was the main activity of the priest or formulist. The formulist's supervisory position in the rite was clearly based on his personal knowledge of the proper sequence of these narrative recitations, which were treated as private property and considered of supernaturally creative power. In the performance of the salmon ceremony (which was the ritual reenactment of mythical times when immortal beings first instituted the rite), the formulist ensured positive response from the spirit forces of the salmon, while overtly regulating the inception of the salmon-fishing season.

The Yurok first salmon ceremony was held annually in April at Welkwau, a small village at the mouth of the Klamath River. Although mentioned by Kroeber (1925: 60-61), and Kroeber and Gifford (1949: 99-100), the rite is described in detail by a Yurok informant, Robert Spott, in Yurok Narratives (Spott and Kroeber, 1942: 171-179). Known as "helku menekuni ne' pui" ("the salmon spearing from shore"), the ritual was performed by an old formulist who lived in Welkwau. Prior to the rite, no salmon caught at the mouth of the river could be eaten, although other species of fish could be caught and eaten at any time. The formulist began preparations seven days before the rite, arranging for and instructing his ritual assistant (who was to perform the actual first eating of the salmon), and in subsequent days cleared a path from the ceremonial house to the mouth of the river. The last day before the ceremony, he recited several formulae, praying for the well-being of the world and food resources. The day of the ceremony, the formulist moved to the mouth of the river and told men fishing on the bank (for species other than salmon, such as sturgeon and lampreys) to watch for the "first salmon." When the species was seen, the formulist was notified, and reciting a formula, he feigned the act of spearing the fish with his harpoon, and allowed it to pass upriver, as the "ne' pe' wo kewononoro' apin" ("the first salmon that goes on up to the head of the river"). The next salmon to appear was speared, and after another recitation, taken to the ceremonial house where it was cooked and ritually consumed. The formulist prayed the entire night in the sweathouse, and the next day officially sanctioned salmon fishing (i.e. declared the season open) for all upstream Yurok villages.

After the performance of the Yurok first salmon rite at Welkwau, the communal effort of dam-building at the upstream site of Kepel could begin, usually several months later in the early summer. The elaborate 10-day ritual of building this fish dam is described in detail by Waterman and Kroeber (1938: 49-80), Kroeber (1925: 58-60), Erikson (1943: 277-282), and Kroeber and Gifford (1949: 81-85). The dam structure consisted of a framework of poles, logs, and small stakes extending across the entire course of the river, and the building of this framework required the coordinated efforts of several hundred men from various villages to cut wood. As many as seventy individuals worked at the dam site itself, constructing the framework (Waterman and Kroeber, 1938: 54-55). At various intervals along the dam, openings leading into a small wooden enclosure were arranged, and during the ten days of fish collection at the structure, large quantities of salmon were harvested and dried.[3] The entire process of construction, use, and eventual dismantling of the dam was directed by a formulist, who supervised in every way the work involved. It has been stated that the Kepel fish dam represents the largest mechanical enterprise undertaken in Northwestern California, and was clearly the Yurok's most communal subsistence effort (Waterman and Kroeber, 1938: 78).

The Karok first salmon rite (described by Kroeber, 1925: 104-105; Roberts, 1932: 426-440; and Kroeber and Gifford, 1949: 35-47) was held in March or April at the village of Amaikiaram on the west bank of the Klamath several miles below its confluence with the Salmon River. The formulist and his assistant were once again the ceremonial officials, reciting formulae, kindling a sacred fire, and cooking the first salmon for ritual consumption. These ritual activities were not to be witnessed by any other persons, and the community as a whole was obliged to leave the village and remain secluded in the surrounding hills. Roberts (1932: 430) mentions that salmon fishing might occur before completion of the rite, but any fish caught were saved and not consumed before completion of the ceremony. The ritual eating of the salmon accomplished, the people returned to the village, and all Karok were allowed to begin fishing and eating fresh salmon.

On the west side of the Trinity River, near the upstream end of Sugar Bowl Valley, the Hupa first salmon rite was held each spring (Goddard, 1903: 78-79; Kroeber and Gifford, 1949: 56-61). A formulist would go to a selected site before anyone had engaged in fishing activities and recite a formula over the first salmon

3 Gibbs (1853: 146) and Wessells (1853: 64) noted that fish dams on the Klamath were effective in obstructing the salmon run and preventing passage of fish to tribes above these structures, presenting a constant source of complaint and dissatisfaction among upper riverine groups. Waterman and Kroeber (1938: 50) observe that the Kepel fish dam was torn down after ten days of use, undoubtedly to allow the run to proceed to upriver tribes and prevent such potential inter-group conflict over the critically important salmon resource.

procured, narrating the mythical creation and journey down the river and back, and detailing ritual restrictions to be observed in fishing matters. Having cooked and eaten the first salmon, he prayed for an additional ten days, while he continued to catch salmon which were smoked and dried in preparation for a feast on the last day of the rite. During this period, as before, fishing was not permitted to the public. On the tenth and final day, a community feast ensued and the salmon season was declared officially "open."[4]

A final example of formulistic ritual for salmon in Northwestern California, outside the previous Klamath-Trinity focal area, is found among Tolowa groups of the Smith River drainage (Dubois, 1932: 258-259; Drucker, 1937a: 261). At the onset of the spring runs, a formulist performed the "ha'guCLi xa'c Renic" (salmon-go-out-to-catch) in which he entered the sacred sweathouse or "salmon's home" and recited prayers during a five-day fast. On the last day of the fast, the formulist caught the first salmon, built a fire, and cooked the fish, placing it upon a basketry tray on which were represented the roots, leaves, and fruit of all available plant foods. He then began a long formulistic recital, requiring several hours, describing the origins of the world and the Salmon's primeval journey up the Smith River. The "first foods" were divided by the formulist among the adult spectators and consumed; "After this, everyone could catch and eat salmon; he opened the season" (Drucker, 1937a: 261).

In general, the procedures of the first salmon ritual in Northwestern California, and the manifest control functions of the formulist in determining the proper time for the beginning of the fishing season, are an extension of the need for careful maintenance and harvest of this essential resource. The annual spring run of salmon was the mainstay of native populations in this region, and the elaborate formulae and ritual restrictions assigned to the fish resource are indicative of this dietary emphasis. However, among other native groups outside the Northwestern culture area, where salmon was of subsidiary importance, ritual activities surrounding the spring salmon run were of a different nature. The formulist is absent, and taking his place as the central ritualist is the shaman or a moiety chief who derives supernatural support from shamanistic ritual.

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4 The Hupa, as distinct from other Northwestern California groups, also performed an organized formulistic first acorn rite, a brief description of which is included here for comparison. Held at Takimilding on the Trinity River, the precise time of the ceremony was determined by the autumnal conditions of the new tan-bark oak acorn crop (Lithocarpus densiflora); "as soon as the acorns began to fall freely" (Goddard, 1903: 80-81; Kroeber and Gifford, 1949: 56-59). In aboriginal times, a quantity of the first acorns was gathered and prepared by several women. The formulist, ritually dressed in mink and deerskin, in impersonation of "Yinukatsisdai" (master of the vegetable world), built a fire to cook the first acorn meal. The formulist directed the ritual bathing of community members in the river, and thus assembled, a meal of acorn soup was eaten by all. No one of the Takimilding division was allowed to eat new acorns until the formulist initiated this feast.

Among the northwestern foothill Maidu, the first salmon observance was undertaken by a shaman, who caught the first fish of the season, cooked it, and distributed morsels of the food to all in the community. This ritual opened the fishing season for the year. Further detail on the structure of the ceremony, as to whether it included the recitation of a particular formula by the shaman, is lacking (Kroeber, 1925: 437; Dixon, 1905: 198) although Voegelin (1942: 57) notes the existence of a definite taboo against eating salmon before the rite was performed.

Yokuts and Western Mono tribes on the San Joaquin River and Yokuts divisions on the lower Kings River held spring salmon ceremonies at their principal fishing sites (Aginsky, 1943: 398; Gayton, 1949: 256). As previously outlined for the Yokuts "Seed Dance" ceremony, a supernaturally prophetic ritual by shamans preceded the first salmon rite by several weeks or months, apparently undertaken to inform the community of resource areas to be fished in the upcoming season. In late winter, shamans performed the "ohowis" or wishing ceremony in a specially constructed house or behind a tule partition, upon which were hung the skins of otters and beavers, believed to be the personal spirits of the shamans whose power was connected with water fauna (Kroeber, 1925: 507). A magic display was performed in which fish were made to appear in a vessel of water or to drop from the animal skins hung on the walls of the ceremonial sturcture. While this performance continued, the shaman called out the names of fishing camps where the people went in the spring to harvest the salmon run (Gayton, 1948a: 121-122). When the spring salmon arrived, a chief (the headman of the moiety ritually "responsible" for the salmon) speared, cooked, and ate the first salmon at these supernaturally sanctioned localities, and prayed to the salmon spirit for an abundant supply of fish. All lineages then participated in a general salmon feast, and the season was officially opened (Gayton, 1949: 256).

The ritual regulation of spring salmon fishing, in the contest of formulistic and other esoteric ceremony, has been briefly outlined in this section, with close attention paid to the central ritualist of the performance and the regulatory role he plays in the subsistence activity. Whether a formulist, shaman, or ritually obligated moiety chief, he appears to have played an important part in the direction and focus of communal subsistence energies at a time when potential salmon yields were highest. The brief examples in this section reveal a remarkable similarity in form and function, and have been presented as a cultural synopsis of the first salmon rite in native California.

Communal Hunting Ritual: Organizational Aspects of Deer, Antelope, and Rabbit Ceremony.

As a food resource of distinct importance throughout native California, game animals, and the ritual surrounding their communal hunting, form the last topics of discussion in this "operational" analysis. Deer and elk were a major secondary resource to aboriginal economies, everywhere of lesser importance than the acorn, but ranking higher than fish in areas without good salmon streams (Baumhoff, 1963: 167).

Communal deer hunting activity usually took place during the fall mating season, when females and competing males were concentrated in large herds.

Ranging over a variety of life zones, predominately in grassland, chaparral, woodland, and other transitional habitats, the mule deer (Odocoileus hemionus californicus) was found throughout the south Coast Ranges, Transverse Ranges, and southern Sierra Nevada. The Columbian black-tailed deer (O. hemionus columbianus) occurred in a complementary northward distribution, throughout the north Coast Ranges to the Cascades and in the Sierra Nevada southward to Lake Tahoe. The Roosevelt elk (Cervus canadensis roosevelti) and Tule elk (Cervus nannodes) also inhabited the north Coast Ranges and Central Valley respectively. Of more regional importance, the pronghorn "antelope," Antilocapra americana, inhabited the Central Valley in aboriginal times but by the ethnographic period, (c. 1900) was limited principally to the marginal desertic regions of Northeastern and Southern California. Although of smaller size than deer or elk species, the large pronghorn herds were amenable to surround and drive hunting techniques. Of similar regional importance in the drier scrub and woodland areas of Northeastern and Southern California were rabbits in the genera Lepus (jack-rabbit) and Sylvilagus (cotton-tail) which were often taken in great quantities through large-scale cooperative drives in the fall.

The ritual organization of communal hunting for deer, antelope, and rabbits was often the prerogative of shamans, hunting "bosses," or other ritualists whose specific task was the direction of hunting or driving activities. Description of the various aspects of ceremony surrounding each game resource, in selected cultural contexts, provides further evidence of the regulatory nature of subsistence ritual.

Among the Atusgewi, the fall deer hunt was organized around a communal sweating ritual called by the chief, followed by a singing and praying ceremony conducted by a hunting shaman, at which plans for the hunt were discussed. The shaman would tell who was to kill a deer, or guarantee that every man in the party would be successful. When groups of hunters moved to temporary camping sites in search of deer, the shaman accompanied them to "charm" the animals, and during the hunting activities, he smoked his pipe and called each mountain in the vicinity by name:

> "Don't hide your children (deer); give my boys good luck; give them your children" (Voegelin, 1942: 172).

Upon return from the hunt, the shaman assembled all the hunters in one group, and before the meat was divided, all were compelled to sweat and cleanse themselves "under the armpits" while the shaman sang.

Western Achomawi shamans practiced a more elaborate "deer calling" ritual in which concealed pits along deer "runways" were utilized. These trapping

pits, as noted by Kroeber (1925: 309), were between six and nine feet deep, and their excavation was an arduous task. At sunup of the selected day, the shaman would cause a brief rain to fall, then sing from behind a blind of tules stretched out in front of the village. The deer ran and jumped (were driven?) into the pit as the shaman "called" them, and the assembled people killed and ate the animals thus trapped. An informant spoke of a particular shaman who performed this ritual:

> "(This doctor) had very strong power to do this; he did it for everybody in his tribe; he got people something to eat, this way" (Voegelin, 1942: 171).[5]

Shamans of the eastern Achomawi also held a ceremony for the fall deer hunt at which they assembled ten or more men for an all night ritual of singing and praying. The deer doctor, who might derive his power from a weasel spirit-guardian, burned marrow from the leg-bone of a deer in small holes in the ground, "feeding" his power to give the hunters good luck. This shaman also accompanied the hunting party.

Wintu shamans were customarily consulted about the location of game and as to who would be the most successful hunters of the next day's outing. The entire night previous to the hunt, the assembled group of hunters lay on their backs in the sweathouse, hitting their chests with slender sticks in time to the singing of the hunt "leader" who knew the supplicatory songs the best. The shaman also sang, charming the deer spirits and telling the hunters where to find the game (Dubois, 1935: 106; Voegelin, 1942: 171).

Fall communal deer hunts were similarly preceded and regulated by shamanistic ritual among the Maidu (Voegelin, 1942: 54, 171-172). Southern and Valley groups held a ceremony the night before the hunt, after an acorn soup dinner which the entire community attended. Shamans or secret-society headmen prayed and sang so that the hunters would sight game. The next day, a shaman or "luck-bringer" would go with the hunting party, walking ahead of the hunters to "spot" the deer. The shaman might also place "medicine" on a stick in deer tracks to give the animals cramps in their legs, facilitating their easy capture. When the deer were discovered feeding, the shaman would go around the herd with medicine to prevent their escape from the surrounding hunters. For this service, he was given a share of the deer meat (Beals, 1933: 348). After a successful hunt, the deer were brought back to the assembly house whole, where the meat was distributed in a feast which again included acorn soup. This hunting ritual was also practiced by northeastern mountain Maidu groups. The shaman conducted singing, dancing, and praying the night before

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5 This account appears to attribute magical compulsion, similiar to antelope charming, to the procurement of deer in pit traps. Deer were not usually subject to "charming" rituals. However, the driving of deer into enclosed pits is reported among the Western Achomawi by Voegelin (1947: 51, 52). Whether or not shamans were directly associated with drive activities of this kind is not recorded.

the hunt in a group ceremonial, charming the deer for the hunters both on this occasion and during the hunt on the following day. Before the deer meat from the hunt could be consumed, the services of the shaman again were required for a ceremony, as an informant stated:

> "Do not eat meat, after big hunt, until somebody prays, talks" (Voegelin, 1942: 172).

Similar shamanistic ritual concerning deer hunting is noted by Aginsky (1943: 444-452) for the Yokuts, Western Mono, and Sierra Miwok. Deer shamans fortold the success of hunting parties, telling hunters where to go to find game, and often accompanying the hunting group, receiving a share of the kill for their supernatural services. Group ceremonies were held both before and after hunting activities.

In contrast, the ritual of the deer hunt in Southern California, among the Cahuilla and Serrano, was centered around the ceremonial leaders who have been previously described as important in the organization of the acorn and pinyon pine-nut harvest. When Cahuilla hunters killed a deer, the animal was often presented to the net in the kis?amna?a (ceremonial house) and preparations for the deer ceremony were begun. Food was collected by the net from all families in the village, and all community members were invited to take part in the feast (Strong, 1929: 77; Bean, 1972: 146-147). The ceremony consisted of singing over the body of the deer, with the manifest intent of encouraging the favor and cooperation of the animal spirit and expressing appreciation to the deer for allowing themselves to be killed. During the morning after the ceremony, the deer meat was distributed to the community at large. Bean (p. 147) notes that this ritual was held frequently enough to exist as a principal mechanism for the distribution of sizable amounts of animal meat to the community.

The Serrano practiced a similar ceremony; the kika conducted an all night ritual in the ceremonial house whenever deer were killed, and in the morning, summoned the people of the village to distribute the meat (Benedict, 1924: 379).

The most specialized ritual organization of hunting activity is undoubtedly expressed in the "antelope charming" ceremonies of the Achomawi, Atsugewi, Northern Paiute (of Surprise Valley) and the Washo, all of which are tribes who inhabited the northeastern California desert range of Antilocapra americana in ethnographic times. A special "antelope shaman" was in all cases the instigator of this community effort. In winter or early spring, when large herds of pronghorn ran in open country, the shaman would inform the people of the presence of a herd in a certain location. The shaman might dream of the animals (which might be his spirit guardians), or send several scouts to locate a herd nearby. Once the antelope were sighted, the construction of a sagebrush corral or a circular sagebrush rope fence, with an opening at one end, was directed by the shaman. A charming ritual was usually next performed inside the brush corral, the shaman leading dancing and singing of the assembled people, and

often falling into a trance-like state in which he allegedly experienced visions of a successful drive. At the conclusion of this performance, the antelope herd was driven into the corral by groups of fast runners, the entrance closed, and the surrounded animals slaughtered and divided among the participants. The shaman usually received the first and largest share of meat for conducting this ceremony.

Among the Apwaruge (eastern Atsugewi) a "power man" (shaman) sang all night to entice the antelope into a sagebrush rope surround. The next day, everyone in the community participated in the killing of the antelope; "even women could participate in the kill because the antelope were all doped" (Garth, 1953: 133). The Achomawi antelope shaman smoked and passed his pipe, leading an antelope dance before the charming ritual, which took place in the evening (Steward, 1939: 366-367).

Several informants' accounts of the antelope ceremony among the Northern Paiute groups of Surprise Valley are presented by Kelly (1932: 83-86). Accounts mention that the antelope shaman called together the inhabitants of 15 or 20 camps from the surrounding areas, perhaps as many as 100 men, to assist in the drive. As many as 200 antelope were killed in a single drive and distributed among the participants. One informant reported:

> "Just one man can charm antelope; I don't know how he learns. He is like a doctor. He sits with everyone in the circle and sings making music on a doe hide (deer or antelope) that is stuffed with clothes and tied with string. If the people know how, they help him sing. A plain stick (unnamed) is wrapped with any kind of braid, and the charmer works it back and forth on the bundle. After a long time he says, 'They (the antelope) haven't looked at us yet.' Finally he says, 'The deer are coming,' and falls senseless on his drum and visions an antelope. Finally he recovers, sits up, says: 'We are sure to kill antelope. I see them coming inside the corral. I see them lying there.'
>
> "They have already placed sagebrush, root ends up, in a big circle, about as far as from here to camp (about a half-mile). There were many people so it didn't take long to pile the brush. Men and women line up in wings by an opening in the circle, the women nearest the corral, the men at the outer ends.
>
> "Then the fastest runner goes out, returning when he has sighted a herd of antelope. Then the men go out in two parties and circle the herd and drive them in. They close the opening of the corral and

stand between the piles of sagebrush that form the corral. If an animal starts their way, they head him back.

"The fastest runner chases the antelope around in the corral until they are tired and frightened, when he kills a doe and throws it on top of a sagebrush pile in the center, and then a buck. They eat these two and then everybody get a share. Then the headman (shaman) tells his people it is their turn to shoot. They shoot from the circle as the animals approach. A wife stands with each man and drags away his kill...

"When they stop for the night, the fastest runner guards the antelope. They set fire to that sagebrush to frighten the animals.

"(The next day) The headman tells them to go ahead and kill. There are so many animals that they don't have to divide them; they never kill all of them, some escaping. Almost everyone kills one. Sometimes an antelope becomes so tired that it falls down and a woman kills it. A woman might even kill two or three.

"The headman shoots too; he takes most of the buck horns, but not the does'. They put the horns on a pile of sagebrush in the middle of the camp circle. All the heads are turned toward the charmer's camp. He wants everyone to come. They cook the heads under the ashes and all eat, each person perhaps getting one head.

"They butcher the antelope and dry the meat on the sagebrush bushes. Coyotes and wolves never bother it.

"When there is no sagebrush for a corral, they braid sage-brush bark and make a fence by tying it to posts about four feet tall. Loose strands of bark hang down the poles and when the antelope are in the corral the people pull the braid and the loose strands wave.

"I have done this kind of antelope hunting. In winter the antelope are in big herds and that's the time to kill them. This kind of hunt is called ku'a'; many camps join. They tell everybody to come.

"It takes just one day to charm antelope (but the killing evidently continues into the second day) (Kelly, 1932: 84-85).

The Washo antelope shaman (ai' yes kumomli) utilized his supernatural dream-power in organizing the antelope ceremony and drive as recorded by Lowie (1939: 324-325):

"The antelope chief sees some antelope in a dream. He reflects about it and goes to the place dreamt about in the mountains. He sees two or three head, then he knows his dream is true. He begins to talk to them. He does not tell anyone as yet, but keeps his own counsel and studies the matter himself. He continues dreaming three or four times. Then he begins talking to the antelope, taking a pipe. He wants to see what he can do. He looks at the antelope, he lets them see him walking along side of them; they do not run away. He does this two or three times. Soon he tells the people to come together and says, 'My people, I have dreamt truly or falsely, I don't know which. In the place I dreamt of last night, there were forty antelope banded together. If I dreamt truly, you'll see them there this morning.' He sends two boys to the place as scouts. They look for game and see ten or fifteen head feeding there together. The boys do not let the antelope see them. They go back and tell the chief, 'Your dream is true, we saw the herd right there.' That evening, he studies the matter again while in bed. He dreams again and tells his people, 'Well, I dreamt again last night, I dreamt right before. I dreamt of two antelopes last night, you fellows drove them into the corral, we all killed them, and had something to eat.' The old people answer: 'Yes, if you dreamt right, we'll have meat, we'll try tomorrow to go after them."

A corral was constructed, of approximately one acre in total size, with a chute leading to the entrance. The sagebrush was piled so high that the antelope could not jump out. The shaman stood in back of the corral while a group of men went out to drive the antelope in:

"He says, 'I'll stay home behind the corral. If I dreamt right, you'll drive them in and we'll kill them. If they get scared at you fellows, we can't help it; but I think we'll kill them easily in the corral.' When the antelope are near, he says to the beasts: 'Don't get scared, come on easily now, don't get discouraged, listen to my words. We are making a home for you, you have come a great way.' The antelope stop and look toward him. They are not afraid at all, but keep quiet like sheep driven into a pen. Instead of scattering they come into the sagebrush pen, the people close up, and the chief bids them commence killing."

In aboriginal times, bows and arrows and clubs were used to dispatch the antelope, and the largest buck was killed for the antelope shaman himself. Of the rest,

three or four men would divide the meat of one antelope:

> "(The shaman says) I dreamt antelope for you, I got the best one, I am satisfied.' Nobody eats while he is speaking."

The antelope was divided among the people, the meat was packed home and all had "plenty that night."

Finally, among rituals concerned with the acquisition of game animals by communal methods are the annual rabbit drives, which were conducted by groups in whose geographic range these animals were a major seasonal food source. Among tribes in which this activity was organized by a ritual specialist, the Washo and the Cahuilla are exemplary.

The Washo "rabbit boss" was a special leader distinct from the political headman or antelope shaman, who set the time for the fall drive, which was held every year in late October or November over a period of several days (Lowie, 1939: 327). A large group of people were organized by the boss, and up to fifteen men among them had rabbit nets which were united into a single unit 200 yards long and four feet high, supported by sticks six or seven feet apart. The line of nets was straight except at the ends which curved inward in the direction of the drive-line movements. 200 Washo, the rabbit boss among them, joined in the drive, scaring the quarry into the net where a boy or an old man would dispatch them with a stick, or the hunters themselves would kill them with a bow and arrow. The total kill might average between 400 and 500 rabbits a day, each man who participated obtaining three or four animals apiece. The next day, a new location several miles distant was selected and the procedure repeated. When all the people were heavily loaded with animals, the rabbit boss would say: "We stop today, we have all we want today. Let us go home."

The ritual aspects of the rabbit hunt are somewhat unclear, but the rabbit boss was apparently an hereditary position and in later ethnographic times, assumed by an individual with supernatural powers acquired in dreams. Downs (1961: 380) proposes that the introduction of agriculture and firearms during the historical period sufficiently decreased antelope and deer populations to cause an associated increased dependence upon rabbit as a major source of food. Ecological factors may thus have facilitated a more recent transference of ritual traits from the antelope charming complex to the rabbit drive (i.e. a "dreamer" directing the hunt). Formalized prayers were said before the hunt by the boss, and in the period covered by the memory of the oldest informants, dancing was often staged nightly during the rabbit drives. Downs elicited data concerning the character of the last Washo rabbit boss:

> "There was...a special leader who directed the hunt who had dreaming power, 'Jack Wallace would dream

> where the rabbits were and when it was time for hunting he would send out a call.' The man mentioned was described as the last of the real dreamers; this power made him extremely influential among the Washo; his descendants are claimants for the 'chieftancy' (1961: 380).

The Cahuilla rabbit hunt was a ritually regulated activity undertaken to provide a large number of animals for various ceremonies and feasts which occurred when rabbit populations were at high density (Bean, 1972: 147). In the fall, these animals were hunted in the mesquite and pinyon-juniper woodlands, where herbaceous plant resources were plentiful. Their presence was significant to Cahuilla subsistence during the winter months when fresh vegetable resources were unavailable. The hunt involved the cooperative effort of large numbers of men, women and children, and was usually organized by the paxaa?, the ritual assistant to the net (the paxaa? might also be a shaman) who supervised the proper arrangement of the rabbit nets into a large arc, directed the drive movements, and organized the collection and cleaning of the game that was killed (Bean, 1972: 113). In some instances several hundred rabbits were collected in a single day's activity.

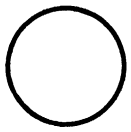
The Functional Context: Model and Analysis

Throughout the preceding sections, the ideational and operational contexts of subsistence ritual have been briefly reviewed in selected cultural settings of native California. It has been proposed that native world view incorporated two basic postulates which reinforced the ritual regulation of economic activity: (1) the world of supernatural cause and effect required proper human attention and respect in the form of prescribed ritual behavior for the continued positive response from spirits in control of food resources, and; (2) the organization of these rituals associated with large-scale gathering, fishing, and hunting activity was usually accomplished under the direction of a shaman, formulist, or other specialist who functioned as a regulatory force by virtue of his ritualized power to control or mediate supernatural phenomena. The general structure of the subsistence rituals previously discussed appears consistent throughout native California: an essential food resource (an "ecological determinant") such as acorns, salmon, or antelope, is available in a relatively concentrated supply during a limited seasonal interval, and often requires the intensive, coordinated effort of human groups to maximize potential yield. Economically productive individuals are organized to collectively accomplish the subsistence activity and/or distribute the product in a ritual context, and are often constrained from individually exploiting or consuming the available resource until a ceremony is performed by a specific ritual functionary. In the case of most plant food and salmon rituals, the conclusion of this ceremony (which may last a variable number of days) commences the "resource season" during which the harvest and use of the food is not further restricted. Table 1 summarizes the operational contexts of subsistence ritual in native California as outlined in the previous section.

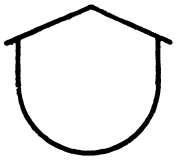
Resource	Season of Ritual Management	Culture Group	Ritualist (s)	Regulatory Pathways (1), (2) as Represented in Figure 1
acorns	fall	Maidu	shaman	restriction upon gathering activity (1), or restriction upon consumption (2)
		Central Miwok	secret society headman	direction of gathering activity (1), restriction upon consumption (2)
		Yokuts - W. Mono	shaman moiety chief	restriction upon consumption of stored product (2)
		Cahuilla	net shaman	direction of gathering activity (1), storage and distribution of product (2)
		Luiseno	tchumu' tushnakut shaman	direction of gathering activity (1), storage and distribution of product (2)
pinyon-pine nut	fall	Washo	"religious man" (dreamer)	supervision of gathering activity (1), distribution of product (2)
		Serrano	kika paha	direction of gathering activity (1), storage and distribution of product (2)
misc. root, seed products	spring	Atsugewi	shaman	direction of gathering activity (1), distribution of product (2)
		Yokuts	shaman moiety chief	supernatural direction of gathering activity (1), restriction upon consumption, distribution of product (2)
mesquite beans	summer	Yuma	kwoxot	distribution of product (2)
salmon	spring	Yurok, Karok, Hupa, Tolowa	formulist	restriction upon fishing activity, direction of dam building (1), restriction upon consumption (2)
		Maidu	shaman	restriction upon fishing activity (1), restriction upon consumption (2)
		Yokuts	shaman moiety chief	supernatural direction of fishing activity, restriction upon fishing activity (1), restriction upon consumption (2)
deer	fall	Atsugewi, Achomawi, Wintu, Maidu, Yokuts, W. Mono, Sierra Miwok	shaman	supernatural supervision and direction of hunting activity (1), distribution of product (2)
		Cahuilla	net	distribution of product (2)
		Serrano	kika	distribution of product (2)
antelope	winter	Achomawi, Atsugewi, N. Paiute, Washo	shaman	direction of drive activity (1), distribution of product (2)
rabbits	fall	Washo	rabbit boss	direction of drive activity (1)
		Cahuilla	paxaa?	direction of drive activity (1)

Table 1. Ritual Regulation of Large-Scale Subsistence Activity in Native California

It would thus appear that the subsistence rituals surrounding major food resources specifically controlled and directed the flow of potential energy between environment and human cultures. The control interactions of ritualists over subsistence work potentials and food energies during periods of maximum resource availability may be considered as a basic "program" for efficient harvest and distribution of major food resources. In brief analysis, a simple diagram can be devised to qualitatively represent the energy flow system of ritual regulation, utilizing a set of circuitry symbols designed by Odum (1972: 38) to model energy flow in human ecological and cultural systems. For the purposes of the proposed model, these modules of energy "language" are defined as follows:

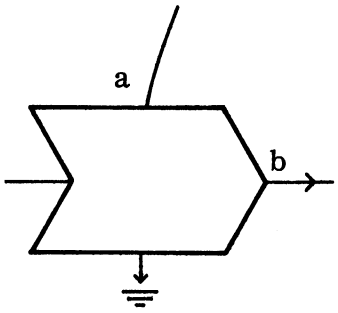


(1) Source. The circular symbol represents the initial source of energy for the ecological system, in this case, input of radiant energy from the sun.

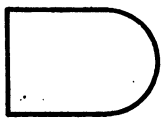


(2) Passive Storage. This symbol represents "passive storage" of potential energy at some location in the system. No new potential energy is created, and some work must be performed both to place this energy in storage and to release it for subsequent flow. This storage includes the "holding" of restricted products until consumption is ritually sanctioned, short-term collection of resources for ritual redistribution, or more protracted storages for future distribution.

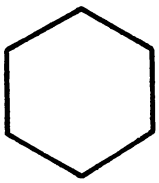
(3) Heat Sink. Required according to thermodynamic law; all processes of energy transformation deliver potential energy into heat, which is effectively lost for further useful flow.



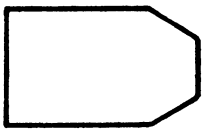
(4) Work Gate. This module represents a point in the system where work performed (a) allows a subsequent flow of energy (b). It includes the energy required by communal groups in subsistence activities, and the organizational expenditures of the ritualist in directing these activities and distributing products to the community.



(5) Green Plant. This symbol represents plant food resources (acorns, pinyon nuts, mesquite beans, etc.) which capture radiant energy through photosynthesis for production and energetic maintenance.



(6) Self Maintenance. Symbol representing the "autocatalytic" self-sustaining units of the system in which stored potential energy is used for the maintenance, work, and resupply of the unit. Heterotrophic organisms such as salmon, deer, antelope, rabbits, and man, which depend upon input from lower trophic levels as energy for maintenance and work may be considered as examples.



(7) Ecosystem. This symbol is a combination of (5) and (6), and represents trophic relationships in the natural sector. Specifically, it represents energy available from the major food resources of aboriginal cultures, both plant and animal, which were highly seasonal in abundance, requiring communal extractive efforts for maximum yield, and subject to formal ritualization. Flow from this module will be considered as the concentrated, short-term potentials represented by a mature acorn crop, salmon run, antelope herd, etc.

(8) Switch. This symbol represents flows which have only on and off states controlling other flows by "switching" actions. The availability of a major food resource has definite on and off states, production and concentration fluctuating with season. The "on" state, i.e. impending to maximum availability, is an informational flow from the ecosystem which acts as a switching action for regulatory activities of ritualists.

Figure 1 is a composite representation of subsistence ritual in native California detailing the basic components and flow characteristics of examples previously discussed.

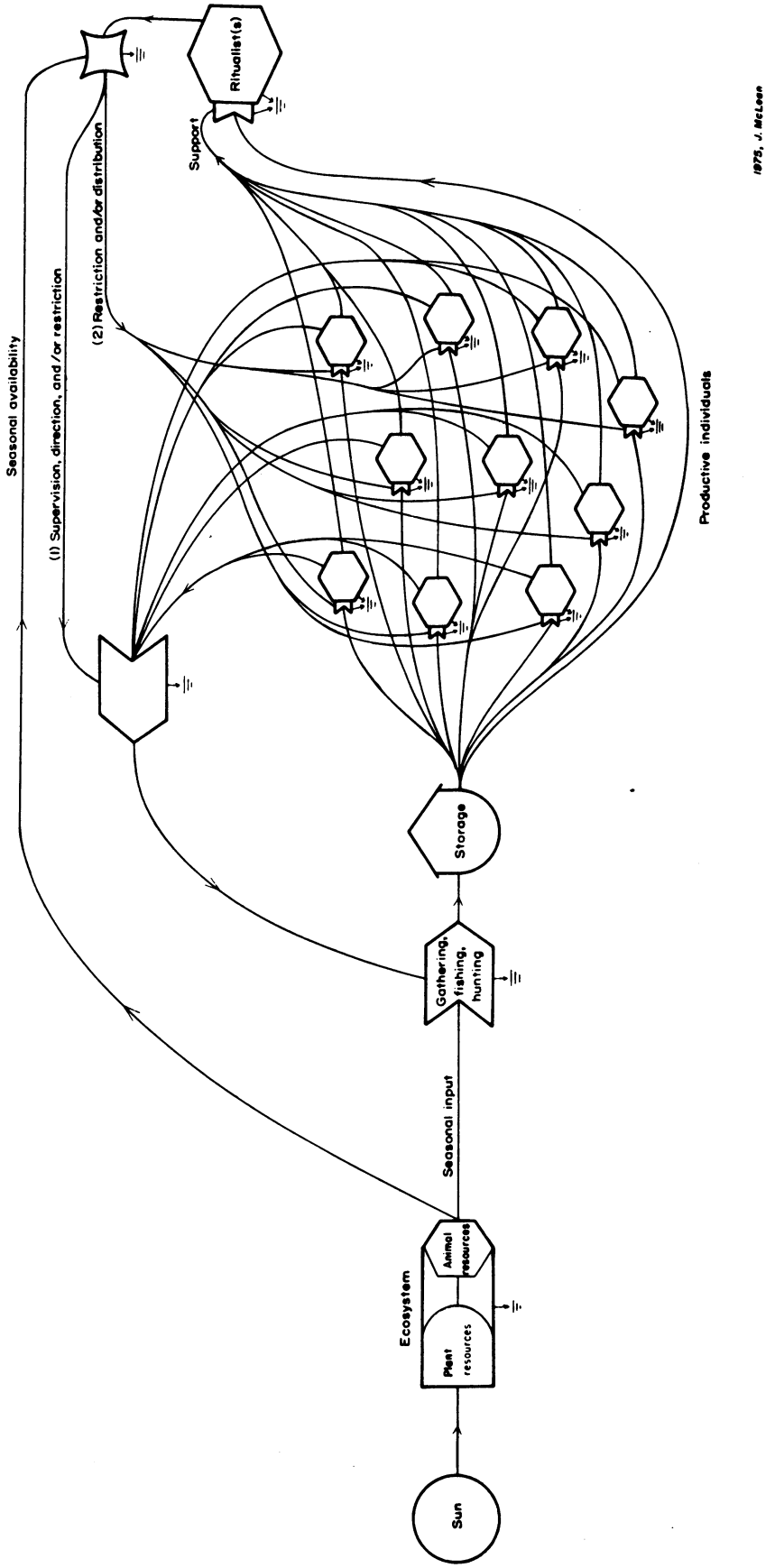


Figure 1. Composite Flow Diagram of Subsistence Ritual Energetics in Native California

A central, self-stimulating subsistence loop is established: between the organized subsistence group (represented here as ten individuals, although the actual size of ritually organized groups was often considerably larger) and a subsistence work gate. Gathering, fishing, and hunting at productive seasonal intervals provide energy flow which, in part, is returned back to the work gate for further subsistence activity. At two positions along this basic feedback loop are located the regulatory gates of the ritualist. Flow from resources may first be regulated along the subsistence energy circuit (1) by the organizational activity of the ritualist, which may include the actual direction or participation in the activity (e.g. the deer hunt shaman) or simply the release of a restriction (taboo) upon the particular subsistence pursuit by the performance of a symbolic rite (e.g. the salmon formulist). This ritual regulation of the actual subsistence activity may act in conjunction with or mutually exclusive of a secondary energetic restriction; (2) that the food resources must be held in passive storage until a ritualist performs a ceremony in which the collected goods are distributed (either immediately or over a protracted period of time), or a general restriction on the consumption of a particular food item is lifted (e.g. first-fruits rites for plant foods). The food energy having reached individuals within the community, it may be used to perform further food gathering activities (perhaps not regulated) completing the subsistence loop originally organized by the ritual specialist, or resources may be "paid" to the shaman or other ritualist for his services. The initial period of supervision or restriction ends upon ritual performance and/or successful accomplishment of harvest or hunt, and the short-term subsistence energy "program" is terminated.

The entire system of energetic regulation theoretically functions on the principle of positive feedback, whereby the more energy supplied to the community from the organizational and distributional efforts of the ritualist, the greater the intensity and organization of the work directed back into subsistence activity. Through this flow interaction, the ritualist controls the magnitude and timing of flow from essential resources and ultimately directs the distribution of this potential energy. Occupying a position at the convergence of many energy pathways, the subsistence ritualist makes possible high magnitude energy flows into the system, with a relatively small expenditure of ritual work. Dependent upon the success of the subsistence behavior he directs, the ritualist also derives continual loop verification from community members (in the form of food "payment" and cognitive support) as to the efficacy of his control activities. This actual decentralization of control mechanisms toward community members from whom energy is derived (i.e. the economic community insures energy delivery to itself by rewarding and supporting the ritualist) is described by Odum (1972: 212-213) as an energetic "democracy," and was perhaps functionally basic to the noted efficiency of ecological adaptation among native tribes of California. World view and elaborate ritual mechanisms which supported regulatory roles of ritual specialists may be viewed as adaptations for the introduction of feedback stability and amplification of energy delivery in aboriginal social systems during periods of maximum productivity of natural resources. In the various cultural manifestations of shaman, headman, formulist, hunting boss, etc., the subsistence ritualist stands out as an energetic organizer

in native California, utilizing cognitive support and ritual prerogatives to stabilize and direct input and flow of energy from important environmental resources. Ritual structure required a series of support interactions between ritualist and community which served as the basis for a stable, dependable, energy exchange system during intervals of concentrated availability of major food resources, and maintained a power base adequate for the support of culturally complex and densely populated hunting and gathering societies.

The energetic structure of subsistence ritual in native California was undoubtedly a functional response to environmental conditions at various adaptive levels. However, the following proposals must remain largely theoretical in the fact that they do not quantitatively emerge from the ethnographic evidence available:

(1) The regulation of harvest procedures for essential resources may have assumed a distinct conservation and management orientation, with ritual specialists serving as short-term "environmental managers." Heizer (1955) has previously presented evidence of deliberate conservation practices in aboriginal North America, noting that these practices were often "masked under guise of magic or ritual." Bean (1972: 147) has suggested that the Cahuilla rabbit hunt encouraged the regular "culling" of large populations of these animals, which, if allowed to remain at maximum density, would be potentially disruptive to new vegetation growth upon which the Cahuilla also depended. Rostlund (1952: 16) notes that intensive salmon fishing of native groups at run intervals (the timing of this activity was strictly controlled by the formulist) probably benefitted the production of Pacific salmon by preventing overcrowding at upstream spawning beds. Ritual direction of plant food harvests undoubtedly served to organize efficient collecting efforts before natural competition from insects, birds, and mammals could reduce the quantity of these resources. The strict enforcement of of ritual restrictions concerning the exploitation of "new" resources (particularly plant foods and salmon) maintained the subsistence base of the community by preventing harvest of important food resources prior to periods of maximum productivity.

(2) Large, communal groups were organized at critical seasonal periods, when efficient gathering, fishing, and hunting activity was energetically crucial to the subsistence base of many groups. Ritualists called attention to the onset of periods when specific products were available in large supply and cooperative action was important.

(3) Ritual organization decreased potential intra-group competition for a seasonally limited resource (which was energetically wasteful and

time-consuming), rather focusing community energies toward maximum cooperative effort by structuring the commencement of a particular subsistence activity so that participants started large-scale gathering, fishing, and hunting work at the same time.

(4) Significantly, most subsistence ritual was a mechanism for decentralization of energy flow and distribution of food resources to the community, in public ceremonies held after the successful harvest or hunt. Ritual restrictions prohibiting the consumption of resources before the ceremony ensured the distribution of the entire supply of collected food according to individual, family, or lineage need.

(5) Finally, successful application of socio-energetic principles of subsistence ritual to a critically needed food resource provided relief from psychological stress and anxiety over the availability of food, supporting the ideology of adherence to ritual behavior as a means for achieving positive response and balanced reaction from the natural environment.

In summary, native cultures were confronted by an ecological and seasonal diversity of natural resources which required accurate control and supervision of subsistence energetics for the maintenance of human populations. A basic response of aboriginal peoples to variable input of natural resources appears to have been the regulation and organization of communal subsistence activities through the ritualization of economic behavior. At intervals of seasonal availability of major food resources, native world view reinforced a set of regulatory prerogatives undertaken by shamans, formulists, and ceremonial leaders which served to organize the work potentials of large cooperative groups. Energy flow from environmental resources and subsistence work potentials were regulated by ritualists in order to facilitate the efficient harvest and use of concentrated, short-term food yields, including seasonal products such as acorns, salmon, and game animals. As functional mechanisms for the systematization of human ecological relationships, world view and ritual were operative ideological institutions of broad adaptive importance to aboriginal societies of native California.

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AAA-M	American Anthropological Association Memoirs
AMNH-B	American Museum of Natural History Bulletin
BAE-B	Bureau of American Ethnology Bulletin
SJA	Southwestern Journal of Anthropology
UC-AR	University of California Anthropological Records
UC-ASR	University of California Archaeological Survey Reports
UC-PAAE	University of California Publications in American Archaeology and Ethnology

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