THE BEGINNING OF ZOOCULTURE¹

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THE DESERT ENVIRONMENT

In arid regions the distribution of flora, fauna, and human population is determined primarily by the distribution of water.

In the deserts of southwestern United States and northwestern Mexico the locations of plants, animals, and men are controlled by delicately adjusted conditions of climate, topography, and rock-structure. Since the meager rainfall is far too slight to support a vegetal mantle, the ordinary leaf-bearing trees and shrubs are confined to certain valleys in which the waters are concentrated either by the conformation of the bounding hills or by subsurface structure, or by both of these conditions in combination; the animals depending on this flora for subsistence are confined, albeit somewhat less closely, to the same valleys, and the human hunters, graziers, and farmers are clustered about these oases, leaving vast expanses of vacant land between. During recent centuries and to a considerable extent during older times this sparsely distributed population has been agricultural and pastoral, limited in number, and (in comparison at least with the most advanced peoples) decidedly provincial in character. The conditions favor patriarchal or feudal organization and oppose extensive confederation or national union; and throughout northern Mexico, conformably to these conditions, the smaller settlements gathered about a single spring or well are usually patriarchal even today, while the larger villages have strong feudal characteristics, and have been welded slowly and incompletely into republican confederation only through persistent and intelligent effort by one of the world's greatest leaders during the last quarter century.

In Papagueria—the land of the nomad Papago Indians in Arizona and Sonora, the most arid area of equal extent in North America—the distribution of ordinary plants, animals, and men

¹ Presented before Section H of the American Association for the Advancement of Science August 26, 1896; read (after revision) before the Philosophical Society of Washington May 29, 1897, under the title "Some Relations between Man and Lower Animals."

is most rigorously fixed by the scant water supply, as is the case in other deserts, and at the same time certain essential features of the organisms are shaped by the bitter struggle for existence against the common enemies of sun and sand. Thus a distinctive flora has been developed, including pulpy cacti and agaves and other plants whose special structures fit them to extend far beyond the water-places. As already set forth,¹ this flora is notable for leaflessness and thorniness, as well as for the development of chlorophyll within and glazed or pilose armor without, while the animals are notable for protective coloring and conformation, as well as for fleetness in some and venom in others; yet, despite this strongly-marked individuality, the animals and plants are interdependent to the extent that the life is gathered into colonies in which even the alien and the inimical are mutually dependent—in which all living things from the lowliest shrub to the economical cactus, provident ant, and intelligent man are combined in a solidarity so perfect that each exists for the benefit of all the others. The essential quality of desert life, combining as it does notable individuality and even more conspicuous communality, is not easy to express; it may be called vigor, strength of character, or perhaps still better *prepotency*, using Huxley's happy term in its more general sense. The reason for the quality is evident, and has been recognized by different students of desert life: Only the individually vigorous organisms are able to survive the hard conditions and leave increasingly vigorous progeny to maintain themselves against the slow desiccation of the aging continent; only those organisms can survive and leave progeny that are able to coöperate in the common strife against the hard physical environment; and, in the eons of struggle, the initial potency common to living things has been developed into a prepotency whereby the vitality of the desert is raised to a distinctive plane, none the less real because it grades down to the mean, much as desert climate merges with normal climate about the margins of the arid region.

These features of the life of the desert must be borne in mind in considering the relations between organisms in arid lands; the distribution of life is controlled by the distribution of water, while the plants and animals are notable for prepotency, which

¹ "The Beginning of Agriculture," *American Anthropologist*, vol. viii, 1895, pp. 350-375.

is displayed not only by strong individuality but by constant coöperation.

RELATIONS BETWEEN ANIMALS AND MEN

The Vulture.—About every patriarchal rancharia, whether Mexican or Indian, located by spring, well, or storm-filled tanque, there is a flock of vultures. They are the village scavengers; they swagger clumsily about corrals and houses on foot, sometimes approaching within a few yards of adults belonging to the rancharia and even closer to small children and girls, though they commonly avoid half-grown boys; if molested, they retreat awkwardly with half spread wings, or take to swift and graceful flight. Anon they perch on fences hard by the houses, or roost on more distant trees; if food runs low, a part or all of the flock circle upward nearly to the limit of vision and soar away over plains and mountains in search of random carrion or a more wasteful or unfortunate rancharia; but they appear to return duly to their own locality.

Approaching a typical rancharia in western Sonora, one of my party wantonly shot at a vulture perched on a corral stake. Happily he missed, and the creature took wing, but the score of rustics were thrown into commotion. Inquiry showed that this was due to the fact that it was *their* vulture that so narrowly escaped; not the vulture of El Patron, La Señora, or any other resident, but one of the flock of vultures belonging collectively to the group of people. Further inquiry elicited the information that the ownership was shadowy, much less definite than that of the dog which commonly attaches himself to some individual or subgroup, less definite than that of the saddle-horse claimed by his habitual rider, less definite even than that of the indiscriminate member of the herd which, with the others, belongs to El Patron; they are seldom recognized individually any more than the inconspicuous steer or burro of the herd, though sometimes a specially large or otherwise distinctive vulture receives a half-jocular sobriquet by which he is known to the youth and many of the adults. It was ascertained, too, that the people are well acquainted with the ordinary affairs of the birds (though not with the places and habits of breeding), and that their sentiments are tolerant and friendly, ripening into vague guardianship and thereby into indefinite collective ownership; the creatures

are not regarded as especially useful or valuable, but are considered harmless and companionable, and a fitting mark of the importance and respectability of the family rancheria. On their part, the birds are thoroughly familiar with all outdoor affairs of the human folk; they note the comings and goings of wanton boys and heartless herdsmen and time their visits to house and corral accordingly; at the first preparations for the slaughter of a beef they are on the alert, but patiently await their portion; they have an eye to the herds and undoubtedly anticipate (and in rare cases hasten) the death of the weakling; and even when the bulls battle at the waterside they watch the contest hungrily and sluggishly exult over a fatal termination, or depart with a ludicrous air of disgust if one of the contestants turns tail. Their attitude toward the people of their group is respectful and moderately fearful—little more fearful than that of ordinary domestic poultry; but they are more distrustful of strangers, as they are of all persons remote from the rancheria.

The Dove.—Throughout western Sonora small doves are common in the vicinity of settlements, though seldom seen over the expanses between. Sometimes they are captured and caged, and are favorite pets of maidens and young matrons, each of whom commonly possesses one and sometimes two or three. They seldom if ever breed in confinement; most are taken young by children, though fully grown specimens are sometimes snared or trapped. They are less familiar with their patron people than the vultures, but frequently adjust their movements to those of their human associates, especially in their visits to well or tanque for drink; they glean the fields and haunt the granaries at the harvest, but retreat othertime to the chaparral, where they nest and rear their young; yet when hawk or eagle swoops, they often retreat toward the human domicil and even take refuge beneath its roof. Both Indians and Mexicans regard the doves with friendly tolerance, and welcome them to field, corral, and plaza; the youth defend them against the attacks of predatory birds and seek to relieve their terror with soft words and proffered food; but, in time of need or when they are so abundant as to injure crops, they are trapped or otherwise taken, though rarely shot, for their flesh. They are less suspicious but more timid than the vultures, and tolerate the human presence with a somewhat capricious familiarity.

The Quail.—The graceful and active California quail abounds in Papagueria, and, through the demand for food and drink, his kind most abound in the vicinity of water-places where human settlements are congregated. About harvest-time they collect in the fields, and at other seasons gather stray morsels from the remoter corrals, invading the plazas only in the absence or invisibility of human occupants or in case of storm or famine. They are regarded as rather ignoble game; among the Indians they are taken usually by boys with arrow, stone, or snare, while even among the pistol-wearing or rifle-bearing Mexicans they are seldom shot. Their attitude toward their human associates reflects their treatment; they are shy up to bow-shot distance, contemptuously bold beyond; they are thoroughly familiar with the human figure, moderately familiar with human movements; they profit by the planting of fields and the storing or pumping of water, for which they pay an impost in flesh; but the relation between bird and man is an antagonistic coöperation compelled by environment, yet one through which both are benefited.

The Coyote.—At the Indian village of Poso Verde the party was made up of leader and Papago interpreter. The male villagers and some of their spouses were recently returned from the fiesta of Santa Magdalena, 100 miles away, laden (inside and out) with mescal; and all the men, save the old shaman, and most of the women were uproariously drunk, so that night as well as day was hideous. Perhaps for this reason the interpreter left the camp hard by the village during the first two nights, sleeping in an outlying ki (grass house) beyond the reach of disturbance, and several times the solitary sleeper was awakened by coyotes sniffing about the meager larder and even about the blankets, only to flee swiftly and noiselessly with the least movement, so that only once was the retreat hastened by an unsuccessful shot. When this incident was recounted to the interpreter, he intimated that it was not good to shoot coyotes; and a subsequent conversation with him and the aged shaman elicited the information that the Indians at this place did not like to injure coyotes, and expected them to visit plazas, corrals, and fireplaces during the night and gather up neglected or discarded food refuse. More extended inquiry here and inquiry and observation elsewhere among the Papago villages showed that this sentiment toward the coyote is common. He is regarded as a mystical

or somewhat supernatural coadjutor of man; his twilight howling on the neighboring hillside is carefully noted and interpreted as information concerning the presence or absence of strangers, the situation of the stock, the state of coming weather, even the sentiments of the mysteriously potent deities dwelling in the adjacent mountains; and if he did not pay his customary nocturnal visits they would suspect proximity of the hated Apache or other enemy, or fear the wrath of some more shadowy demon. In one of the strongest clans, which has representatives in most of the Papago villages, the coyote is the incarnation of the tutelar beast-god and is especially sacred—so sacred that killing him would be not merely a crime but the most heinous sacrilege; and to some extent this veneration is shared by the members of other clans. So the coyote is tolerated, sometimes with reverence and affection, sometimes with apparent indifference, which is always rather friendly than otherwise; the men and women and even the infants are familiar with his appearance, anticipate his visits, and listen interestedly to his resonant mouthing; and they are accustomed to the occasional admixture of his blood with that of their own dogs of European lineage. The coyote, on his part, is thoroughly familiar with the characteristics and habits of the Indian villagers, even with their household arrangements, and adjusts himself to the conditions with foxy cunning; he wanders far over the waterless stretches in search of game, and breeds in seclusion, but his favorite haunts are near the Indian rancherias, where he finds some food, more water, and a tacit encouragement to prowl. The actual benefits of the association to the coyote are considerable, especially where the water-supply comes only from deep wells; the advantages to the man are mainly imaginary, yet in some part real, since the animal is a watchful sentinel, and even his trails and scattered tracks and his excavations in the sand for water are full of actual meaning to the wanderer trained in desert lore.

The Seri Indians living over against the Papago on the shores and islands of the Gulf are much less affected by civilization; they have no domestic animals but dogs, and these apparently of fully half coyote blood on the average, some showing hardly a trace of consanguinity with the European stock. They, too, are friendly with the animal—the tutelar deity of one of their clans—who runs about their rancherias unmolested, coming

almost within kicking distance, and paying no attention to movements which would scatter non-tolerant animals in terror. Other tribes in various parts of the country were equally familiar and friendly with the small wolf, and some, like those of the Siouan stock, had domesticated him as a beast of burden and draft and a source of food in emergency as well as in ceremony.

The Cow.—Throughout much of Papagueria the people are pastoral, and their largest herds are of kine. These are of course domesticated, the descendants of European stock; yet their condition is by no means that of the thoroughly domesticated cow of the dairy farm or cottage, not even that of the animals on the ordinary stock ranch of the western states; they are wild and vicious, fearful of men, especially strangers, absolutely uncontrolled in respect to breeding, and, except for the annual rodeo, often nearly as free from human constraint as the bura deer of the mountain-sides. They are held in contact with man chiefly by the need for water, preferably taken from tinaja or barranca far from human habitation, but from well or tanque during the drier months. The well may be remote from habitation, save perhaps an adobe house in which two or three vaqueros exist to draw the water (in a rawhide bag by means of a riata laid over a beam and snubbed to the saddle-horn); the tanque may be a dozen or a score of miles from the nearest rancheria. Hither the cattle repair daily or bi-daily, about sunset, in herds of a score or possibly a hundred, each led by a powerful bull continuously bellowing defiance as he approaches; at the water-side the herds meet, sometimes to mingle peacefully or with minor battles among the subalterns, but often to witness fierce conflicts between the respective leaders, which are often duels to the death. After drinking, the beasts wander away, browsing as they go, toward their respective ranges, whose limits are fixed by frequent fighting; they travel 10, 15, even 20 miles, and their tracks, which may be composed into radii from the tanque as a center, are a guide to the observant traveler. On the more remote ranges the stock flee or hide among the mesquites like deer from the horseman, but would promptly attack a footman; at the water-place they are more tolerant of the individual vaqueros with whom they are acquainted, though quick to either attack or flee from strangers. Only on the most civilized ranchos are the cows milked; here a few of them are trained to this use,

perhaps for weeks or months, by three or four vaqueros who, amid clouds of dust and expletives, cast their riatas over horns and feet, snub them taut about their saddle-horns, and have their horses hold the struggling beast or throw it in case of too violent resistance. The calves dropped on the range are even more fearful of men than the adults, and, so long as they suckle, avoid the water-places; commonly their first real acquaintance with the master is at the rodeo, where the deft riata and red-hot branding iron serve only to deepen their fear and hate of the human presence. On the whole, the kine are sullenly tolerant of mankind through the constraint of thirst and the restraint of defeat in conflict; while the men tolerate and constantly strive to subjugate the unwilling animals only for the sake of food, clothing, and saddlery. The toleration is the unkindest of the desert, and is maintained only because of its mutual beneficence—without the kine the rancheros would be impoverished, and without the artificial wells and tanques most of the cattle would famish.

Certain noteworthy characteristics of the cattle and men grow out of the customs of the desert country. The patriarchal bulls are self-chosen leaders, who defend range and harem by dint of battle; and natural selection—there is practically no artificial selection in Papagueria—tends to produce a strain of powerful, active, and sharp-horned stock, capable of defending themselves against carnivorous enemies. At the same time the vigorous and vicious cattle must be controlled by the vaqueros; and it is the highest ambition of these modern knights to subjugate the animals without slaughtering them, *i. e.*, by means of their own courage and alertness, in conjunction with the speed and strength of their horses; so natural selection—for on this plane the methods stand—produces a strain of bull-fighters. The strife between bulls and men is not without benefit to both, for in both the antagonistic coöperation has resulted in the development of strong character, or prepotency, like unto that of the plants and all the other animals of the desert. Among the vaqueros the habitual labor is mimicked in sport, and leads to competitive contests and eventually to the development of professional toreadors and to elaborate bull-fighting arenas in the larger villages and towns. Thus professional bull-fighting is merely an adjunct and outgrowth of peculiar conditions; wheresoever men are supported by herds of half-wild cattle, and are inspired by emulation and

the hope of sweethearts' smiles, there bull-fighting must arise, and moralists but waste their breath who declaim against it; yet it could be eradicated in a century by judicious admixture of gentle Jersey or other cultured bovine blood, or by polling the herds—for just so delicate is the adjustment between man and beasts in pastoral culture.

Summary Relations.—There are relations between men and other animals in the deserts of Papagueria, but those of the vulture, the dove, the quail, the coyote, and the cow are representative. In each case there is an intimate association which is commonly more or less antagonistic, yet mutually beneficial. The vulture is a scavenger, the dove is a pet and the quail a gleaner while both are food-sources, the coyote is a tutelar guardian and scavenger, and the cow is a source of wealth. Associations of the sort are not, indeed, confined to Papagueria; visitors to the ancient city of Charleston are familiar with the buzzards roosting on the market-house, petted by the people and protected by ordinance in recompense for their services as public scavengers; on many eastern farmsteads the common quail is a family protégé and wanders at will about fields and granaries; in some cities, like the Moslem capital on the Bosphorus, ownerless dogs take the place of Charleston's vultures, and are guarded by popular sentiment and public law, as in the days of Willis' "Pencilings by the Way," when the citizen who slaughtered one of the vicious curs of Constantinople was fined in a quantity of wheat sufficient to bury the beast when suspended by the hind feet with nose touching the ground; yet it is noteworthy that the relations are closer and more numerous in the deserts, where the antagonistic elements of environment are few and fierce, than beneath softer skies. It is significant, too, that in all of these cases the relations are alike in one respect—they are *essentially collective*, not only on the part of the men, but on the part of the animals; the primary relation is not between individual man and individual animal as in perfect ownership, nor between a single individual of the one and a group of the other as in ordinary domestication, but between a group of the one and a group of the other.

SIGNIFICANCE OF THE RELATIONS

On considering the several cases of relation between animals and men, they are found to present certain similarities; yet there

are differences. The relations of mankind with quail and coyote are wholly collective, and there is no definite ownership (save in the rare cases in which individual animals are restrained); in the case of the vulture the relation is also wholly collective and the ownership shadowy; in the case of the dove the relation is collective and not at all proprietary, save in the pets; while in the case of the cow the relation is collective only in a general way, which is qualified by ownership of the entire herd by the patriarch—yet even this ownership is much less definite than in civilization, *e. g.*, in that it is understood that any hungry traveler is entitled to kill such stock as he may need for his own consumption. Although the cow alone is classed as domestic and was imported into the country for man's behoof, the other animals are hardly less dependent on man for continued existence. If a migration of the nomadic type were made by Mexicans, or more especially by the Papago Indians, the herd would be driven slowly, consuming such pasture as might be found on the way; undoubtedly the vultures and coyotes would follow the clan and herd; a part of the doves would be carried in cages, some others would follow, and those that stupidly remained behind would doubtless die, while the short-sighted quails would probably remain to suffer decreased food-supply and increased predation.

On considering the several aspects of the relation between animals and men, it is found easy to arrange the series in the order of intimacy. In the Mexican villages the order is undoubtedly, first, kine; second, vultures; third, coyotes; fourth, doves, and, finally, quails—*i. e.*, the relation runs down from domestication to simple association enforced by the hard environment. Among the Indians the order appears to be, first, kine, acquired from the Spaniards; second, coyotes; third, vultures, and, fourth, doves, for, so far as observed, the quail and Indian can hardly be said to be coöperative. Now it is to be remembered that the relations exemplified in these cases are veritable and—save perhaps in the case of Indian and quail—represent mutual adjustment on the part of both the associates; the habits of each copartner would be modified by the removal of the other; and the several associates, with others, combine to form a similarly interdependent assemblage, or a solidarity.

On considering the degree of relation it is found that the clear-

est line of demarcation is between that of the kine and those of the lowlier animals, and, partly in deference to common usage, the cases may be classified with respect to this line. Under such classification the kine alone represent domestication; the others are essentially alike in that they are characterized by mutual *toleration* between men and the respective animals without definite ownership or purposive control on the part of the former.¹ There is a third class of relations between men and animals, which it is not the purpose here to discuss, represented by pre-visional breeding, or stirpiculture, or *artificialization*. So the effective relations between animals and men, in which the former always yield eventually to the dominant intellect of the latter, may be called *zooculture*, and may be seriated in three great classes, which also represent stages in development, as follows:

$$\text{Zooculture} \left\{ \begin{array}{l} \text{Artificialization} \\ \text{Domestication} \\ \text{Toleration} \end{array} \right.$$

THE GENESIS OF ZOOCULTURE

One who observes the several cases of mutual toleration between animals and men in Papagueria can hardly fail to inquire why simple toleration has not passed into complete domestication. The inquiry is not altogether fruitless. It is found that vultures are on such terms of intimacy with the residents of the rancherias that they might, with little effort, be coaxed into the domicils, and in the course of a few years trained to return to them like domestic poultry; this is not done, as is evident, and indeed as the rancheros explain, only because they are unclean and foul-smelling birds, attractive enough at a little distance, but repulsive on nearer approach. Among the Indian villages it is found that the coyote is repelled from the firesides and plazas only by the fully domesticated dogs of European descent; and, as the shaman at Poso Verde explained, the coyote is too independent in spirit (*i. e.*, too fractious and petulant in disposition) to associate or compete with the common dog about the

¹ The term *toleration* has recently been used in about this sense, though in a less definite and not a denotive way, by Giddings ("Principles of Sociology," 1896, pp. 113, 114). He justly says: "As soon as toleration is established coöperation and alliance are possible. Mutual aid begins unconsciously in accidental helpfulness and protection. Natural selection preserves it, and at length, when its benefits are perceived, it is consciously perpetuated."

household; yet the Indians have traditions of a golden past in which coyotes and men associated freely, and, in view of the domestication of the animal among scores or hundreds of tribes, it is manifest that the tradition contains a grain of truth. Among both Mexicans and Indians it is found that the dove is so familiar with the human folk as to suggest that it might be completely domiciliated, as it is in small part—indeed, when one of an adult pair is caged the mate voluntarily takes up its abode on or alongside the cage, which it leaves only for food or water, or on too close approach of the somewhat-feared human associate; and, so far as can be judged, complete domestication is neglected only because the bird is too small to be valuable as poultry, and too easily taken to demand culture in confinement. It is found, too, that the more wary quail is regarded as too small and trifling for serious attention. So adequate reasons appear for the retention of the several animals in the lower stage of zooculture.

When the inquiry is pushed into the past and extended to other animals it is still found fruitful. Evidently the present reasons for failing to domesticate the coyote did not apply before the importation of the European dog, and it is accordingly easy to understand how he was brought into domestication through the antecedent stage of collective toleration; the conditions being especially favorable when the habitat of the coyote was shared by the wolf which drove the smaller animal to human shelter, where his presence gave notice of the more dangerous enemy, so that the human and bestial copartners were both benefited. It is evident, too, that the present reasons did not apply to the peaceful and toothsome turkey, which must have sought refuge about the prehistoric rancherias just as the dove does now; so it is easy to see how this animal became domesticated so completely as to be guarded by night in corrals and covered shelters by the ancients of both Sonora and Arizona. It is equally evident that the reasons did not apply to the timid guanaco or vicuña, whose useful pilage, edible flesh, and capacity for burden-bearing must have attracted the cupidity as well as the sympathy of the ancient Mexicans, and led to that domestication which is recorded in prehistoric corrals as well as in petroglyphs and paintings. The modern association is essentially collective, and owes its intimacy to the mutual acquaintance of the animals and men and to the toleration by each of the pres-

ence and movements of the other; and the occasional capture and confinement of individuals is a relatively unimportant factor. The character of the prehistoric association is lost in the mists of antiquity, yet it may safely be inferred from that of the present, and the only reasonable inference is that the course of natural development has been uniform, and that the prehistoric association was also collective and arose in mutual toleration; and this inference is checked and verified by the fact that it was those species (and those alone) best adapted to mutual toleration with agricultural man that were brought into domestication on the western hemisphere before the advent of the Caucasian.

THE INFLUENCE OF ENVIRONMENT ON ZOOCULTURE

Observation in all lands shows that plants, animals, and men are dependent on their physical environment in varying degrees. The stationary plant lives at the mercy of sun and storm, moisture and soil; the moving animal seeks shelter from cold, heat, and wind, journeys to water, and migrates in search of food; thinking man builds habitations and manufactures clothing for protection against the elements, and stores, manufactures, and transports food and drink. So the living things of the earth may be arranged in an order of emancipation from physical conditions, and this arrangement is found to represent also the order of self-activity or spontaneity—the plant adjusts itself to conditions, the animal seeks or flies conditions, the man modifies conditions.

All observation shows, too, that plants, animals, and men are dependent on their vital environment in varying degrees. The mindless plant assimilates sluggishly the mineral and vegetal nutriment brought to it by physical and vital chance, consuming a little more greedily the more highly differentiated organic substances, and thus adjusting itself mechanically to general vital conditions; the instinctful animal seeks the higher and more readily assimilable organic substances, selecting the good and rejecting the bad, consuming plants and sometimes other animals and thereby interacting with both, and thus by unconscious or subconscious effort adjusts itself to the living world; thoughtful man begins on the plane of the animal but soon learns to cultivate the good and eliminate the bad among animals and plants, and thus makes conquest of the vital environ-

ment just as he modifies physical conditions. So the living things of the earth may be arranged in order of potency or of grade of faculty, when this arrangement is found to represent also the order of intellectual development or mentality—the plant is purposeless, the animal unconscious of purpose, the man purposeful. This arrangement serves to contrast vitality and mentality; the course of vitality is shaped by conditions, but it is the province of mentality to mold conditions.

Observation shows, in like manner, that plants, animals, and men are mutually helpful in varying degrees: The apathetic plant, in so far as constrained by the cruel law of the survival of the fittest, strives against its alien fellows and even its own kind for stature, length of life, and abundance of seed; its strength is against its neighbor, and it combines slowly and imperfectly with other organisms of its own grade, preferably of its own species; yet it is ready to profit selfishly by the labors of pollen-bearing bee, seed-distributing bird, or cultivating man. The sentient animal enters, partly by planetary chance and partly through instinct, into combination with its fellows and also with the plants and other animals on which it subsists; if it selfishly destroys the living things forming its own food-supply it pays capital penalty, while if it improves the creatures constituting its provender it reaps due reward; and the species that most effectively contribute toward the improvement and perpetuation of food-yielding organisms survive longest and flourish most exuberantly. Inventive man, realizing at once what the beast learns only through the extinction of numberless species, preserves the stock and next the seed of useful plants, and then learns to sow, harvest, and garner; at the same time he warms toward tolerant animals, and in time protects them from enemies and succors their young; but he wages war on intolerant animals and useless plants, and gradually exterminates their species; and in these and other ways he exalts his own kind, aids the good among plants and fosters the good among animals, and multiplies both vitality and mentality. So the living things of the earth may be arranged in an order of helpfulness to contemporary organisms, and this arrangement will be found to represent also the order of domination—the plant mechanically antagonizes contemporaries, the animal instinctively encourages certain contemporaries and discourages

others, the man recreates and harmonizes the good and destroys the evil among contemporaries. The arrangement serves to contrast egoism and altruism; the selfishness and cruelty of the living world culminate in the lower stages of vitality, while beneficent altruism, at first the offspring of intellect, gradually rises to crown and dominate the parent.

The various observations show that the progress of life on the earth is from relative inaction to external and internal activity, from mindlessness to instinct and intellect, from barren egoism to coöperation and altruistic motive. Various stages in this comforting and promising course of development are represented by different groups of plants, animals, and men, whether considered severally or collectively; and in all cases the stages are found to reflect physical conditions with considerable fidelity. The cases are too many and too infinitely varied for enumeration; but it may be noted that vitality and mentality are of a higher order on land than in the sea, in the temperate zones than in the tropics, in arid regions than in humid lands; or, in general terms, that the excellence of life culminates where the physical conditions are such as to demand exercise of faculty, whether in the form of self-activity, mentality, or beneficent domination. The general course of life on the earth is in harmony with the portion of the course represented in Papagueria and other deserts where the plants and animals are characterized by a vigorous prepotency—where the genetic tree of organic relation is so successfully forced that the plants display the germ of instinct, the animals the germ of reason, while both are forced into the earlier stages of altruistic organization through the stress of strife against a common enemy; and here it is that the dominant intelligence of man is specially fitted to enter into and control the incipient organization of his subhuman contemporaries. So, while it may not be denied that the stage in collective cooperation among living things represented by the beginning of zooculture might originate in humid areas, it must be considered infinitely more probable that the stage was reached first in the arid lands of the continents.

The lessons of the relations between animals and men in Papagueria are simple and easily read; the first lesson is that the relations are collective; the second lesson is that there is a

stage of mutual toleration of presence and movements anterior to domestication proper; the third lesson is that the relations are forced in rate of growth and in intimacy by a rigorous environment.

It has already been shown that agriculture was, in its beginning, an art of the desert; it may now be affirmed that the sister art, zooculture, is also a child of sun and sand.

BOOK REVIEWS

The Ghost-dance Religion. By James Mooney. Extract from the Fourteenth Annual Report of the Bureau of Ethnology. Washington: Government Printing Office, 1896. Pp. 640-1136. 8°.

The greatest aboriginal revival that this country has ever seen was the recent one known as the Ghost-dance Religion. It was greatest not only in the area over which it spread and the number of the tribes which it involved, but also in the hold which it took on the different peoples who subscribed to it and who practiced its simple ceremonial. That it should have taken such a hold on them was only natural, since this religion offered to the savage the promise of a return to those primitive conditions which had been a part of the earlier life of men as yet not middle-aged. Chief among these promises was the assurance that the buffalo should return, and this meant to the Indians plenty and comfort. No blessing ever seemed to any people so bright in retrospect as do the vanished herds of the buffalo still appear to those Indians who can recollect the happy days of buffalo plenty, in which they themselves had part.

The history of the ghost-dance religion has just been written. Until the publication of Mr Mooney's volume, knowledge of this revival was confined to a mass of scattered individual observations and conclusions, and a still greater mass of crude, unintelligent, and misleading newspaper articles, in which truth and falsehood were inextricably confused. Now, however, we have history, and history written by a trained field ethnologist, whose knowledge of Indian character has come to him in the only way in which such knowledge can be acquired—by living with Indians. Mr Mooney has visited most of the tribes which took part in the ghost dance, and the extent to which he has won their confidence is shown by the fact that he himself has stood in the slowly re-