CURRENT ANTHROPOLOGY Vol. 20, No. 3, September 1979

Questions in the Sacred-Cow Controversy

by Frederick J. Simoons

The trial of the ecological perspective must, and will, be in the empirical arena. The decision rests on its success in handling the facts of this case and that. . . . An adaptive perspective, goes the moral, must not presume that whatever is there is good, rational, useful, or advantageous. Lots of things people do are truly stupid, if understandable, and many cultures have gone to the wall.

MARSHALL SAHLINS, "Culture and Environment"

Harris (1966:51; 1978*a*:28) has incorrectly ascribed to me the statement that "irrational ideologies" often compel men "to overlook foods that are abundant locally and are of high nutritive value, and to utilize other scarcer foods of less value." My actual words were "it is not rare for the *foodways* to lead men to overlook foods that are abundant locally . . ." (Simoons 1961:3, italics added). Nowhere on the page cited or in my subsequent section on beef eating in India do the words "ideologies" or "irrational ideologies" appear. This, however, has not deterred Azzi (1974:319), apparently expanding on Harris's error, from citing the same page of my book as reading that "irrational ideologies" cause an inefficient surplus of cattle in India. Azzi cannot have seen the page he cites, for there is no consideration of surplus Indian cattle on that page. Nor is the question of surplus cattle discussed anywhere in my book. All this could be ignored if these were the only half-truths or outright errors that can be traced to Harris in his crusade over the sacred cow. Unfortunately, they are not. This paper is an effort to help set the record right.

Harris begins his first article on "the myth of the sacred cow" with two quotations, one from Marx, the other from Gandhi (Harris 1965:217). Marx is quoted as saying that social life is basically practical and Gandhi that Hindu cow protection is based on the economic usefulness of the cow. It is not my purpose here to evaluate Harris's "Marxist" theoretical position. I would, however, note Paul Diener's observation (personal communication) that Harris's interpretation of Marx's remark is a "gross distortion," Marx having contended in the bulk of his writings that men debate and conflict concerning the practical world, not that the result is always *profitable*. Thus, says Diener, Harris misuses Marxism in ignoring religion as a sociopolitical force in the sacred-cow controversy and in focussing on a search for the "profit factors" behind sacred-cow beliefs, "the 'market forces/environmental forces' which have led the invisible hand to throw up this custom." Like Paul and Rabinow (1976), Diener sees Harris's technoenvironmental approach as an "environmental marketplace solution, a bourgeois rationalism."

As for Gandhi, he and other Hindus committed to cow protection have made many, sometimes contradictory, statements explaining and justifying their positions. (For a broad range of Indian views on the cow, see A. B. Shah 1967, Lall 1973.) Some are in the spirit of that cited by Harris; most, however, are not. Representative statements by Gandhi and one of his followers reveal a more complex blending of economic concerns and religious commitment:

> The central fact of Hinduism is cow protection. Cow protection to me is one of the most wonderful phenomena in human evolution. It takes the human being beyond his species. The cow to me means the entire subhuman world. Man through the cow is enjoined to realize his identity with all that lives. . . . The motive that actuates cow protection is not "purely selfish," though selfish consideration undoubtedly enters into it. If it were purely selfish, the cow would be killed, as in other countries, after it has ceased to give full use. [Gandhi 1954:3, 5]

> The cow protection ideal set up by Hinduism is essentially different from and transcends the dairy ideal of the West. The latter is based on economic values, the former, while duly recognizing the economic aspect of the case, lays stress on the spiritual aspect viz. the idea of penance and self-sacrifice for the relief of martyred innocence which it embodies. Under a dairy ideal, means do not count, even cow slaughter is resorted to for insuring cheap milk supply and getting rid of what are supposed to be uneconomic and superfluous cattle. Under the religious ideal, means are the principal thing—in fact everything. The essence of cow protection according to Hinduism thus does not lie in the mechanical act of "saving" the animal per se, . . . but in the self-purification and penance behind the act. "P." [Gandhi 1954:85–86]

These two statements differ significantly from the one selected by Harris. Gandhi and his followers, far from seeing their cow-protection ideal as deriving simply and directly from economic concerns, view it as a notable departure from the "dairy ideal of the West." Their views constitute a blending of religious and economic concerns, with religious commitment primary. Most secular Indians also see Hindu cow protection as basically religious in motivation.

Harris (1965:218–20) proceeds to describe "the standard

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The present paper was submitted in final form 5 x 78.

case for the great cattle bungle":[1] that India's "dairy industry is one of the least efficient in the world"; that there are many old and "useless" cattle in India which wander about, "impeding traffic and damaging the crops"; that there are homes for aged and infirm cattle; that there are surplus cattle in India; that many cattle in India have no commercial value other than their hides and represent a liability, not an asset. Countering this "standard case," Harris argues that what is involved is a "myth of the sacred cow" and raises two "basic" questions: whether there is competition between man and cattle for scarce resources and whether eliminating the ban on cow slaughter would "substantially modify the ecology of Indian food production." His answer to the first question is that man and cattle have a symbiotic relationship in India, not a competitive one; that bullocks are indispensable work animals in India's plow agriculture; that cows produce over 45% of India's milk supply and are even more important as bearers of bullocks and providers of dung; that cows and other cattle provide leather and, to low-caste Hindus and to pagans, Christians, and Moslems, also beef. The wandering of cattle, moreover, is seen as an efficient use of plants that otherwise would be wasted. One does not need to refer to religious concepts to explain the large number of cattle in India, says Harris. Rather, the religious concept of ahimsa (nonviolence) is "an ideological expression" of ecological pressures. Thus it is positive-functioned, not negative-functioned. In answer to his second question, Harris argues that eliminating the ban on cow slaughter would threaten human well-being.

What Harris has done in his early articles is assemble a mélange of opinions on the sacred cow to create an unreal composite view, a straw man to be ridiculed for failing to appreciate the economic importance of the cow. Almost all experts recognize that in India, as in its neighbors Pakistan and Bangladesh, common cattle and water buffalo are of vital importance to human livelihood. Despite this, many experts insist, certain Hindu views and actions on behalf of the sacred cow are, on balance, negative-functioned, and changes would be to India's ecological, economic, and nutritional benefit.

The case of the Shin, a Moslem people of Dardistan, clearly demonstrates how negative-functioned—how detrimental to group well-being—views of the cow can be. Though they possess cattle and depend on them for plowing much as do other Indians and Pakistanis, the Shin look on the cow as other Moslems do the pig, with abhorrence: they avoid direct contact with cows, refuse to drink cows' milk or burn cow dung, and reject beef as food (Drew 1875:428; Shaw 1878:29, 34–35; Biddulph 1880:37, 112–13; Leitner 1893: Appendix 6v; Durand 1900:202–3, 210; Muhammad 1905:94, 111; Francke 1907:36; *Imperial Gazetteer of India* 1909:108; Rose 1911–19: 406; Schomberg 1935:165, 167, 209; Lorimer 1935–38:257*a;* Simoons 1970:558–61). The Shin case seems to fit Hallpike's (1974:488) suggestion that an "inefficient society and its institutions are perfectly capable of surviving in many natural and human environments," depending on competition with other groups.

My position is that the proper framework in which to place the sacred-cow controversy is one which permits traits to be positive-functioned, negative-functioned, or both and which allows for human choice among alternative cattle policies and systems. It is with this in mind that I consider specific questions raised by Harris and others. My concern is with the origin of the sacred-cow concept and with whether, in one way or another, it contributes to waste and destructiveness in present-day India.

[1] As Hoffpauir has observed (1977:111, 127–30), the attention given to India's sacred cows has obscured the important role of its 51,000,000 water buffalo, which contribute more than half of India's milk supply. The "bad press" of the water buffalo derives in part from its lack of religious status and from concern that in economic competition it is a threat to the sacred cow.

IS HARRIS'S HYPOTHESIS ON THE ORIGIN OF THE SACRED-COW CONCEPT REASONABLE?

In his initial articles on the sacred-cow concept (1965, 1966), Harris ignored the historical record bearing on its origins. Lately, however, he has dealt with that record, advancing a hypothesis in the spirit of Ellsworth Huntington. According to Harris's hypothesis (1977*a*:145–47), population increase following 1000 B.C. in the Ganges Valley was accompanied by deforestation, floods, and lengthy droughts. Farms grew smaller, and cattle, as plow animals, became increasingly important to peasant survival. As a result, cattle became the main object of the religious ban on meat eating. To kill cattle for their flesh would have endangered a farmer's livelihood. Therefore, Harris contends (p. 146), "beef was tabooed for the same reason that pork was tabooed in the Middle East: to remove temptation."[2] In his opinion (p. 147), the ban on beef eating originated as a practical matter, "the cumulative result of the individual decisions of millions and millions of individual farmers." Those who did not slaughter their cattle were "more likely to hold onto their farms, and to pass them on to their children."

Harris's argument has what appear to be fatal flaws. Most damaging, literary evidence for cow sanctity indicates that the concept was not developed independently by "millions of individual farmers," but imposed from above and at variance with common practice (Brown 1957:37–39). Further consideration of Harris's hypothesis reveals other serious shortcomings. The Rajasthan Desert, which is part of the same belt of arid and semiarid lands as the upper Ganges Valley to which he alludes and which is spreading at the rate of a half-mile per year, is considered to be largely man-made (Whyte 1964:274; Bryson and Baerreis 1967:141; Bryson 1972:142; Bryson and Murray 1977:107–14). The air over the Rajasthan Desert contains abundant water vapor, four times as much as that over most deserts and about as much as that over some quite rainy tropical forests (Bryson 1972:141; Bryson and Murray 1977:111). Where plots in the desert are protected against man and animals, a rich grassland develops (Whyte 1964:274; Bryson 1972:142; Bryson and Murray 1977:114). A major factor in desertification in Rajasthan has been overgrazing (Whyte 1964:275; Bryson and Murray 1977:113–14), especially by 13,000,000 cattle, 7,000,000 sheep, and 8,000,000 goats (1961 figures). Thus man and his animals are the principal villains. If one works these facts into Harris's hypothesis, the results are these:

Human population grew in western India following 1000 B.C. This, coupled with desertification brought on in large measure by overgrazing, led to smaller agricultural plots. With need for plow animals more critical (because farm plots were smaller?), millions of farmers stopped slaughtering cattle and eating beef. This, in turn, increased cattle numbers, accelerated environmental destruction, and left less feed and weaker oxen with reduced ability to plow. People were also deprived of beef, a valuable source of protein, and their nutritional status was lowered. All of the above worsened still further human chances of survival.

Of course, many pastoralists, in modern India and elsewhere, do keep large numbers of animals under conditions of severe drought in the hope that at least some will survive. In this case, however, we are dealing with farmers, not pastoralists. They would, under the conditions hypothesized, be making decisions unsound in both individual economic and broader environmental terms. The farmer's "temptation" would have been to destroy his most valuable assets, plow oxen. What

[2] In the case of pigs, in Harris's view, the temptation was to ***keep*** them under changed ecological conditions to which they were unsuited. Wagner (1978) has rightly asked why, if pigs could not flourish, a ban would have been necessary. For a rebuttal of Harris's argument on pork avoidance, see Diener and Robkin (1978).

farmer would have eliminated the basis of his livelihood, except in the final throes of starvation? And why would he have had to ban the slaughter and eating of all cattle, including the old and infirm, to save those capable of working, breeding, and milking?

If, nevertheless, Harris's hypothesis were valid, one might expect that, since independence, Moslem farmers in arid, overpopulated Pakistan, who are not protected from "temptation" by the sacred-cow concept, would have slaughtered so many cattle as to ruin themselves. This has not happened. One might also expect to find the strongest support for a ban on cow slaughter in those Indian states suffering from the greatest human population pressure. The reverse is the case. Kerala is India's most densely populated state and among the lowest in average daily intake of protein and calories (Gopalan et al. 1971:45, 47, 94). It is also one of the few states that has not passed legislation against cow slaughter, and in 1974 it even announced plans for building India's first beef-processing plant (Drummond 1974). West Bengal is India's second most densely populated state and is also among the lowest in protein and calorie intake. West Bengal "adamantly resisted the imposition of a ban on cow slaughter" (Ravenholt 1966:11) and today has only a partial ban. West Bengal's resistance, says Ravenholt, makes good sense, "for were all useless cattle also retained for sentimental reasons, the nutrition for animals and humans alike would further decline." In view of all these observations, I conclude that Indian farmers banned cow slaughter and beef eating for reasons other than the need "to remove temptation."

There are two principal alternatives to Harris's hypothesis. Each sees the bans on cow slaughter and beef eating as imposed from above. One is being pursued by Diener, Nonini, and Robkin (1978), who take what they call "a new evolutionary viewpoint" focussing on the economic and political constraints that operated in India in the past. Their suggestion is that the prohibition of beef in India derives not from technoenvironmental pressures, but from deliberate action taken by the early Indian states to further their political and economic ends. They note a large-scale sedentarization of agriculture, expansion of trade, and rise of urban states, such as Magadha, at the very time the sacred-cow concept was gradually being established. They argue that those states fostered the ban on beef as part of a broader effort to provide surpluses for the politically dominant urban elites. According to their hypothesis, cow veneration did not develop because it was beneficial to peasants or as a reflection of an ecological adaptation favorable to them. Instead, it was a state policy imposed on peasants, one that may have had a quite detrimental ecological impact. That the prohibition took a religious form they view as reflecting the close links between the urban elite, the state, and emerging religious ideas and movements.

The second alternative hypothesis places the impetus for the development of the sacred-cow concept and the ban on beef eating within the socioreligious realm. The Sanskritist Brown (1957:35) demonstrates that the doctrine of the sacred cow gained ground gradually during the period from about the 5th century B.C. to the 4th century A.D., a time of religious turmoil. Whereas before that time even members of the priestly *jatis*, the Brahmins, slaughtered cattle and ate beef, following that time Brahmins not only abandoned those practices, but became leading proponents of the position that society in general should abandon them.

In the view of many other scholars who have weighed the documents, the rise of the sacred-cow concept was indeed linked to continuing religious controversy (Crooke 1912:301–6; Sundara Ram 1927:62–74, 160–202; Hutton 1933:395–97; Kosambi 1946:45–48; Ambedkar 1948:116–21; Alsdorf 1961; Dumont 1966:187–93; Dutt 1967; Lal 1967; Roy 1967:19–20; Lodrick 1977:78–86; Diener, Nonini, and Robkin 1978). Early Jains and Buddhists argued for ahimsa and against taking life, although they did not focus solely on the cow. Buddhists did, however, object to indiscriminate slaughter of cows, especially for sacrifice. Brahmins were affected by Buddhist and Jain thinking and went beyond it in raising the cow to a special position of sanctity, one buttressed by later strife with Moslems and British. According to this hypothesis, the sacred-cow concept and the bans on cow slaughter and beef eating derive mainly from religious controversy.

To weigh the merits of these two alternative hypotheses would require much additional collecting, sifting, and weighing of data. What evidence is at hand, however, suggests that Harris's is highly unlikely.

ARE WANDERING CATTLE A PROBLEM FOR INDIAN FARMERS?

Late in the 19th century, John Voelcker, invited by the government of British India to suggest improvements in agriculture, was impressed by the large numbers of "Brahmani bulls" wandering about and described them as a "standing religious menace" to crops (Mishra 1973:298). His impression was subsequently supported by quantitative data: in the first livestock census, in 1919–20, India had 5,100,000 breeding bulls in a total cattle population of 113,000,000. By contrast, in 1966 there were only 400,000 breeding bulls in a cattle population of 176,000,000. Mishra suggests that the extremely large population of breeding bulls at the turn of the century was beyond breeding needs and seems to have derived partly from religious views, which since that time have given ground to economic pressures.

As the present-day traveller to India observes, however, wandering cattle are still prominent in the landscape. In his discussion of this phenomenon (1965:223–24; 1966:54–56), Harris focusses on its advantages. Allowing cattle to wander does indeed free the owner from the need to provide feed and permit the use of vegetation that might otherwise be wasted. That it makes economic sense in a broad range of ecosystems is affirmed by the widespread occurrence of "free-ranging" not only in India but elsewhere in the Old World (Simoons and Simoons 1968:242, 268–69; Palmieri 1976:81–83). Not properly emphasized by Harris, however, is the damage that wandering cattle can inflict on crops. Nor does he make clear that not all wandering cattle are useful or potentially useful for breeding, traction, or milking and that some are "stray" and others "wild" (feral).

In rural India, many wandering cattle are old cows past usefulness, released by farmers who cannot afford to feed them but are unwilling, because of religious sensibilities, to sell them for slaughter. An informant from the Hissar region, Punjab, told me that weak and old oxen are sold at cattle fairs held outside Hissar every three months (Romesh Chandna, personal communication). Farmers will not sell an ox knowing that it is to be killed, yet some traders are Moslems from distant areas, and animals sold to them may ultimately be slaughtered. Old cows, however, are usually taken outside town to a wooded area and released, to feed as best they can in the countryside. When such cows raid a farmer's fields, he drives them away but does not kill them.

There are no reliable estimates of the numbers of wild and stray cattle in India. Stray cattle would be expected to be most numerous in areas where feed shortages are most acute. This fits with Bansil's (1975:501) observation that stray cattle seem to be far more numerous in urban than in rural India. Wild cattle would be expected to be most numerous in areas

where the sanctity of the cow is most strongly supported. This fits with the results of one survey (Animal Husbandry Department, Himachal Pradesh 1963:2–3), which found 50,000 wild cattle in Uttar Pradesh and 30,000 in Punjab, far more than in any other state considered.

Even if wild and stray cattle are old and infirm, Harris might properly insist, they are not "useless," since their dung may be used as fuel and eventually some carcasses as food. These benefits must, however, be balanced against the damage done to crops. That such damage is serious, even alarming, is clearly indicated by published statements, both general (Mayadas 1954:29; Ford Foundation Agricultural Production Team 1959:225–26; *Supreme Court Reports* 1959:676; Bellerby and Majumdar 1961:91; Whyte 1964:28; U.S. AID Mission to India 1964:13, 21; *U.S. News and World Report* 1966; Dutt 1967:36) and for specific areas of India (Darling 1930:19–20; *Times of India* 1962; Animal Husbandry Department, Himachal Pradesh 1963:4–5). The Food Grain Enquiry Committee has noted that wild and stray cattle cause such enormous crop damage that "large blocks of valuable cropland in certain areas have been abandoned by cultivators because of this menace" (Whyte 1964:28). Understandably, rounding up and removing wild and stray cattle is a matter of official concern and action (*Gosamvardhana* 1960:20–21; Whyte 1964:28; Dutt 1967:36).[3]

It can also result in controversy, as is illustrated by an episode that occurred in 1961 and 1962 (*Times of India* 1962). Farmers of Ghoga village, Bihar, were set upon by a "ferocious herd of 60 wild cows," which made repeated raids into their *kharif* crops. The villagers first approached the Union Ministry of Agriculture for help, but its Wild Cattle Catching Department suggested that the municipal corporation pay the estimated 3,000 rupees necessary to capture and ship away the animals. The municipality insisted that protection of crops was not its responsibility—that payment should come from the national government or from the villagers. The Ministry then wrote the Director of Animal Husbandry in New Delhi for funds, and he, in turn, asked the municipality to share the cost. That is where, seven months later, the matter rested. The villagers by that time were afraid that their *rabi* crops, too, might be destroyed. About two years before, a similar request had been made by villagers from the Ghoga area, but at that time public opinion had been divided. Thus, when a cow-catching crew had arrived, almost half of the villagers, out of "religious sentiment," had obstructed them, and some had even chased them with weapons. By 1961, following "bitter experience of what wild cows can do to crops," these villagers apparently had had a change of heart.

Mayadas (1954:29) says that the problem has become worse since independence. Formerly it was possible to dispose of surplus cattle, but now farmers are "constantly being harassed day and night by herds which must either feed on one's green crops, or starve," and the average farmer cannot bear the cost of fencing and watchmen. Writing of the East Punjab, Randhawa and Nath (1959:50) say that the numbers and destructiveness of aged and infirm bovines have increased enormously since partition, with the establishment of a strict ban on cow killing. On the other hand, the problem ended in the West Punjab, now part of Pakistan, when Hindus and Sikhs migrated to India and pressure against cow killing ceased. In Lahore, the problem of stray cattle was once a serious one, but since partition Moslems have simply picked up and slaughtered the strays (Rashid Malik, personal communication).

[3] A deer called *nilgai*, "blue cow," also causes much crop damage. Because of its name, many Hindus are unwilling to kill it. In the hope of weakening public objections to killing this destructive animal, in Uttar Pradesh its name has been officially changed to *nilghora*, "blue horse" (Mayadas 1954:32–33).

IS MUCH BEEF WASTED BECAUSE OF THE SACRED-COW CONCEPT?

Harris, in dealing with this question (1965:222–23), observes correctly that Indian Moslems, Christians, and many tribal peoples do eat beef. Even certain low-caste Hindus, such as leatherworkers, may consume it, and the sacred-cow concept is positive-functioned in making beef available for such impoverished groups. Strangely ignored by Harris, however, is the continuing spread of the inviolability of the cow (von Fürer-Haimendorf 1963:149) and the considerable decline in beef eating since partition (Ministry of Food and Agriculture, Directorate of Marketing and Inspection 1955:47, 156). Much of this decline stems from the migration of Moslems to Pakistan and Bangladesh. Also involved, however, is the abandonment of beef eating by some Hindus, leatherworkers and sections of other low castes, in an attempt to improve their social status (M. Singh 1947:116; Gondal 1948:22, 25; Fuchs 1950:357–58; 1960:69–70; Dube 1951:vi; Ministry of Home Affairs 1963:7, 10, 24, 59).[4] Already in the mid-1940s it was noted that in Punjab and western Uttar Pradesh only a very small proportion of Chamars (leatherworkers) and Bhangis (sweepers, scavengers) ate carrion (M. Singh 1947:116), their main source of beef. There is also abundant evidence that as the acculturation of tribal people to Hindu ways has progressed, many of them have also given up cow slaughter and/or beef eating (Dalton 1872:54; Thurston 1903:49; Gurdon 1904:58; Sherring 1906: 292–94; Majumdar 1937:26; Roy 1937:9–10, 88; Elwin 1955: 522–23; Nakao 1956:105; Johri 1962:122; Hoffpauir 1978: 234). Hoffpauir, for example, reports that in Nepal the Tamang, though not Hindu, have taken over certain views of their Hindu neighbors about the sanctity of the cow; today they refuse to slaughter cattle, though they will eat beef from animals that have not died at human hands. Some Himalayan groups influenced by Hindu views of the sacred cow have even given up eating yakflesh (Palmieri 1976:128–30). In Madhya Pradesh, especially in the south, tribals' abandonment of beef has become quite general (National Council of Applied Economic Research 1963:31, 32, 111).

Carcasses of dead cattle are disposed of in various ways by Hindu farmers. Traditionally, leatherworkers were responsible for removing dead cattle from the village. They flayed the carcasses and might then eat the flesh. They were sometimes suspected of deliberately killing cows to obtain meat, and in any case their beef eating contributed to a low ritual and social status. Therefore some of them today refuse even to remove dead cattle from the village (Randhawa and Nath 1959: 50–51). If no leatherworker is present, farmers themselves may bury a dead animal or drag it to a particular place in the village to be left for vultures and other scavengers. In the pilgrimage city of Varanasi (Benares), Deryck Lodrick reports (personal communication), it is not uncommon to see a dead cow or ox hauled to the Ganges, weighted with heavy stones, and thrown into the river. Nambiar (1975) confirms this in writing of hundreds of cattle "cast in the Ganges" each year.

The above demonstrates that concern with ritual purity and pollution, social status, and the sacred-cow concept is leading many groups to abandon beef eating. It also shows that the flesh of many dead cattle is not eaten. It does not, however, answer the question of exactly how much beef is going to waste in India because of the sacred-cow concept. There are no hard

[4] Judging from Moffatt's (1975:117) study in a Tamil village, some beef-consuming *jātis* explain status differences among themselves in terms of the recency of the practice and the source of their beef. Highest among the untouchable *jātis* in the village are the Talaiyaaris, who until a generation ago did not eat beef. Intermediate are the PaNNaikkaars, who admit that they may eat beef but brag that "it is not predeceased." Lowest are the VeTTiyans, who eat the carcasses of dead cattle.

data on this question. It is clear that though most goatflesh and mutton come from slaughtered animals, only a very small percentage of the beef consumed becomes available by slaughter.[5] That percentage, moreover, has progressively declined because of prohibitions in various states (Ministry of Food and Agriculture, Directorate of Marketing and Inspection 1967:7), dropping from 50% before independence to 5% in recent years (Nambiar 1975). Almost all beef now becomes available for consumption when animals "fall,"—die from starvation or other "natural causes," without the direct, immediate intervention of man.

One may get a hint of how much of this "fallen beef" is not utilized by considering the percentage of fallen cattle that go unflayed. One survey, for Punjab in 1954–55, found that 30–40% of all bovine animals were not flayed, but were buried or left to vultures or dogs (Bhalla 1955:58).[6] With an estimated 950,000 common cattle dying in Punjab in 1961,[7] this amounts to roughly 280,000–380,000 unflayed and uneaten animals in that state alone. One cannot legitimately extend the Punjab estimate to India as a whole, but if the all-India average had been half that of Punjab, the total loss of hides and flesh in 1961 would have amounted to that of 4,200,000–5,600,000 cattle.

The number of flayed and unflayed cattle cannot, of course, give an accurate idea of how much beef goes uneaten, nor can it reveal the contribution of the sacred-cow concept. Many cattle remain unflayed for reasons that have nothing to do with cow-slaughter and beef-eating concerns, for example, drowning or dying in a distant place where they cannot be reached by a leatherworker (Ministry of Food and Agriculture, Directorate of Marketing and Inspection 1967:5–6). On the other hand, even if an animal is flayed, its flesh may not be eaten. In any case, the scanty data available suggest that we are dealing with a substantial waste of beef brought on by religious sensibilities. The ban on cow slaughter has also had a negative effect on the leather industry in reducing the availability of hides (Sen 1967:30–31; Nambiar 1975).

Turning to the broader question of cow slaughter, food availability, and human nutrition, Mishra's (1966) economic analysis demonstrates that legalization of cow slaughter in India would result in an increase in food available to all consumers, both vegetarians and beef eaters, which, in turn, would benefit India's public nutrition and health. Hindu rejection of cow slaughter therefore does not make good sense nutritionally and is "negative-functioned" in this regard. As Schwabe (1978*a*:274) notes, there is a certain parallelism between Hindu views of cattle and American attitudes toward dogs, which lead Americans to pass up the "120,000,000 pounds of edible meat represented by 13,000,000 unwanted dogs 'put to sleep' in American dog pounds each year." One can only add that for India the problem of nutritional deficiency is far more serious than for the United States.

Despairing of bringing about much domestic expansion in beef production and marketing, secularists in India have weighed the possibilities of export. Shipping live cattle abroad is uneconomic because of transportation costs. Exports to Burma of dried beef (*biltong*) did occur before World War II but ceased with independence and cannot be revived because of antislaughter feelings (Ministry of Food and Agriculture, Directorate of Marketing and Inspection 1955:42). Export of other types of beef continues, but on a small scale. In the mid-1970s, the Government of India considered a beef-for-oil exchange with Arabs of the Persian Gulf states. The latter offered to build slaughterhouses in Delhi and even looked into the matter of air-freighting the meat (Drummond 1974). In Kerala, which has no ban on cattle slaughter, the state government in 1974 announced a plan to build a $2,000,000 packing plant, India's first, to supply beef for export (Drummond 1974). It was estimated by the Union Ministry of Commerce that beef could be India's most valuable export, earning more foreign exchange than jute, tea, textiles, and marine products combined (Nambiar 1975). This could amount to $700,000,000 annually, two-thirds of India's bill for imported crude oil (Drummond 1974). Even in developing such progressive schemes as these there is a powerful deterrent: the ban on cow slaughter (Nambiar 1975).

HAS HINDU RELIGIOUS BELIEF LED TO INEFFICIENCIES IN CATTLE BREEDING?

Most Indian animal-husbandry specialists and economists are concerned that religious and legal restrictions on cow slaughter create inefficiencies which hinder improvement in the quality of India's cattle population (P. Bhattacharya, personal communication; Balasubramanian 1960:387–88; Khurody 1963: 317–18; Whyte 1964:25–29; 1968:38–39, 193; Dutt 1967:36). As Dandekar (1964:355; 1973:21) notes, India's cows are culled largely by neglect and starvation, and those which survive may not be the best ones. He argues that without selective slaughter of cattle, of whatever sex or age, there can be no efficient management of cattle in India.

Almost all veterinary officials and a majority of specialists in related fields in India agree that slaughter is the most effective way of eliminating substandard stock, a procedure which is essential if breeds are to be improved (P. Bhattacharya, personal communication; Ford Foundation Agricultural Production Team 1959:225; Whyte 1964:25–26; 1968:38–39, 168–69). Indeed, Whyte (1968:38–39) describes present-day cattle breeding in India as "genetical hypocrisy" for its lack of one element basic to all successful breeding efforts—culling of inferior animals by slaughter. Yet many officials hesitate to make public statements because slaughter is against community sentiment (P. Bhattacharya, personal communication; Whyte 1968:173–74).[8] When one high official in the early 1960s made a public statement in favor of cow slaughter, many felt he did so because he was about to retire from government service and was therefore free of the fear of retaliation. In private, officials may assert that "education is necessary" and that "in time, the Indian people will abandon their opposition to cow slaughter." Yet organized campaigns tend to center on extending the ban on cow slaughter, not on eliminating it.

At a meeting of animal-husbandry specialists in Bangalore in 1964, a resolution was passed urging "effective disposal of uneconomic cattle" (K. K. Iya, personal communication). The terminology suggests that reference was being made to slaughter, and this was in the minds of many present. No more direct statement was made because many felt it would not be proper for the group, consisting largely of government officials, to issue a policy statement contrary to a constitutional ban on

[5] According to the livestock census of 1961, only 4% of all kips came from slaughtered cattle (Ministry of Food and Agriculture, Directorate of Marketing and Inspection 1967:7).

[6] This is the only postindependence survey I have uncovered. One does read in a later publication (Ministry of Food and Agriculture, Directorate of Marketing and Inspection 1967:6) that the percentage of unflayed fallen hides (of common cattle and water buffalo) ranges from 4 to 10 in various parts of India, but this estimate seems to have been carried down from the colonial period.

[7] Estimate made using total population from the livestock census of 1961 and Bansil's (1959:283–84) figure of 16% annual mortality among India's cattle.

[8] Nor can they be certain that their statements will be printed by Indian newspapers. Dandekar was unable to get his article favoring slaughter published in an English-language daily newspaper in India because editors feared adverse public reaction (A.B. Shah 1967:12).

slaughter. A strong body of opinion existed in favor of slaughter and complete economic use of beef, but this was not incorporated in the resolution. The opinion of most knowledgeable specialists, however, remains that Hindu opposition to cow slaughter hinders improvement of cattle quality in India.

ARE INDIAN HOMES FOR OLD COWS ECONOMIC OR RELIGIOUS INSTITUTIONS?

Harr's (1966:58–59) describes homes for aged and infirm cattle as "among the more obscure aspects of the cattle complex." He acknowledges that some of them are charitable institutions which provide for aged and derelict animals until they die. In keeping with his view that the sacred-cow concept is positive-functioned, however, he stresses the economic role of such homes and suggests that they are "perhaps not as quaint as usually implied."

With the recent completion of Lodrick's (1977) excellent study of animal homes in India, the matter is no longer obscure. There are two traditional forms of animal home: *pinjrapoles*, which admit creatures of various sorts, including cattle, and *goshalas*, homes specifically for cattle. In Gandhi's words, pinjrapoles are "an answer to our instinct for mercy" and goshalas "a refuge for all worn out and maimed cattle" (Lodrick 1977:23). In addition, there is the modern *gosadan*, a government institution included in India's first five-year plan to solve the problem "of unproductive cattle and their adverse effect on the economy" (p. 321). It is not on the latter that I focus here, for gosadans have not been successful in meeting their goals and have received scant attention in later plans (pp. 324–25). Instead, I am concerned with goshalas and pinjrapoles, institutions estimated to number 3,000, involving nearly 600,000 head of cattle (p. 20).

The geographic distribution of pinjrapoles clearly reflects their religious affiliations; 97% are found in Gujarat, where the Jains are concentrated, and within Gujarat pinjrapoles are more numerous in areas with the highest percentages of Jains (pp. 52–54). One type of goshala, the Vania goshala, moreover, is closely linked with the Marwari Vania community, which has spread this type of institution as it has migrated across India (pp. 56–57).

Pinjrapoles seem to go back at least to Aśoka's time, the middle of the 3d century B.C., though they may have existed among Jains even earlier (pp. 88, 90). They are open to a broad range of animals, wild and domestic, and are based on the concept—central to the Jain religion but also prominent in Hinduism—of ahimsa. Goshalas, homes for cattle, seem to have had later origins, the earliest references to them dating from the end of the 12th to the beginning of the 13th century A.D. There was, moreover, an early link between goshalas and temples and between goshalas and the worship of Krishna, god of cowherds (p. 93). With inroads by Islam in India, however, the sanctity of the cow became a rallying point for Hindus and the issue of cow slaughter a matter of tension between Hindu and Moslem. As Shivaji (A.D. 1627–80), leader of the Mahratta revival and founder of a Hindu state, noted: "We are Hindus and the rightful lords of the realm. It is not proper for us to witness cow slaughter and the oppression of the Brahmans" (p. 99). The growing popular support for cow protection among 19th- and 20th-century Hindus Lodrick ascribes (p. 107) mainly to yet another confrontation with an alien culture, this time the British, and along with this confrontation there was an increase in numbers of goshalas and pinjrapoles.

Lodrick notes that goshalas and pinjrapoles in India today are basically religious in nature, charitable institutions reflecting the concepts of ahimsa and the sanctity of the cow. They do, it is true, play an economic role, especially in preserving cattle at times of drought, and this role is increasing with government and other encouragement (pp. 298–300). They operate, however, at a considerable financial deficit made up by charitable contributions, rent from properties owned, and other funds available to them (pp. 337–39). What are the elements that contribute to such a deficit operation? For one thing, 30% of the cattle in such homes, or nearly 174,000 for India as a whole, are nonproductive, kept with little or no return (p. 336). Yet such animals eat much fodder each year, and, during times of shortage, goshalas and pinjrapoles, with their greater financial resources, are able to outbid local farmers seeking to keep their working, breeding, milking animals alive. As Lodrick notes (p. 339), "useless" animals may survive at the expense of useful ones. The dung and hides of nonproductive animals have value, but whereas most dung is used or sold, only 5% of all reporting institutions sell carcasses to tanneries for processing (pp. 285–87). The conclusion seems inescapable that goshalas and pinjrapoles are essentially religious institutions that to some extent divert funds from projects more beneficial to national well-being. As Lodrick concludes (pp. 341–42), where "religion, economy, and society are inseparably intertwined," it is improper to "interpret the functioning of the sacred cow concept solely in terms of economic materialism or cultural ecology."

DO INDIA'S CATTLE COMPETE WITH MAN FOR FOOD?

Harris observes correctly that many Indian cattle are not fed, but scrounge for their food, and that cattle feed in India comes mostly from by-products of cultivation that humans cannot consume. He reaches the curious conclusion (1966:55), however, that "in India men and bovine cattle do not compete for existence." Heston (1971:192), contradicting Harris, points out that substantial amounts of livestock feed (49% of all feed, by value, in 1958–59) are "fodder crops, cereals, pulses, and concentrates that directly use land that could be planted to crops for human consumption." Fodder crops alone account for 5% of all cultivated land in India (Heston 1971:192), and in some regions, notably in the north and northwest, the figures rise as high as 10–20%. Most feed unquestionably goes to working or milking animals,[9] but, in the view of most experts, there is an intense competition between men and cattle for subsistence (Schneider 1948:89; Randhawa and Nath 1959:50–51; U.S. AID Mission to India 1964:21; Whyte 1964:22–24; Ravenholt 1966:11; M. M. Shah 1967:44; Whyte 1968:13; *San Francisco Chronicle* 1972). Like Heston (1971:192) and the Agricultural Production Team of the Ford Foundation (1959:223), these experts insist that if cattle numbers were reduced, more land would be available to provide food for humans.

On a local level, Freed and Freed (1972:406–7) found clear evidences of such competition in a Hindu village near Delhi. Cattle there compete with man in consuming wheat, gram (chick peas and certain other pulses or grain legumes), and *gur* (unrefined sugar) that could be utilized by humans. In addition, much acreage is set aside for fodder crops, and farmers also buy supplementary feeds, such as oil cake and cottonseed. Even though the latter are not human foods, the Freeds note that they cost money that humans could use otherwise.

In his effort to demonstrate a symbiotic relationship between men and cattle in India, Harris seems to have overstated his case and failed to appreciate the competitive aspects of the relationship.

[9] The estimate by one official in New Delhi that old, economically useless cows consume the "output of 40 million of India's 300 million cultivated acres" (*Time* 1961:28) may be an exaggeration.

DOES RELIGIOUS BELIEF CONTRIBUTE TO A SURPLUS OF COWS?

Hindus, Sikhs, and Jains are convinced that cow slaughter and beef eating are wrong. Even mention of the word "beef" while traditional Hindus are eating is said to cause them to stop and get up (Bose 1929:103). Hindus of status who have eaten beef, even accidentally, have sometimes been expelled from their caste (Fuchs 1950:252). A Hindu inadvertently responsible for the death of a cow becomes ritually polluted and may be required to perform various acts of penance to return him to a state of ritual purity.[10]

Natural calamities have also been believed to occur as a result of cow slaughter and beef eating. In 1817, for example, British troops on a military campaign slaughtered a cow near a Hindu shrine, over the objections of the priest in residence. Beginning that very day, it is said, there was an outbreak of cholera in the British camp, and from there the disease spread throughout India. People believed that the spirit of the saint who was buried at the shrine was directing the cholera epidemic as punishment, and this led many to erect temples and to make offerings to him (Sleeman 1915:162–64). Again, in 1829 and for several years thereafter there was a blight that destroyed most of the wheat crop along the sacred Nerbudda River. A devout Brahmin sought to determine the cause of the blight and, after three days and nights of fasting and prayer, received a vision to the effect that the blight had been caused by the slaughter of cows, which had been forbidden in the area by previous governments. Following the advice of the vision, the Brahmin persuaded many landowners to join in petitioning the British authorities to ban beef eating in the region. The request was denied, but even after the blight ended some remained convinced that cow slaughter and beef eating so near the sacred river were responsible for reducing crop yields and would lead to more such blight as well as other calamities and disease (Sleeman 1915:193–95, 202–4).

It is understandable that such feelings have led to constant agitation, both past and present, against cow slaughter and beef eating (Sleeman 1915:163; Crooke 1926:363–64; Chandulal 1966; Ravenholt 1966:2–8; *U.S. News and World Report* 1966; K. Singh 1967; Whyte 1968:170–74; Lall 1973:229–315). Such agitation has pitted Hindus against Moslems and British, among whom the practices are commonplace. This, in turn, has made the cow increasingly symbolic of Hinduism. In Kutch, where the Jadeja rulers were dedicated to protecting the cow within their realm, it became part of the state emblem (Pannu 1956:21), a symbolic use paralleled in present-day Indian politics.[11] Moslem armies, for their part, were reported as regularly slaughtering cows after conquering districts inhabited by Hindus, in confirmation of their victory and as an expression of their scorn for Hindu beliefs (Monier-Williams 1885:173).[12]

In some cases, efforts at reducing or eliminating cow slaughter and beef eating by persuasion have met with some success. One reads that, following appeals by certain local congressmen, the Moslems of Dinapore resolved not to sacrifice cows at their annual Bakr-Id festival (*Hindu* 1949:5); that in the village of Shamirpet, Hyderabad, Moslems avoided slaughtering cows out of respect for Hindu sentiments and concern with avoiding trouble (Dube 1955:67); that some Moslem rulers in the past took action against cow slaughter (Sundara Ram 1927:122–23; Lal 1967:32-33; *The role of livestock* n.d.:8); and that certain Moslem Indians have even organized cow-protection societies.

Most Moslems, however, have persisted in slaughtering cows and eating beef, and their opponents have taken action to stop them. The record contains many examples of violence against Moslems guilty of cow slaughter. It also contains abundant references to legal action against the practice, sometimes with quite severe punishment. For example, various princely states, which enjoyed freedom in this regard from the British, made cow killing or, in some cases, selling a cow for slaughter punishable by life imprisonment (Emerson 1944:110) or death (O'Malley 1941:26). Such penalties were instituted even in Moslem areas, among them Kashmir, where one Sikh ruler established the death penalty for cow killing (Moorcroft and Trebeck 1841:132)[13]—a punishment in keeping with the Sikh view that killing of a cow is the vilest of crimes (Monier-Williams 1885:172–73). This action made beef virtually unobtainable in Kashmir.

With independence from Britain, moreover, a weak ban on cow slaughter was included in the "Directives of State Policy" section of the Constitution of India, and laws were passed at various levels of government to reduce or eliminate cow slaughter. This has led to legal challenges pitting Moslems and secularists against traditional Hindus and to rulings by the Supreme Court of India (Sathe 1967, Simoons 1973). In 1959 that Court ruled constitutional any legislation by states that bans the slaughter of all cows, regardless of age or state of usefulness; of all calves, male or female; and of breeding bulls and working bullocks. Other bulls and bullocks can be slaughtered if they are past breeding or working. Today, cow-slaughter bans of one sort or another are in force in almost all of India's states. Some are total bans on the slaughter of cows; others are partial ones. There is, moreover, clear evidence that a large body of the public favors legislation against cow slaughter, that laws are being enforced, and that substantial pressure exists for a nationwide ban.

Enforcement is not totally effective, and illegal slaughter does occur. Certain farmers and butchers are reported as deliberately maiming animals or otherwise cheating to make them legally eligible for slaughter (Mukherji 1957:3; *Supreme Court Reports* 1959:686). There are also cases of the driving of cattle from an area where slaughter is banned to a place where it is permitted (Ministry of Food and Agriculture, Directorate of Marketing and Inspection 1967:137). Yet one must conclude that, on balance, social and legal pressures in India, today and in the past, do create conditions favorable to a large population of cows and perhaps of other types of cattle.

Analysis of the available data suggests that the numbers, distribution, and composition of India's cattle population are mainly determined not by religion but by geographic and economic factors. Raj (1969:78) notes that in regions where

[10] Among these are bathing in the Ganges (Das 1953:233) or consuming the *pañchagavya*, "the five products of the cow"—cow's milk, curd, ghi, urine, and dung (Kipling 1892:107). For more detail on the role of the *pañchagavya* in ritual purification, see Simoons (1974).

[11] The continuing effectiveness of the cow symbol is revealed by the 1978 controversy between the official Congress Party and Indira Gandhi's breakaway party. A ruling by India's election commissioner that the cow and calf symbol belongs to the official party is regarded as a major setback to Mrs. Gandhi's group and is being appealed to the Supreme Court (*Times* [London] 1978*a*, *b*).

[12] Such acts could have dire results. Certain 19th-century Pathans, apparently thinking themselves safe from a Sikh army facing them across the swift-flowing Indus River, "slaughtered cows, and insulted the Sikhs in the most aggravated manner." Angered, the Sikh Maharaja, Ranjit Singh, ordered his troops to cross the river. Despite considerable loss of life, many Sikhs reached the opposite bank and began an indiscriminate slaughter of men, women, and children that lasted for days. So infuriated were the Sikhs that they refused to spare even those Pathans who, in a way effective with orthodox Hindus, threw themselves down, put grass in their mouths, and shouted "I am your cow" (Masson 1842:140–41).

[13] There are also reports (Cunningham 1854:306; Sherring 1906:294; von Fürer-Haimendorf 1966:144–45; Palmieri 1976:128–30) of the application of the concept of the sanctity of the cow and the ban on cow slaughter to yak or yak hybrids by certain Tibetan and Nepali groups.

human population pressure on land resources is great, there is both a lower proportion of bovine to human population and a higher proportion of adult to young animals. Sopher (1975: 184–85) observes that the proportion of "non-working, non-breeding, adult male bovines" is much higher in peripheral districts of low population density and in certain tribal districts, where plowing and milk use decrease in importance. He also presents data to support the view that where buffalo are the main suppliers of milk, the proportion of cows in the total common-cattle population is much smaller. There are additional economic and geographic determinants as well (Ellefsen 1968:64–71), but identifying them seems unnecessary in view of agreement that these are the primary ones.

Disagreement exists, however, on whether Hindu and other religious sensibilities also have a significant influence on numbers and composition of the cattle population, especially whether they have contributed to a surplus of cows. That religion can have an impact on the numbers of domestic animals in India has been demonstrated by Debysingh (1970:12–18, 154–60), who found a significant correlation between the number of chickens kept in rural districts and the proportions of Brahmins and other social and religious groups. The religious concepts deterring Hindus and Jains from keeping and eating chickens are nonviolence, which acts to preserve all animal life, and ritual purity and pollution, which makes scavengers such as the chicken unclean. Whether religious belief has had a similar impact on cattle numbers, leading to a surplus of cows in India, remains, however, more controversial than any other question raised about the sacred cow.

Mishra's (1973:298–301) review shows that concern with surplus bovines in India dates back at least to the 19th century. Studies from the 1920s through the 1940s were principally concerned with possible improvements in the productive efficiency of cows and oxen and with whether bovines were surplus with reference to available feed supply. With respect to the latter question, a consensus developed that bovines were indeed surplus in relation to feed supply. By the early 1960s that consensus was "fairly incontestable," and even today it would be difficult to find someone seriously to argue against it (Mishra 1973:301).

Dandekar (1964) added a new dimension to the surplus-bovine question by asking whether the number of cows in India was greater than needed to reproduce the existing bullock population. Bullocks are essential plow animals in India, and the most important economic function of cows is to provide for bullock replacement. Much recent controversy has centered on Dandekar's question, especially among economists (see Dandekar 1964, 1969*a*, *b*, 1970; Raj 1969, 1970; Hanumantha Rao 1969; Heston 1971; Mishra 1973). Calculations made by Dandekar (1964) led to the conclusion that India in 1961 had a 43–50% surplus of cows in terms of needs for bullock replacement (Mishra 1973:301–2), a figure close to that arrived at by Heston (1971:194). Mishra (1973:305), using somewhat different assumptions, concludes that, in bullock-replacement terms, 19% of India's cows were surplus in 1961. Raj (1970) admits that surplus cattle may exist in India, but he insists that "no dramatic changes can be expected in regard to the holdings of cattle in India unless substitutes can be offered for the various goods and services which cattle now provide directly and indirectly" (Mishra 1973:304–5). The model used by Raj in reaching those conclusions, however, has been criticized by both Dandekar (1969*a*:1268–69) and Mishra (1973:304) as failing to approximate the real Indian livestock situation.

Various writers have observed that with better nutrition, cattle in India would greatly increase their per capita goods and services. Burns (1944:108–9), for one, notes that adequate feeding of ordinary village cows raises milk yields per animal by 50%; he contends that, with improvement in breeding, management, and disease control, the increase in yield could in time reach 75%. Burns also argues (p. 110) that, with adequate husbandry, bullocks could cultivate 60% more area if there were a "consolidation of holdings or some system of cooperative farming." Heston (1971:194) adds the suggestion that surplus Indian cows could be eliminated "without reducing the output of milk and other products, for one cow fed on the feed that would keep two cows alive produces more than twice the milk, more than twice the dung, and probably a hide of more value than the hides of two poorly fed cows." Mishra (1973:305–6), in a similar vein, demonstrates that elimination of a certain number of cows would provide more feed for those remaining and would not only increase total milk output by 3%, but raise breeding efficiency by 3.6%. He concludes that "there does not seem to be any economic rationality in maintaining this surplus" of cows. Thus the majority view of these economists is that India has surplus cows both with respect to available feed and in terms of bullock-replacement needs, though they differ on the size of the surplus. The majority also agrees that if surplus cows were eliminated, those surviving would provide a substantially greater per capita output of goods and services. The further suggestion is made that total output of goods, or of certain goods, might also be increased.

A second approach to the question of surplus cows is to ask whether the proportions of animals in states or districts that are predominantly Hindu are greater than in those that are mainly non-Hindu. Efforts of this sort have been made by Raj (1969), Heston (1971), and Sopher (1975). Raj (1969:81–82) found Kashmir, with a predominantly Moslem population, and Kerala, with a large Christian and Moslem population, to have higher proportions of adult female cattle than the national average, whereas Bihar and Orissa, centers of Hindu orthodoxy, have lower than average proportions. His further analysis of eight districts in Uttar Pradesh, some traditionally Hindu and others Moslem, found little difference in the proportions of adult female and male cattle. His conclusion was that religion is unimportant in determining the numbers and proportion of cattle in India. Sopher (1975), giving little detail about the basis of his conclusion, supports Raj. Heston (1971:196), however, argues that Raj's samples are not representative and that his analysis is faulty in various ways. Indeed, in an analysis of all 54 districts in Uttar Pradesh Heston found the opposite: higher proportions of cows in highly Hindu districts than in Moslem ones. He also compared predominantly Moslem districts in West Pakistan with bordering Hindu/Sikh districts of East Punjab and found that the former have only .33 adult female cattle for each adult male, whereas the latter have .76 (p. 196). Similar results were obtained by comparing Moslem districts of the Sind in West Pakistan and equivalent Hindu districts of Rajasthan and Gujarat. His conclusion is that "the Hindu religion does lead to unusually large holdings of female cattle" (p. 197).

Of special note is the survey done in 1975 by Lodrick (1979*a*) in Varanasi. This is the only survey I know of the relative numbers of common cattle and water buffalo kept by Moslem and Hindu householders living at comparable socioeconomic levels in an urban setting in India. Included were two high-density neighborhoods, one entirely Hindu and the other predominantly Moslem. Of the 209 Moslem households, only 8(4%) possessed bovine animals, and all 12 animals were female water buffalo kept for milking. Of the 300 Hindu households other than those of dairymen, 42(14%) possessed bovines, with milking cows far in the majority, 62 as compared to only 17 water buffalo. Thus Moslem householders kept no cows at all, whereas among Hindu householders cows outnumbered water buffalo by nearly 4 to 1. Lodrick concludes that the predominance of the cow among Hindus appears to reflect a religious preference for the cow, whereas the Moslem preference for the buffalo is based on economic considerations—the superiority of the buffalo as a milk animal under local conditions. This conclusion is supported by the observation that the 4

households (not enumerated above) of practicing Hindu dairymen (Ahirs) kept 13 buffalo but only 3 cows and that of the other Hindu householders who owned cows about two-thirds were Brahmins, for whom the cow is especially important in religious observances.

Returning to the surplus-cow question, one notes two local studies done in agricultural settings, one by Odend'hal (1972) in West Bengal and the other by Freed and Freed (1972) near Delhi. The two areas differ in critical ways. Of all Indian states and union territories, West Bengal has among the smallest percentages of fodder acreage to gross area sown (0.03 in 1959), whereas Delhi has among the highest (9.7) (Whyte 1964:36–37). West Bengal has one of the largest numbers of bovines (2,974 in 1959) per acre of fodder crops, whereas Delhi has among the lowest (fewer than 8) (Whyte 1964:36–37). In West Bengal, dietary deficiency is very common (44% of the rural population have an inadequate intake of calories [1961–62]) (Dandekar and Rath 1971:29). Its Hindus, moreover, are noted for their laxity; the percentage of vegetarians is low, only 5% of the population in 1962 (Gopalan et al. 1971:49), and the state has only a partial ban on cow slaughter. Delhi is located in northwestern India, a region in which a smaller percentage (13–18%) of the rural population has an inadequate caloric intake, in which Hindu orthodoxy prevails, and in which there is a high percentage (about 50% in 1962) of vegetarians. Delhi also has a complete ban on cow slaughter.

Using measurements of feed consumption and productivity, Odend'hal prepared an annual energetic balance sheet for his study area and concluded that competition between cattle and man was virtually nonexistent—that cattle consumed little, except mustard oil cake and wheat bran, that man could eat directly. There was also a quite complete utilization of the products of cattle, among them dung, milk, and beef.[14] Odend'hal did not mention surplus cattle of any sort and concluded that cattle management seemed appropriate to existing ecological conditions.

The Freeds found that in the Hindu village of Shanti Nagar the bullock population was in balance and farmers chose whether or not to own bullocks mainly by their judgment of the costs versus the benefits of possessing plow animals. The situation appeared to be different for cows. If one followed Heston's suggestion (1971:193) that, at most, a ratio of one cow to three bullocks is needed to maintain a stable bullock population, villagers would be judged to have had a 47% excess of cows for village needs (Freed and Freed 1972:404–5), a figure similar to that reached by Heston in his all-India estimate. While it is true that "excess" cows provided milk and dung, villagers regarded water buffalo as superior producers of milk (yields twice as high) and dung (pp. 404–5). Why, then, did they keep excess cows? In part to provide bullocks for trade. Questioning, however, also revealed that substantial percentages of villagers looked on the cow as "the best thing in Hindu religion" and that improper selling of cows, for example to Moslems, was punished (pp. 405–6). The Freeds seem to imply that villagers' commitment to the sacred-cow concept did contribute to a surplus of cows.

Most Indian and Western experts remain convinced that, though more working bullocks may be needed, India has surplus cattle of other types. The gosadan scheme mentioned earlier was specifically intended to remove old and useless cattle to camps in rural areas where they would be cared for, at a per capita annual cost estimated at more than three times greater than the total per capita expenditure for education in India (*Supreme Court Reports* 1959:678). There have also been attempts at slowing the increase in the bovine population. The Indian Veterinary Research Institute has long been active in developing drugs and surgical methods for sterilizing cows. In the mid-1960s attempts were made, with the cooperation of the animal-husbandry programs in five states, to introduce a contraceptive device, the intrauterine loop. The plan was to pay farmers an inducement for each cow fitted with a loop. Even Hindu leaders of the anti-cow-slaughter movement recognize a problem and have suggested solutions, one of them that cattle be segregated by sex (Lelyveld 1967). A definitive answer to the question of surplus cows, however, awaits further, more careful and more sophisticated economic and geographic study, involving comparison of districts as well as a much broader sample of Indian villages. The question, moreover, is more than one of surplus cows. As Dandekar points out (1969*a*: 1271), the right question is whether "the size, age-sex composition and quality of Indian cattle are the most economic in relation to India's resources and needs. If not, is the Hindu orthodox sentiment about the cow responsible?"

Harris (1978*a*:31) ignores the fact that some Indian cows are also used for plowing and other draft purposes and that this is one area of possible improvement in the cattle system. Admittedly, for India as a whole the number of working cows is quite low, in 1956 amounting to less than 3% of all working cattle and 4% of all female cattle over three years of age (Rajapurohit and Muranjan 1965:122). Working cows accounted for 28% of all working cattle in Manipur, however, and for 12% in Madras State. A survey in a Madras village found that though cows weighed only two-thirds as much as bullocks and allowances had to be made at times of calving, villagers did not regard cows as inferior plow animals. Those who made the survey suggest (Rajapurohit and Muranjan 1965:129) that small farmers in other parts of India take up the use of cows for draft purposes if soil and other conditions are suitable; that at least they could be used, along with bullocks, at times of peak demand; and that on large farms where bullocks are needed for heavy work, cows could displace bullocks for lighter operations such as harrowing, sowing, and intercultivation. The suggestion had been made by Pepperall in 1948 (Whyte 1964:20) that all-purpose cows, both for draft and milk, be developed. Why are more cows not used as draft animals in India? The authors suggest "ignorance, bias and social inhibitions" (Rajapurohit and Muranjan 1965:121).

CONCLUSION

As Schwabe (1978*a*:258–59) properly observes, much investigation is still required if we are to understand and appreciate the role of cattle in India; one cannot merely look on cattle in Western terms, mainly as sources of meat and milk. In India, they are important, even irreplaceable, in providing traction and fuel. These are facts long known to researchers in India, but one must acknowledge that Harris has performed a certain service in calling them to the attention of Americans unfamiliar with the Indian scene. It is unfortunate, however, that Harris fails to stress sufficiently the negative impact of the sacred-cow concept. This failure derives from his approach to the problem—his commitment to a determinism in which the Hindu ban on cow slaughter and beef eating is expected to be a positive-functioned reflection of technoenvironmental pressures.

Of particular concern to India today are matters that tend to be obscured by Harris's emphasis on the functioning cattle economy: that the nation's vegetation can feed only about 60% of its cattle and that serious overgrazing and soil erosion are occurring. Such environmental damage, indeed, is viewed by some investigators as the "most serious problem in India" (*San Francisco Chronicle* 1972). Four decades ago Jacks and

[14] Despite its low nutritional standing among India's states, West Bengal is second only to Kerala in average per capita daily intake of meat, fish, and eggs (Gopalan et al. 1971:38).

Whyte (1939:77–78) linked overgrazing and deforestation as the most powerful causes of soil erosion in India; they observed that natural grasslands have disappeared in much of the land and that village herds live on bush and tree growth, the resulting erosion being so severe that it must "be seen to be believed." Behind all of the above is India's increasing human population, a situation so serious, Whyte insists (1971:119), that unless the demographic problem is eased animal husbandry has no long-term future. Whyte and others see a nation experiencing serious environmental deterioration and suggest what seems a modest but reasonable policy: improvement in quality and reduction in numbers of cattle through slaughter. Harris sees a threat to millions of peasants if slaughter is given precedence over other functions of cattle, but this is not what the experts propose.

Bennett (1967:251–52) describes Harris's approach to the system of cattle keeping in India as a "classic functionalist reification," one in which "functionality" is overstressed and inefficiencies played down. The model followed by Harris ultimately derives from Steward, who found it well suited to explaining the pattern of life of such hunting-and-gathering groups as the Paiute of the Great Basin. Bennett argues, however, that such a model is not appropriate for an entire complex national economy such as that of India (1971:197). To understand such an economy, Bennett notes, requires a different sort of ecology, with attention to economic resource utilization and development theory. Harris, he observes, seems guilty of a "cavalier dismissal of the experts" who visualize a more efficient system and seek constructive change. A further Bennett criticism (1971:197) is that Harris does not look on religion as a "strategy of action" or "become involved in the religiopolitical question," although religion plays a major role in the Indian cattle situation. The result is that, for Harris, "men do not seem to *use* resources; rather, men and resources form some kind of mechanical system." These criticisms of Harris's approach to the sacred cow are similar to those of Friedman (1974:458–59). They also recall criticisms levelled by Hallpike (1973, 1974) against Vayda's explanation of primitive warfare and by Newcomer (1972) against environmental explanations of the historical relationship between the Nuer and the Dinka. They suggest that, if they are to avoid the oversimplification and error that seems inherent in Harris's technoenvironmentalism, cultural ecologists should consider alternative approaches (Bennett 1976:231–34, 243–76).

I am forced to conclude, on the grounds that Harris has repeatedly ignored or summarily dismissed evidence contrary to his views, that his work on the sacred cow is seriously flawed and that his version of the ecological approach fails the test set forth by Sahlins—success in handling the facts.

Comments

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I agree with Simoons that the sanctity of the cow in India is influenced by the sociopolitical system and that economic materialism is insufficient to explain it. His observations about surplus cows, however, raise a fundamental question: who owns surplus cows? In the village of Dikadla in North India, where I did fieldwork in 1974, I found that, of 276 households owning milch cattle, 24 owned only cows for milk production, and of these 22 were landless; the remaining households owned both buffaloes and cows. The households with only cows purchased cow-heifers from other landowning households of the village at a nominal price ranging from Rs.2 to Rs.5 (the price of two to three litres of milk). Landowners were willing to sell at this price because they had a fixed capacity for maintaining cattle stock. The small landowners had fodder constraints and the big landowners time constraints, and buffaloes, because of the high fat content of their milk, and bullocks received the highest priority. These landowners could have earned much more by selling these heifers to Muslim butchers, but they preferred the monetary loss because the sale of heifers for slaughter meant displeasing Lord Krishna, fear of hell after death, eighty-seven transmigrations of the soul, and lower social status within the village. Farmers were reluctant to sell heifers to people they did not know or people they suspected would slaughter them; they were less particular about buffaloes or other categories of cattle. This sacrifice of cash was an attempt to compromise between material and nonmaterial interests. These households did not rear the heifers for sale at maturity because the price of an adult cow (Rs.300–400) was much less than the cost of maintaining it for three years. On the other hand, they did not rear them to breed bullocks because if the offspring were a heifer, they would have to maintain it for another one to two years on the chance of getting a bullock.

The landless households maintained these heifers on pasture and some crop residues obtained as wages. If these heifers died of malnutrition, little was lost. If they survived, the households got an opportunity after calving of consuming milk, which they were unable to afford otherwise. If the cow delivered a male calf, this gave them substantial cash along with milk. Would Simoons consider these cows surplus? Would a deliberate slaughter of these cows improve human nutrition through increased milk production? How would one procure these heifers for slaughter? The landowners have the resource base to maintain buffaloes for milk consumption, and the procurement of these cows for slaughter (which would be difficult) would be detrimental to the nutrition of these landless households without improving the nutrition of other landowners.

Regarding the origin of the sacred-cow concept in India, the observation of Simoons appears correct. The ancient Hindu literature indicates two contradictory forces. In ancient India, the cow was held in great reverence, but at the same time animal sacrifice to certain deities and the eating of their flesh on certain occasions were permitted. Restriction of beef eating and animal sacrifice to certain occasions probably had the purpose of permitting a culling of unnecessary cattle by the nomadic Aryan tribes. This interpretation may be drawn from the practice among African tribes of killing cattle only on ceremonial occasions. The present veneration of cows came after Brahmin revivalism and the injection of politics combined with hatred for beef-eating Muslims and British rulers. At present these values are so strong that they stand in the way of an efficient cattle development policy. This is apparent from the opposition to mechanical interference with the body of the sacred cow for artificial insemination, the riots of the pre- and post-independence period, resulting in heavy loss of life and property, and the spectacular success of the Jana Sangh party, which increased its strength from 14 to 35 in Parliament and from 116 to 245 in six state assemblies during the fourth general elections through its skillful exploitation of the sensitive issue of cow-slaughter.

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Simoons's well-documented and exhaustive analysis offers deeper insight into many controversial issues but reaches few conclusions. Indeed, he concedes that "much investigation is still required if we are to understand and appreciate the role of cattle in India."

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Simoons's reconsideration of India's sacred-cattle complex is important, timely, and impressive. Others have recently noted shortcomings in Harris's work (e.g., Hirschfeld, Howe, and Levin 1978, Norton 1978, Sahlins 1978, Diener and Robkin 1978, Diener, Nonini, and Robkin 1978, Chagnon and Hames 1979). Some (Coe 1978, Leeds 1978) find Harris's general theoretical effort valuable, while admitting shortcomings in specific cases. Others (Friedman 1974, Paul and Rabinow 1976, Sahlins 1978) suggest that the general theory itself is faulty. I share the latter view. However, as Simoons notes, Harris's approach must ultimately be judged in terms of its "success in handling the facts."

I find Simoons's critique of Harris's ecological analysis convincing. Other problems could be noted. For example, ecological factors impinge upon peasants at the microecological levels of the farm enterprise and the agro-community, not across biomes and even continents. Also, peasants weigh and value many crop and animal combinations to come up with an appropriate mix for a specific locale, given existing constraints. Hence, to isolate out only cattle, and across an entire subcontinent, is a dubious business. In fact, it is the *cultural* unity of India which makes such an approach possible. Rather than environment's determining culture, the culture has determined Harris's ecological unit of analysis. On the supposed beneficial effects of heavy grazing in agrarian ecosystems, the nutritive value of high-fiber diets for cattle, the "positive function" of burning dung and thus removing organic material from the soil cycle, the effects of large animal populations on soil compaction and water flow, the role of cattle in desertification, the disease vectors opened by overly close association of human and bovine populations, and other ecological issues, Harris either is in error or is silent (see Diener, Nonini, and Robkin 1978).

Even if we agree to consider not the specifics of Harris's discussion, but the general theory which lies behind it, problems remain. For example, Harris argues that field invasions by cattle are positive-functioned and serve to redistribute wealth; the assumption here is that "viable systems may be regarded as consisting largely of positive-functioned traits, since the contrary assumption would lead us to expect the system's failure" (Harris 1975:153). Simoons, however, documents that crop invasions result in human deprivation and involve a great deal of conflict, both between cattle and men and between men of various classes and groups over cattle. Are we willing to accept Harris's *theoretical* view that most traits are positive-functioned and that conflict and dialectical models are "vague," "superfluous," "inconsequential," and "nonsense" (Harris 1968:230; 1978*b*:516)? I prefer Simoons's suggestion that we allow traits to be positive-functioned, negative-functioned, or both, depending upon the social and historical context.

In Guatemala, elites allow the cattle they own to invade the fields of others. Such invasions serve to transfer surpluses directly and also act as threats and hence operate as a mechanism of social control. A ritual system which directs surplus from the poor to the rich is buttressed by such cattle invasions (Diener 1978). In India, cattle may also play an important role in the conflicts which divide the village and in the distribution of resources (Diener, Nonini, and Robkin 1978). Simoons's discussion of Ghoga, in which some of the villagers sought to have marauding cattle controlled, while others took up weapons to prevent this action, is of great interest. Freed and Freed (1972) and Lewis (1965:71) also see conflicts and contradictions as an important aspect of animal husbandry patterns in Indian

The question in the sacred-cow controversy is difficult to resolve for two main reasons:

1. Any theory on the origin of the sacred-cow concept is based not only on inadequate knowledge of the past but also on overlapping issues of religious practices and economic behaviour, which are in some cases difficult to separate. For example, Simoons speculates that, according to Harris's hypothesis, "Moslem farmers in arid, overpopulated Pakistan, who are not protected from 'temptation' by the sacred-cow concept, would have slaughtered so many cattle as to ruin themselves. This has not happened." It can be argued, however, that since there is no protection by the sacred-cow concept, the Pakistani government has actually banned the slaughter of livestock, including cattle, for two days a week (called "meatless days") in order to conserve livestock resources (personal experience in 1959 and information from recent visitors to Pakistan). It has further been observed (Platt 1961:127) that "the Pakistani farmer is interested in his cattle as draft animals rather than as producers of meat and milk, and meat rarely appears in his diet except on festal occasions when he may slaughter, or buy, a goat or two."

2. The existence of surplus or useless cattle cannot be determined *separately* from the agricultural system in India of which they form an integral part, providing most of the draught power, fuel, and food to the farming population and contributing about 50% of the total income from agriculture (Randhawa 1962:259). Because of the poor and small farms and the subsistence nature of farming in most parts of India, cattle are fed poorly, with some concern generally during ploughing and/or milking seasons, and are used till they are completely worn out. To many farmers such aged and emaciated cattle are useful, though useless by Western standards. Thus a measure of surplus cattle is not only seasonal, but also relative.

Simoons points out a substantial waste of beef brought about by the religious sensibilities of Hindus and the consequent problem of protein deficiency in India. Approximately 65% of Hindus have been estimated to be nonvegetarians (Chakravarti 1974:403). The protein deficiency problem, however, is more prevalent in South India, not because of Hindu vegetarianism, but rather on account of the predominantly rice diet as compared to mixed cereal and pulse diet in North India (Gopalan and Raghavan 1969:56–57). Jammu and Kashmir state, on the other hand, which has a predominantly nonvegetarian Moslem population, has one of the lowest per capita intakes of meat, fish, and eggs and the lowest per capita intake of animal protein of all the states in India (Gopalan et al. 1971:118–19).

If there are surplus or useless cattle in India, beef consumption by Moslems, at least in those states with a partial or no ban on cow slaughter, should be higher than it is. Even Moslems, however, eat little beef, for two reasons: First, beef, generally from decrepit cattle, is the least expensive meat in India. Many Moslem families who could afford it would prefer chicken or mutton, since beef is tough and fibrous and does not make a good curry—the commonest mode of meat consumption in India. Second, meat, including beef, where available, is comparatively expensive for the millions of poor Moslems who can satisfy their food requirements with cereals, pulses, and vegetables.

No agricultural system, developed or underdeveloped, can be fully efficient and wasteproof. The Indian agricultural system, with millions of submarginal and small farms and equally poor and inefficient cattle, is certainly wasteful in many areas. Nevertheless, Leon (1975:38–40) has estimated that "Indian cattle are far more efficient for Indian society than are American cattle. In the U.S. the amount of edible food consumed by cattle is nearly six times the amount of food the cattle produce. This heavy subsidization of cattle does not exist in India, where the food produced by cattle exceeds the amount of edible food consumed."

villages. In Kanjhawla, 19 miles from New Delhi, at present (*Chicago Tribune* 1978):

> The land is the issue—120 acres of communal grazing ground given in 1970 by the government, with approval by the head of village then, to 120 landless families. . . . Tensions heightened this summer. An Untouchable's hut was burned down in July. A month later, Jats ran several hundred head of cattle through the Untouchable's fields, trampling 35 acres of newly planted corn. Fighting ensued. . . .

The relationship between conflict, cattle, and peasant agronomy in villages such as Ghoga and Kanjhawla remains to be studied. What has been demonstrated in Guatemala, and Latin America generally (Feder 1971), is not necessarily true for India, but the hypothesis deserves testing.

Harris's model also fails to tie Indian husbandry practices to the larger regional, national, and international economic systems of which they are part. Patterns of dependency, the "development of underdevelopment," and regional systems theory all go unnoted. Simoons feels that leather exports could pay for much of India's oil imports; pressures to maintain or alter husbandry patterns are tied to such issues. The connections, however, flow through many levels; interrelations are not always direct or causality complete; strategic decisions are marked by conflict, error, and chance as well as by positive functions. It is not clear how a theory emphasizing strict determinism and environmental constraints which operate at the local level can aid us in relating the village to the encapsulating social field.

Harris's speculations about origins are more seriously flawed; the attempt to explain *origin* by reference to *operation* is fallacious in its very form (Hempel 1959). Simoons is too generous when he credits Harris with a recent consideration of historical process; Harris has merely added a few references and given a date to his functional explanation of origins for sacred cattle. Harris sees ecological operations as solving the origin problem, but the biological physicist Pattee (1973:43) notes, "The problem of the *origin* of control is quite distinct from the problem of the *operation* of a well-defined control system. . . . This distinction between the origin and operation of controls holds at all evolutionary levels."

The rise of sacred-cattle beliefs in classical India is part of the transition from pre-state to state polity. In this process, "Magadhan theoreticians proposed a relentless conduct which might have caused any Borgia to blench; but their openly declared principal aim was to change the face of the land" (Kosambi 1965:127). From the earlier Vedic stage, in which cattle were widely kept and beef often eaten, we pass to a period in which the state maintains "a complete record . . . of the entire cattle wealth in the state" (Kangle 1965:175–76) and in which decrees of the state regulate beef consumption (Gokhale 1966:121). The *transition* from the ritual consumption of sacred animals to state religious prohibitions upon consumption is one problem; how ritual consumption or divine prohibition *functions* in any given setting is a distinct, but related, problem. Further, we must consider later changes and different uses; for example, Simoons suggests major revisions of the cow complex under both Islamic and British influence.

Thus, although Harris (1978*a*:36) suggests that the "elimination of meat eating came about in a slow, practical manner" as a result of ecological operations, we have found that its appearance was associated with rapid political and religious change. Later major reformulations also involve macroevolutionary events. We require a theory of "punctuated equilibria" (see Gould and Eldredge 1977) capable of dealing with functional-ecological *operation* during those relatively long periods when social systems are in dynamic stability, but also with evolutionary *origin* during those relatively brief periods when many new traits and institutions appear or old traits and institutions undergo dramatic restructuring.

Harris notes some ways in which Indian peasants make the best of bad conditions and concludes that the system "consists largely of positive-functioned traits." Similarly, we might note that in concentration camps prisoners sometimes hang uniforms on barbed-wire fences to dry, or pick and eat weeds which grow along such fences, or that fences in concentration camps break up the population into smaller units and thus integrate inmates and limit feuds. But do fences *overall* benefit prisoners? Harris proposes no sampling method by which the overall effects of Indian cattle husbandry practices might be measured. His selective argument is thus not inductively sound.

Nor does Harris's conclusion follow from his evidence. As Simoons notes, Harris explains the *prohibition* of beef consumption (as opposed to limited consumption) not by ecological factors, but by a "need to control temptation." Harris's "key assumption" that "people are too stupid or weak to do anything sensible without divine sanctions' being forced on them" (Anderson 1978:509) is a psychological one supported by no evidence at all.

The desire to control peasant "temptations" was the primary goal of the regulatory edicts of Aśoka and has been a major interest for all governments up to the present day. As Sahlins and others have noted, Harris's speculations too often explain away political and economic *policy* as ecological *necessity*. That an analysis so faulty could be so widely accepted may indeed be related to the role of Harris's thought as social ideology rather than social science. However that may be, the ecology of India's cattle complex is of theoretical and practical importance, and Simoons has rendered a great service by his careful reappraisal of the facts of the case.

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I appreciate Simoons's careful weighing of the positive and negative functions of cattle in the Indian economy and wholly agree with him that cattle management in India cannot be explained only in terms of rationality and adaptive utility, as Harris claims. I should have like him to apply the same rigorous judgment to the political appropriation theory proposed by Diener, Nonini, and Robkin (1978), which appears even more unsatisfactory than Harris's technoenvironmental one; Simoons's leather argument, for instance, might have served as a partial invalidation of one of their assertions (p. 230).

Simoons and other critics, I think, have convincingly refuted most of Harris's claims. His "temptation" argument, however, has hardly been criticized, though it is based on two unproven and very unlikely assumptions: first, that there is such a thing as meat addiction and, second, that, even if it existed somewhere in the world, it could be expected to be found in India. In the case of intoxicants, where addiction is frequent, a total prohibition may have its wisdom and has been imposed by different peoples at different times. What, however, is the evidence for meat addiction? What peasants are known to have endangered the survival of their livestock by their uncontrollable desire for meat? In assuming that Indians would be tempted to eat too much beef, Harris projects the modern American attitude towards meat, and in particular beef, on Indian culture. The Western attitude towards meat is positive; meat is a status symbol and its consumption tends to increase with income. On the contrary, the Hindu attitude towards meat (and not just towards beef) is negative. Whereas most Western festivities presuppose a rich meat dish, most Hindu festivals, even among meat eaters, require purely vegetarian food; there are countless prescribed and voluntarily observed meatless days; and a rise in status, usually concomitant with increased income, tends to bring a decrease in meat consumption. Therefore, even if the cow were not sacred, Hindus would hardly desire their daily steak, and it is extremely unlikely that peasants had to declare the cow sacred in order to keep their beef hunger in check.

No doubt some things people do are perfectly rational and aimed at achieving the greatest possible material benefit, and a lot of things people do may be truly stupid (to use Sahlins's terminology); the bulk of human actions, however, probably lies somewhere in between these extremes. Cattle management in India for me clearly belongs to this middle category. It is neither economically optimal nor inefficient enough to endanger the survival of India's population; besides, its economic drawbacks may be compensated by other benefits. While I agree with Simoons that in India the influence of religion on cattle management cannot be overlooked, I disagree with him when he seems to consider only the negative economic side of that influence. Do we have to impose our ethnocentric, exclusively utilitarian view of cattle on Indians and lament the loss of beef whenever a bovine dies without being eaten? Simoons himself mentions Schwabe's observation concerning Western feelings for the dog, but there are many more species which we do not normally think of as providers of animal protein. It is sufficient to recall the angry protests north of the Alps when Italians treat migratory birds as a succulent side dish for *polenta*.

The slaughter of "surplus" cows without qualms would probably bring some economic benefit but by itself would hardly solve the Indian food problem. Conversely, the abolition of the belief in the sanctity of the cow would bring an enormous psychological loss. Would anybody seriously suggest that the taste of beef might outweigh the joy of having a living goddess in one's house and the comfort she offers in the hour of death? Harris's theory, in my opinion, has the one great advantage of not telling the Indians to slaughter their cattle freely (though, of course, not out of respect for their sentiments).

Nobody would advocate a truly radical solution of the Indian population problem; the best one can do is try to persuade people to adopt family-planning methods. Similarly, contraceptives and segregation of cattle by sex, as some Indian authorities cited by Simoons have suggested, are probably the best way to reduce the number of cattle in India and to better their breed. Such measures will be slower than a radical intervention, but they will avoid doing unnecessary harm to people and cows.

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Simoons accuses me of "half-truth" or outright error. He claims that I ascribe to him in two of my articles (1966:51 and 1978:28) the following "statement": " 'irrational ideologies' often compel men 'to overlook foods that are abundant locally and are of high nutritive value, and to utilize other scarcer foods of less value.' " This claim is itself less than half true. In Harris (1978:28) nothing resembling the ascribed "statement" appears. This is what one finds: "Specialists in food habits around the world like Fred Simoons . . . consider Hinduism an irrational ideology that compels people to overlook abundant, nutritious foods for scarcer, less healthful foods." This obviously is a paraphrase or a summary, not an ascribed "statement"; therefore it is not a misquote and, as we shall see, no error, since what was and apparently remains Simoons's position is fairly represented.

I do accept responsibility for a stylistic error in Harris (1966:51). A citation is incorrectly placed, giving the impression that the phrase "irrational ideologies" appears on page 3 of Simoons's book. The citation should have been placed at the end rather than at the beginning of the sentence. I apologize. However, Simoons again has himself only told half the truth, for I indicated that what I was ascribing was a "sample opinion" in "summarized" form. Here is what the article said:

> A sample opinion on this subject is here summarized: According to Simoons (1961:3), "irrational ideologies" frequently compel men "to overlook foods that are abundant locally and are of high nutritive value, and to utilize other scarcer foods of less value" [here is where the citation should have been placed]. The Hindu beef-eating taboo is one of Simoons' most important cases.

As long as I am compelled to waste precious time and journal space on trivia, I will point out that Simoons has substituted the word "often" for "frequently." Perhaps I should sue him.

Of course, the only issue worth the reader's concern here is whether I have fairly represented Simoons's position (and whether he fairly represents mine). Anyone who has read Simoons's (1961) book must agree that I summarized his position accurately. I substituted my paraphase "irrational ideologies" for his "foodways" because Simoons consistently attributed the origin of "foodways" to ideologies: to "holy qualities associated with deities" (p. 86), to "the belief that the dog is unclean" to "the dog's being a holy animal" (p. 105), and, specifically in the case of the Hindu foodways, to "feelings . . . that derive from the sacred character of cattle" (p. 63). Since these beliefs and feelings are religious in nature, and since religion is commonly recognized as a part of a culture's ideology, it was correct to write that Simoons saw ideologies as the cause of Hindu food taboos. Does he not in this new opus again favor the theory that the beef and slaughter taboos developed from the "socioreligious realm" and "religious controversy"?

What about the word "irrational"? Did Simoons see the causative ideologies as irrational? Yes. The main concluding paragraph of his book repeatedly invokes the rational-irrational distinction (p. 106):

> Many people . . . tend to assume that man's selection of food is determined by . . . reasonable consideration of the material available for human consumption. What the preceding chapters have shown . . . exposes the inadequacy of this assumption. . . . Western man, despite his frequent temptation to claim that *his* foodways are based on rational considerations, is no more rational in this than other men, for it makes no better sense to reject nutritious dogflesh, horseflesh, grasshoppers, and termites as food than to reject beef or chicken flesh.

Indeed, so firmly committed was Simoons to the basic irrationality of his "foodways" that he even suggested that madmen played a prominent role in their origin: "One of the most interesting lines of investigation is the role of the mentally disturbed" (p. 120). My summary of his position therefore was not a half-truth; if I erred seriously it was only in the direction of failing to convey the full measure of his eclectic and idealist theoretical confusions about sociocultural and ecological processes.

Simoons claims that "Harris misuses Marxism in ignoring religion as a sociopolitical force and in focusing on . . . the 'profit factors' behind sacred-cow beliefs." Perhaps I misuse Marxism, but I do not ignore religion as a sociopolitical force. My explanation of the origin of the ecumenical religions, including Hinduism, is that they embodied the ideological needs of successful expansionist states and that they exerted an enormous sociopolitical force on behalf of the creation of archaic empires (see below). Nor I do focus on "profit factors"; rather, I focus on costs and benefits measured as energy, protein, depletion of resources, production inputs and outputs, and human lives lost and saved. Simoons surely wishes to join me in such concerns, which alone justify our use of public funds (cf. Harris 1979*a*).

Simoons next indicts me for "gross distortion" in my interpretation of Marx's "remark" that "social life is basically practical." The "remark" in question is the eighth of Marx's "Theses on Feuerbach": "All social life is essentially *practical*. All mysteries which lead theories to mysticism find their rational solution in human practice and in the comprehension of this

practice." Simoons offers nothing to substantiate his charge. Marx's view of this issue clearly corresponds to what I imputed in quoting the above thesis. This is what one finds in volume 2 of *Capital* (1967[1887]:160, 236–37):

> As a beast of toil an ox is fixed capital. If he is eaten, he no longer functions as an instrument of labour, nor as fixed capital either. . . . The Hindoo peasant will perish by hunger beside a fat bullock. The prescriptions of superstition which appear cruel to the individual, are conservative for the community; and the preservation of the labouring cattle secures the power of cultivation, and the sources of future life and wealth. It may sound harsh and sad to say so, but in India it is more easy to replace a man than an ox.

Of course, now that Simoons is concerned about "gross distortions" of Marx, he should be warned that some Marxists will tell him that even Marx grossly distorted Marx.

Simoons next denounces my use of a quotation from Gandhi. The gist of the criticism is that the quote I chose is not representative of Gandhi's view of the cow. The quote in dispute is this: "Why the cow was selected for apotheosis is obvious to me. The cow was in India the best companion. She was the giver of plenty. Not only did she give milk but she also made agriculture possible" (Gandhi 1954:5). To prove that Gandhi did not see cow protection as "deriving simply and directly from economic causes," Simoons offers two longer quotes from the same book. But who asserts that Gandhi saw cow protection as "deriving simply and directly from economic causes"? Do I? Does Gandhi? My purpose in including the above quotation was simply to indicate that practical and mundane factors were important in Gandhi's explanation of why the cow was *apotheosized*. Simoons's counterexamples are not counterexamples at all; they do not refer to the question of why it was the cow (and not some other form of animal life) that was *apotheosized*.

Simoons characterizes my earlier articles as setting up an "unreal composite view, a straw man to be ridiculed for failing to appreciate the economic importance of the cow." It is a strange "straw man" that has provoked a stream of abusive counterattacks for 15 years. The reason that Simoons thinks I attacked a straw man is that the opinion of the "experts" has shifted since the halcyon days of high-energy technification for India and the rest of the less developed countries (Weiss 1979). If today "almost all experts" recognize the importance of cattle and water buffalo to human livelihood, very good, but that was certainly not true 15 years ago. That was why I cited the "experts," including Simoons, the Ford Foundation, and many others, in the 1966 article—not to ridicule them, but to change their minds. Apparently I have had little success with Simoons.

Speaking of straw men, what is the next thing we find in Simoons's article? The Shin of Dardistan! They abominate cows, abhor milk, and refuse to burn dung. So? Lots of other peoples abhor milk and would be well-advised not to burn dung. Instead of trying to find out why the Shin do what they do, Simoons already thinks that they are the victims of some irrational religious quirk. Obviously, here is a group worth studying, but I have no intention of jumping through that hoop right now.

Next Simoons declares that my explanation for the origin of cow sanctity has "fatal flaws." It quickly becomes evident, however, that his understanding of my explanation is the source of the "fatal flaws." I am supposed to hold that the beef and slaughter taboos were imposed *only* from below and *only* in conformity with popular practice. The theoretical principles of cultural materialism could not conceivably lead to any such one-sided view of the evolution of sociocultural systems. My theory of the origins of the beef and slaughter taboos holds that they were embedded in the transformation of egalitarian into stratified redistributive systems in association with the rise of states and empires. As proposed in *Cannibals and Kings* (1977:179), the monopoly of the Brahmins over the slaughter and redistribution of animal flesh was gradually converted into an imperial cult that not only prohibited slaughter, but ceased to redistribute any material wealth at all (while it continued to assure its elite of adequate proteins from dairying):

> it was a great convenience for the rulers of India, Islam, and Rome to humble themselves before gods to whom heaven was more important than earth, and a former or future life more important than this one. As the imperial systems of the Old World grew larger and larger, they chewed up and depleted resources on a continental scale. When the globe had filled with tens of millions of sweating drudges, the "great providers" were unable to act with the open-handed generosity of the barbarian chiefs of yore. Under Christianity, Buddhism, and Islam they became "great believers" and built cathedrals, mosques, and temples where nothing at all was served to eat.

At every point in my discussion of the origin of the prohibition on cattle slaughter and beef eating I make it clear that this complex cannot be understood apart from the rise of the Gangetic empires, and at every point in my discussion of the rise of the state and empires I make it clear that in stratified societies nothing that is beneficial to the subordinate classes gets instituted that is not of equal or greater benefit to the ruling classes as well. The argument about imposition from above or below rests on a false dichotomy abhorrent to my life work and contradictory to everything I believe to be valuable in Marx. The fact that I stress the positive function of the beef and slaughter taboos for "millions and millions of individual farmers" says nothing about whether the consequences of these practices were of even greater value for the ecclesiastical and political elites. As I emphasize, Ashoka's conversion to Buddhism and cow worship occasioned the rise of the greatest of all Indian imperial conquests. Simoons does not seem to realize that the theory of imposition from above rests on the principle that every innovation made by a ruling class is necessarily contradictory to the welfare of the subordinate classes. I wonder if Simoons or any other person of good will really wants to boost that point of view. The point about "millions and millions of individual farmers" was directed not at the question of imposition from above or below, but at the question of how selective principles operating on the individual level can lead to cultural innovations. This is a problem that one confronts regardless of the class of the innovators, unless one believes that all history and prehistory is a product of board meetings and cabinet sessions.

Next Simoons attempts to prove that the ecological costs of the beef and slaughter taboos outweighed the benefits because the taboos led to overstocking, overgrazing, and the desertification of Rajasthan. He does not mention the fact that the main theme of *Cannibals and Kings* is the interaction between intensification, depletion, and sociopolitical transformations. I too emphasize the desertification of northern India. Unlike Simoons, however, I refuse as a matter of strategic principle to attribute this kind of ecological disaster to a mystical or inscrutable hypertrophy of cow love (just as I refuse to attribute the depletion of America's fresh air to a hypertrophy of car love). Rather, I attribute it to relentless reproductive pressures exacerbated by the struggle for imperial hegemony among the archaic states of northern India.

Simoons's scenario is illogical and contrary to ecological and demographic principles. The total size of a livestock population bears no strict relationship to its age pyramid. If the taboos increase cattle life-span, they do not necessarily increase pressure on recources. We know—and Simoons himself acknowledges (see below)—that the major features of India's bovine populations are adapted to regional infrastructural conditions and that, taboo or no taboo, culling takes place. Moreover, at any given population level, it is energetically far more efficient to employ cattle for dairying than for meat production. De facto bans on slaughter are recurrent progessive and defensive reactions to overgrazing wherever dairying is an ecologically viable adaptation. Finally, both archaeological and historical

evidence suggests that the beef and slaughter taboos were institutionalized only after desertification was well advanced. Hence, Simoons's alternative scenario has little merit, and it will continue to have little merit until he considers the material forces that lie behind the desertification process. Do we not have here yet another instance of Simoons's devotion to irrational ideologies as the cause of poverty?

Continuing to disregard the literature, Simoons next asks why farmers "would . . . have had to ban the slaughter and eating of all cattle, including the old and infirm, to save those capable of working, breeding, and milking." This kind of question is also taken up and answered in *Cannibals and Kings* (pp. 196–99). As sacred precepts, taboos represent systemic attempts to resolve ambiguities created by discrepancies between long- and short-term cost/benefits or by other complex or conflicting vectors of value. The chief characteristic of taboos is their on/off or digital response to an analog reality. This means that taboos will always be violated, but not without effectively lowering the rate of the interdicted alternatives. The taboo on nuclear family incest, for example, is usually a total interdiction, even though a little bit of some forms of incest would not make much difference with respect to most of the postulated deleterious social or biological consequences.

Taboos or no taboos, the main characteristics of India's bovine population are clearly determined today, in the present, by local and regional infrastructural conditions (A. Vaidyanathan, K. N. Nair, and M. Harris, work in progress; Harris 1977*a*). No one knows precisely what effect the prescriptions have today. They probably shift the definition of old and infirm animals to favor borderline specimens, especially in crisis situations such as droughts and famines. They are also probably preventing the development of an agribusiness form of beef production for the elite and international market, slowing down the conversion to a landless peasantry, and lowering the rate of urban unemployment. I contend that the benefits still outweigh the costs of these practices from the point of view of the subordinate classes, although they may have ceased to be as desirable as they once were from the point of view of the elites.

Simoons says that if there were really any practical benefit to be derived from the Hindu beliefs, then the farmers in overpopulated Pakistan, who are not protected by the sacred-cow concept, would have slaughtered so many cattle as to ruin themselves. How does Simoons know that these farmers are not protected by a "sacred-cow concept"? Moslem families in Kerala assured me that Koranic law forbade the shortening of the life of their cattle. Moreover, cattle-census data suggest that under similar ecological and economic conditions Moslem and Hindu farmers within India and in the border area of Pakistan and India treat their cattle in essentially similar fashions (Raj 1971, Harris 1977*a*). Simoons himself (1961:66) recognized that there were repeated attempts by the Moslem rulers of India to ban cow slaughter. Although these bans were never institutionalized at the ecclesiastical level, this is no reason to suppose that many Moslem farmers in India and neighboring Pakistan do not have strong prejudices against slaughtering cattle. Moreover, one must remember that some Hindus as well as Moslems have always eaten beef.

Unfortunately, no one has really been able to isolate the role played by religion with respect to variations in bovine species and sex ratios. In comparing Moslems with Hindus we must control for the ecological, economic, and political niches that they occupy as well as for their nominal religious status. If, however, Heston (1971) is right and "the Hindu religion does lead to unusually large holdings of female cattle," this is still quite irrelevant to the main issue—which is not whether Hinduism influences cattle-rearing practices (both Simoons and I say that it does), but whether the influence is deleterious for the farmers and for India as a whole. Who is better off, a Hindu farmer with a cow or a Moslem farmer with no cow? Which is better off, an India dependent on tractors or an India dependent on bullocks?

The same kind of question applies to Lodrick's findings that urban Moslems prefer she-buffaloes to she-cattle. What is Simoons trying to prove? That Moslems and Hindus exploit different urban economic niches? Who would deny that the castes and ethnic groups of India are adapted to different economic and ecological niches? The issue before us is whether the Hindu taboos are responsible for the *mismanagement* of certain niches, not whether Hindus and Moslems have identical subcultures.

Continuing to throw up obstacles based on non sequiturs and misinformation, Simoons turns to the case of Kerala. Since Kerala is the country's most populous state, it should have the greatest need to protect its cattle. Instead, it is one of the few states that is planning to expand its slaughterhouse facilities. This ignores the fact that most of the cattle officially slaughtered in Kerala aren't raised in Kerala (Nair n.d.); that commercial slaughter is the least common form of culling; and that Kerala is unique in India in having a double reversal of its sex and species ratios: more he-buffaloes than she-buffaloes and more she-cattle than he-cattle. Kerala "protects the cow" more than Uttar Pradesh and Bihar—the Hindu heartlands—which favor she-buffaloes as suppliers of milk and where male cattle outnumber female cattle two to one. Does Simoons know how to explain the cells in table 1? If not, he is wasting our time in writing about Kerala. There is important work to be done here, and Simoons is not doing it. Nor can he do it as long as he remains mired in the assumption that cattle management is dominated by irrational ideologies.

It is difficult to tell exactly what Simoons might propose one should do to explain this table. As we have seen, he believes that the origin of the beef and slaughter taboos lies in "religious controversy." This is a nontheory, because it gives no nomothetic reasons for the content or resolution of the "religious controversy." Yet he later on admits that "analysis of the available data suggests that the numbers, distribution, and composition of India's cattle population are mainly determined not by religion but by geographic and economic factors"! So what are we arguing about?

The rest of Simoons's article contains some useful information but much that is irrelevant, poorly documented, or hearsay. Lodrick's study is useful, but not in the way that Simoons supposes. We learn that the cattle homes are run as businesses but that 30% of the cattle in them are "nonproductive." Assuming that they are really nonproductive, we have a grand total, according to Simoons, of 175,000 cattle kept on charity. Since there are about 170,000,000 cattle in India, we are at best dealing with a rate of mismanagement of about .1%. Of course, Lodrick admits that the "useless" animals did not remain constipated during his study and that their dung was sold. The cattle homes operate at a considerable financial

TABLE 1

BOVINE AGE AND SEX RATIOS,[a] ALL INDIA AND KERALA

	0–1 YR.	1–3 YRS.	3+ YRS.
All India (1966)			
Cattle	101	90	136
Buffalo	67	39	32
Kerala (1971)			
Cattle	67	34	31
Buffalo	77	79	145

[a] Males per 100 females.

deficit, we are told, but they make it up from charitable contributions, rent, and other funds. So does Columbia University.

Simoons cites Freed and Freed's (1972) study to show that "cattle compete with men." This study does not involve the all-important weighing of costs and benefits. Simoons's data on wandering cattle are hearsay. I never saw a bovine in India whose activities were not closely supervised by a nearby human, usually a young one. His section on the wasting of beef is irrelevant, since we already know that cattle are raised primarily as a source of cheap traction and not for meat or milk. Again one wonders what he is trying to prove. The notion that nutrition would improve if the ban on slaughter were removed is based on a complete misunderstanding of the system by which animal protein is produced and allocated in India. Any encouragement of a beef-slaughter industry will represent a serious threat to the nutritional standards of the marginal sectors now enjoying beef as an occasional cheap by-product. It will also raise the price of staple crops by diverting resources from plant foods and milk to meat.

As for Simoons's final suggestion that cultural ecologists should consider alternative approaches to mine, I agree. Simoons, however, does not yet understand my approach or the alternatives. Nor does Lodrick, who is quoted as admonishing us not to "interpret the functioning of the sacred cow concept solely in terms of economic materialism or cultural ecology." I invite them to compare their eclectic strategy with that of cultural materialism, not as they imagine it to be, but as it really is (Harris 1976*b*).

by ALAN HESTON
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While learning much from his new materials and sharing many of his views, I would like to emphasize a somewhat different approach than that of Simoons. One question that Harris originally raised was whether religion is needed as a variable to account for the cattle complex in the subcontinent. My approach is that religion is one of several variables that are candidates for explaining the sex ratio of cattle (one generally accepted characteristic of a cattle population that may be influenced by, among other factors, attitudes towards cow slaughter). If one is explaining variations in the sex ratio of bovines between, say, districts, states, or provinces across the subcontinent, there are many other ecological variables to introduce which vary across even small geographic regions; among these are factors like soil type and depth, which affect the use of females as draft animals, whether buffaloes can be good milch animals in the local environment, and factors affecting the cropping pattern and therefore fodder availability and draft requirements. Across geographic areas of the subcontinent, these variables may explain a larger portion of the variance in sex ratios than the religious composition (and fervor with respect to cow slaughter). Where I disagree with Harris is in his view that, because ecological factors are important in explaining geographic variation in sex ratios, religion is not important to our understanding. It is not a question of ecology *or* religion, and, as Simoons richly documents, there is much evidence of how religion affects individual decisions with respect to cattle. Further, Simoons supplies evidence within small ecological areas suggesting that at a local level, religion is often the major explanatory variable in interpreting the cattle complex; in fact, comparisons across such small geographic areas provide a better test of the influence of religion than broader ones.

This multivariate approach to the Indian cattle complex does not deal with the origins of religious sanctions against cow slaughter, and Harris appears to suggest that because he offers an ecological explanation of these origins religion can be safely dismissed as an independent factor. While I am not in agreement with this position methodologically, I shall confine my comments to Harris's explanation of origins and Simoons's comments.

I accept the scenario that human population and settled agriculture increased in northern India after 1000 B.C. and that as a consequence intensity of cultivation increased, requiring more draft animals. Harris suggests that, to accommodate this increasing requirement for draft animals at a time when pasture land was declining because of more intensive cultivation, it was advantageous for fewer cattle to be slaughtered for food. Individual cultivators who survived were those who did not slaughter cattle for eating, according to Harris, and as a consequence taboos against slaughter evolved that were later ritually enforced. Simoons criticises Harris on the grounds that there is textual evidence that cow sanctity developed as a doctrine that was imposed from above, rather than generated from below. Simoons also summarises the argument of Diener, Nonini, and Robkin that the prohibition of cow slaughter was a way for rulers to extend political control and extract additional surplus from agriculture.

This discussion seems to assume that beef eating in Vedic times was widespread and not simply associated with occasional sacrifices. If no one had eaten beef in northern India after 600 B.C., would this have substantially reduced the slaughter of cattle, as Harris, and I believe others, assume (without obvious support)? Was there in fact any surplus to be extracted by prohibiting cow slaughter?

Even if beef had been a major source of food before human population growth moved northern India from pastoralism to a settled agriculture, raising the relative cost of feeding cattle because of diminished pasture land, it would not have been necessary for cattle slaughter to decrease. Society could have devoted more land to fodder crops, which would in turn have been justified by the fact that draft cattle were more valuable in settled agriculture. Finally, even if it is accepted that cow slaughter decreased as agriculture became more settled, why would this generate religious sanctions? The higher cost of cattle resulting from less pasture land could have led to diminished slaughter of cattle as the populace substituted other meats and vegetables in their diets for the relatively expensive beef, without any development of ritual bans on slaughter. This pattern is documented for Europe, where the relative price of meat fluctuated inversely with human population and, at the generally low levels of income prevailing in the medieval period, meat consumption per person declined when human population increased. The Indian subcontinent was subject to similar pressures on land, so one might expect similar economic adjustments without the evolution of religious sanctions against cattle slaughter. Though for different reasons, I therefore also share the doubts of Simoons and others about the account of origins of cow sanctity suggested by Harris.

by ROBERT HOFFPAUIR
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Simoons's paper is a most significant contribution to the sacred-cow controversy. By presenting evidence seemingly ignored by or unknown to Harris, this paper systematically dismantles the substantive structure of his interpretation of the sacred cow. In addition, weaknesses in the foundation of Harris's thesis are pointed out by correctly identifying his methodology as oversimplified and narrow-minded technoenvironmental determinism. Simoons's findings lead us to the more realistic conclusion that the cattle situation in India is a product of multidirectional interaction of a broad spectrum of environmental, economic, and socioreligious factors. The restrictive one-way cause-and-effect formula for problem solving that Harris and others have applied to cultural phenomena (under the guise of "cultural ecology") has very limited, if any, value in the com-

plex ecosystem of India. With regard to the particularly perplexing question of the relationship between economy and religion, my own research on India's other major bovine, the water buffalo, has led me to conclude that while economic incentive is a significant driving force influencing bovine husbandry practices, the effectiveness of the incentive and the consequential realization of economic success is at least partially controlled by the religious system.

In the case of the buffalo, we have a large and hardy bovine well adapted to the lowland tropics and able effectively to maintain itself on low-grade fodder. In addition, under normal local conditions in India, the female buffalo has the ability to produce an average of about twice as much milk with twice the butterfat per unit of milk as the cow. Recognition and evaluation by Indian peasants of the animal's biological advantages in light of prevailing economic and ecological conditions has resulted in the rather high economic esteem in which the animal is generally held and the position of the buffalo as India's primary milk animal. Even though India has over twice as many milk cows as milk buffalo, buffalo produce 61% of the total milk supply. As a work animal, the buffalo, while performing superbly in India's wet-rice fields, does not have the general versatility and speed of work cattle. Thus, cattle are generally preferred for traction and buffalo for milk production.

As interpreted by Harris, the sacredness of India's cattle is merely a reflection of their economic utility and was originally bestowed to protect them from slaughter. If this premise of the shaping of religious ideology by economic rationality is extended to the buffalo, one would expect that the ideological manifestation of the undeniable economic utility of this animal, especially as a milk producer, would be a highly revered religious status of inviolability similar to that of the cow. Yet, this is not the case, for the buffalo is not sacred and has a distinctly inferior position in Hindu thought, a position characterized by plebeianism, profanity, and violability. There is no evidence that it enjoyed a higher position at any time in Indian history.

I would argue that the lack of any rigid social or legal restrictions on buffalo slaughter has contributed significantly to this animal's economic success. The farmer or milkman can exercise his own economic judgment in the disposal of unwanted buffalo, thereby preventing the accumulation of an excessive population of "useless" buffalo who are competing with productive ones for available fodder. Thus, unburdened by sanctity, the buffalo has developed into an important economic asset. Whereas religion seems to play a restrictive role with cattle, with buffalo it plays a generally permissive role by offering very little resistance to the economic management of the animal at the local level. The buffalo's enviable situation suggests what might have happened with the husbandry of the cow had that bovine not been so revered.

by DERYCK O. LODRICK

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Few of us who have grappled in the field with the problem of Indian cattle can fail to share Simoons's view that there are serious flaws in Harris's ecological approach to the sacred-cow concept of India. Several features of the cattle economy are not adequately explained by Harris's functional model, and, furthermore, these tend to contradict his claims that there are no "useless" components in the cattle complex, that the relationship between bovines and humans in India is symbiotic rather than competitive, and that taboos on cattle slaughter and beef eating reflect ecological pressures rather than religious values (Harris 1966:52).

Ahimsa, for instance, is presented by Harris as deriving strength and sustenance from the material rewards it supposedly bestows on both man and beast in India rather than from any deep commitment to the principles of nonviolence and the sanctity of life (p. 52). Yet for over two millennia ahimsa has been a fundamental tenet of the Jain faith, and even today the concept continues to exert a considerable influence in Jain society without the economic underpinnings envisaged by Harris. What possible material benefits can be derived from supporting the bird houses (*kabutriyas* and *parabadis*) of Gujarat or protecting aged cattle, sick cats and dogs, injured deer, and even insects in the Jain animal homes (pinjrapoles) of western India? These institutions, and indeed many other aspects of Jain life, assume meaning only with reference to Jain views of the world and the importance of ahimsa and related concepts of reincarnation, karma (the principle of universal causality resulting from action), and *jiv-daya* ("life-compassion") in Jain religious philosophy (Lodrick 1979*b*). Jain concern for the sanctity of life, being philosophical rather than ecological in origin, extends to all living creatures, both wild and domesticated. Thus, although Jains do not view the cow as sacred, like Hindus they abhor its slaughter and will not eat beef—evidence that ahimsa remains a potent philosophy in its own right in India today, but evidence that is paid scant attention by Harris.

This reluctance to accept that religious beliefs can influence behavior without some underlying functional rationale leads Harris to emphasize that goshalas and pinjrapoles—the animal homes discussed at some length by Simoons—fulfill economic functions and may not be the quaint, charitable institutions that are usually implied (1966:58–59). Even the most cursory examination of their past, however, reveals that the economic activities of animal homes are of recent origin and, in most institutions, were developed specifically to finance the upkeep of useless animals. Maintenance costs for nonproductive cattle generally exceed income from goshala dairy herds, and most institutions operate at a considerable financial loss, their deficits being covered, in part, by charitable donations and local cesses (taxes) (Lodrick 1977:239–41). In addition, the cost of supporting useless cattle is compounded by their consumption of scarce fodder resources, by the diverting of agricultural land owned by animal homes from other uses to the growing of fodder crops, and by the waste involved in methods of carcass disposal (pp. 286–90). Thus, despite their economic activities, the presence of animal homes in India is detrimental to the cattle economy; and, in that their traditional animal-protection functions originate in Hindu and Jain beliefs and values, their survival in modern India must be seen as reflecting the negative influence of religion.

Ahimsa and animal homes are but two elements of the cattle complex lending support to Simoons's conclusion that Harris's ecological approach does not adequately explain the facts of the Indian situation. If this is true of the contemporary scene, how effective can the approach be in accounting for the origins of the sacred-cow concept? There are, as Simoons suggests, alternative hypotheses that better fit the facts of both Indian history and Indian ecology. Given the complexity of Indian society, moreover, it is inherently more satisfying to see attitudes towards cattle as reflecting the interplay of cultural, historical, and environmental forces rather than the mechanistic control of ecological determinants acting persistently over periods of thousands of years.

Although Harris's functional views of the sacred-cow concept have done much to create interest in the Indian cattle complex, his ecological approach is questionable on several counts. Simoons performs a valuable service in bringing this to our attention and in correcting some of the "myths" about cattle in India perpetrated by Harris and his particular brand of cultural ecology.

by S. L. MALIK
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This article is primarily an exercise in intellectual bickering over Harris's contentions. While Harris pointed out the utility of cattle for traction and fuel, Simoons argues that he did not sufficiently stress the negative impact of the sacred-cow concept and emphasized only its positive ones. Simoons, on the other hand, elucidates the negative impact, for example, soil erosion due to overgrazing. The basic assumption in the hypotheses of both Harris and Simoons—that the cow in India is merely an economic entity—falls short of reality. Systematic analysis of the concept of the sacred cow in India would have provided evidence that the cow is esteemed in Hindu culture apart from its economic advantages (as delineated by Harris) and/or disadvantages (as shown by Simoons). Whether or not cows should be slaughtered therefore depends not on their economic importance, but on their sacredness. Moreover, this latter arises from beliefs which are generally not explainable in terms of the simple scientific or rational logic to which we are accustomed.

The theory that all cultural idioms have their basis in the economic experience of the society and its technoenvironmental characteristics may not fit the present-day situation. This is not to suggest that these factors might not have been responsible for the origin of the sacred-cow concept, which is an altogether different issue. At present, however, the sacred-cow concept exists in India mainly because of ritual beliefs and not because of economic variables. In traditional Hindu mythology, as recorded in the Vedas, the Puranas, the *Ramayana*, the Bhagavad-Gita, and other mythological books, the cow is regarded as mother. To return to a state of ritual purity from pollution (for example, childbearing), Hindus take a mixture of cow's milk, curd, ghee, dung, and urine. It is further believed that the cow has 330 million gods and goddesses in her body and that serving and praying to her alone will lead to Nirvana for 21 generations to come.

Simoons's failure to understand the sacred-cow concept leads him to suggest the improvement in quality and reduction in numbers of cattle through slaughter. I specifically call it a failure to understand and not ignorance, since he has discussed at length the beliefs of Hindus in reference to the cow. The cow cannot be allowed to become merely an economic animal because of its high ritual position in Hindu culture. In view of the cow's being regarded as mother, it might even be said that no one would slaughter his mother because she was not economically important.

by WOLFGANG E. MEY
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Simoons has dealt with an aspect of anthropological tradition I've a particular liking for: the demystification of myth. I was glad to read his article because for the most part it voices my own questions concerning Harris's approach. On the other hand, I am disappointed to find Simoons playing the game according to Harris's rules. This remark limits my critique partly to a question of methodology:

Simoons's discussion of the sacred-cow concept in terms of Western economy is rigorous, and I agree with its results.

His concern is "with the origin of the sacred-cow concept and with whether, in one way or another, it contributes to waste and destructiveness in present-day India," but he later dismisses the discussion of these historical and religiopolitical aspects as too lengthy. This deliberate avoiding of the discussion of the historical aspects reduces general historical processes to specific historical (=present-day/economic-ecological) processes; it reduces the historical and religiopolitical aspects of the sacred-cow concept to aspects of waste and destructiveness in present-day India—to an ecological problem. It is precisely this exclusion of dialectics which paves the way for Simoons's rather formalistic arguments.

On the other hand, Simoons agrees that "one cannot merely look on cattle in Western terms," thus referring to a second frame of reference, as he does repeatedly (see the quotations from Gandhi to prove that the sacred-cow concept reveals a "more complex blending of economic concerns and religious commitment" than Harris thought of, the allusion to the concept of ahimsa in the Harris quotation, and the use of Buddhist and Jain concepts in the context of political centralization). This constant mingling of Western and non-Western concepts does injustice to both. Though the importance of a non-Western frame of reference has been established and its difference from Western concepts has been acknowledged by Simoons, he deals with the sacred-cow concept only in terms of Western economy (see the discussions of wandering cattle, the waste of beef, the inefficiency in cattle breeding, the homes for aged cows, cows' competition with humans for food, and the contribution of religious beliefs to a surplus of cows).

Ultimately the question originally phrased as one of the origin and effects of the sacred-cow concept ends in the discussion of the profitability of sacred cows under conditions of general scarcity. I'm very much afraid that Bennett's criticism of Harris, to which Simoons refers ("that Harris does not look on religion as a 'strategy of action' or 'become involved in the religiopolitical question' ") applies equally to Simoons: Religion, the other frame of reference, is being considered not as a "strategy of action" in the Hindus' attempt to interpret nature, but as the background for profitability calculations.

The integration of the dialectical relationship between the sacred-cow concept and processes of political centralization in ancient India (religion as strategy of action) as well as the use of the sacred-cow concept in the domination by Hindus of marginal groups both within and outside the caste system could have been helpful in overcoming the limitations to which the sacred-cow controversy has once again been subjected. I cannot help feeling that the sacred cows of the Hindus have become the sacred cows of anthropologists.

by S. N. MISHRA
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In the limited space available, I shall begin by commending Simoons's excellent effort at an exhaustive survey of the record on the sacred-cow question. The record is overwhelmingly against Harris's thesis. Whether Harris will accept it as refutation of his thesis is, nevertheless, doubtful. The sacred cow has her parallel in sacred doctrines, and to the faithful contrary evidence amounts to heresy rather than refutation. That the sacred-cow controversy can ever be resolved in a scientific spirit is unlikely; one need only consider how much American scientific talent and resources it has absorbed since the controversy took root a decade and a half ago.

To me the fruitful approach to the problem of cattle in India is one of development planning, which is and ought to be a matter of pervasive concern for social science in present-day India. Viewed from this angle, it was obvious fairly early to me (Mishra 1966), as to many others, that if India maintained surplus cattle in relation to feed availability, this situation implied the potential for more food (milk and meat) and greater efficiency for the cattle economy if that surplus could be eliminated. Soon the existence of the surplus was questioned (Raj 1969). It is worth noting at this point that the existence of surplus is inconsistent with and, therefore, intolerable to not only the cultural-symbiotic hypothesis of Harris, but also the dominant neoclassical bourgeois economic theory in general, the invisible, omnipotent, sacred god-the-market of which supposedly never leaves any surplus of anything, no matter

how powerful the forces of opposition, religious or otherwise, it meets on the way. Once the surplus was denied, it became imperative, nevertheless, to examine it empirically. The results of this examination were circulated in mimeographed form among Indian participants in the controversy back in 1973. The general-survey part of this examination was subsequently published (Mishra 1973), but the model deriving the formula for computing surplus only appeared five years later as part of my book on livestock planning (Mishra 1978). Sufficient time has elapsed, but my model and estimate of the cow surplus (19.37% of the cow stock in 1961) have not been contested in India. One of the particpants, Hanumantha Rao, who had denied the surplus (Hanumantha Rao 1969), has in fact accepted (personal communication) my criticism of his position. In view of all this I find it difficult to accept Simoons's contention that "a definitive answer to the question of cow surplus" is still awaited.

Estimates of the surplus may reasonably differ because of errors of measurement of the relevant variables and parameters—the breeding efficiency of the adult cow stock and the mortality rate of the young male stock—but all such estimates must lie within a narrow range. In a parametric variational exercise over reasonable ranges of these two parameters, the surplus for 1961 was in no case lower than 19.37% of the adult cow stock (Mishra 1978:81–85). This should satisfy Simoons's request for a definitive answer. As I wrote earlier, the only possible explanation of this surplus is the sanctity of the cow in India. This should not, however, be construed as a reflection on the economic rationality of the average Indian cultivator. To him the cow has both use value and sacred value. She simultaneously belongs to the economic basis and the ideological edifice of the social order.

by STEWART ODEND'HAL
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5 III 79

In general, Simoons's article is a disappointment. In his desire to counterbalance Harris's thesis, he has helped to perpetuate past misconceptions about Indian cattle. After reading his article I would not be surprised if one would think that Indians who own cattle are not very bright.

Simoons presents no original data which he himself has gathered in India. His references to newspapers and magazines (as if they were paragons of scientific authenticity) and statements like "the traveller to India observes," "an informant . . . told me," and "the estimates of one official" are very disconcerting. His presentation of my work also leaves something to be desired. He implies that I "concluded" in my study that "cattle consumed little, except mustard oil cake and wheat bran, that man could eat directly." I know of no one who has ever eaten mustard oil cake or wheat bran directly. This inaccurate appraisal of my article makes me suspicious of his evaluations of the work of others.

I would like to offer a few contrary observations based on my experience in India over a period of three years, during which I came into direct contact with cattle on a daily basis as a veterinarian and as an investigative quantitative population ecologist.

I suspect that if a total ban on cow slaughter were imposed there would be very little impact at the village level. There is no way that Muslims can be prevented from killing cattle within the confines of their own villages. Many Hindus know this, and it is acceptable as long as they can sell their cows when they need money for a dowry or some other purpose.

Never have I seen wandering cows feeding on cultivated crops. Untethered cattle are the responsibility of the younger members of the family, and they know better than to allow this. The goshalas I have visited are efficiently operated big businesses controlling large tracts of land. They sell milk, dung, calves, and other by-products. Sometimes old, infirm, and injured cattle are maintained to attract donations. Heston (1971) and other economists call for a reduction of "surplus" cattle on the basis of treating the cattle of India as a single herd. I think this is naive. Not until urban Indians and Western "experts" themselves have to depend on the rational management of limited household resources can they speak authoritatively about the villagers' situation.

Given the environmental constraints, I firmly believe that the villager in India is managing his cattle and plots of land far more efficiently than by any means anthropologists, sociologists, geographers, or economists can suggest. It is a source of amusement to me to consider that the typical Indian villager will remain unaffected by whatever conclusions are derived from the great "sacred-cow controversy."

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27 II 79

The controversy over India's sacred cattle has attracted the attention of numerous scholars, many of whom have chosen the arena of this journal to air their views. One of the most forceful contenders in these battles has been Marvin Harris. Since his original article on the subject appeared almost fifteen years ago (Harris 1965), Harris has transformed the contest into a jihad, a crusade for positive-functioned techno-environmental determinism. In that light, Simoons's review of the historical and empirical evidence bearing on what he calls "questions" in the controversy over the sacred cow is a refreshing and bracing intellectual challenge to consider alternative explanations to Harris's seductive constructs.

Keen observers of the role of cattle in Indian society, economy, and ecology must agree with Simoons that Harris's positive-functioned model of technoenvironmental determinants is too simple—not sophisticated enough—to embrace the broad range of realities, perceptions, and behavior which are—or were—found in India. To these, Simoons's weighing of negative-functioned traits of sacred cattle is not only justified, but welcome. Harris (1965:223–24; 1966:54–56) argues, for example, the advantages of freeing cattle to wander without supervision. Simoons, accepting certain advantages, details certain maladaptive qualities of wandering and describes how these have been translated into serious social and economic problems. My own experiences in the field, among agropastoralists in the Nepal Himalaya, suggest that, in fact, local peoples appreciate fully the counterproductive nature of ranging cattle. To cope with wandering cattle, they have adopted a variety of control mechanisms, both technical and sociopolitical, raising still more questions of dysfunction and maladaptation.

Simoons refers to my work in the Himalaya, including my observation (1976:128–30) that, among non-Hindus, the consumption of yakflesh has declined, even disappeared, in certain regions because of spreading Hindu influence. It may be worthwhile to note that the northward diffusion of Hindu influence in this regard is felt in different ways by different Tibetan and Himalayan groups. Some abstain out of consideration for the convictions of local Hindus who have transferred to yak their beliefs concerning common cattle. Others, the Thakali of the Kali Gandaki, for example, have given up yakflesh in an attempt to elevate their caste status and to facilitate the establishment of social relations with dominant members of Nepal's ruling elite (von Fürer-Haimendorf 1966:144–45). Still others have been so affected by Hinduism that, like some Tamang (Hoffpauir 1978:234) and some Gurung (personal

communication, Don Messerschmidt), they themselves now view yak as sacred and refuse to eat its flesh.

In any case, to me the most fascinating question addressed by Simoons is the one dealing with the influence of religious belief on numbers, distribution, and herd composition of cattle in India. Undoubtedly, empirical evidence supporting or rejecting such determinants will emerge out of a more definitive comparative regional literature embracing studies similar to those considered here by Simoons. Moreover, we need just this kind of evidence to examine thoughtfully some theoretical implications of the ecological perspective.

Such theoretical issues transcend even sacred cattle. The ecological perspective, for example, must embrace dysfunctional and maladaptive culture traits, and it must recognize that a single trait may be *both* positive-functioned and negative-functioned, depending on its temporal or regional setting. An evolutionary element is injected here, one which balances the purely adaptive imagery of functionalist interpretation. In this regard, it is difficult to consider Simoons's review of the sacred-cow controversy—and the theoretical caveats imbedded within it—without recalling and reflecting upon Diener and Robkin's (1978) recent publication on pigs in the Near East. For those of us convinced of the utility of a properly applied ecological perspective, these two articles should serve as blazes to help keep us from losing our way.

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Simoons argues that the sacred-cow concept in India was "imposed from above," whereas Harris (1966, 1977*a*) has suggested that high human population densities resulted in the adoption of a "religious duty to protect cows." The answer to this question, although largely lost in history, is of great interest not only to anthropologists, but also to ecologists.

The ecologist examines the sacred-cow question from the perspective of energetics and agricultural ecology. In early as well as modern agriculture, the timing of planting is critical to most crop production. Each day that planting is delayed when conditions of temperature and rainfall are favorable may shorten the growing season and reduce the capacity of the crop plant to collect solar energy and convert it into food. With corn grown in the United States, for example, each day after May 1 that the growing season is shortened means a 60 kg reduction in yield.

Tilling the soil of one hectare by hand requires about 50 eight-hour days of labor, an input of about 200,000 kcal (Pimentel and Pimentel 1979). Clearly, the timing of planting would be a real problem if the tillage had to be carried out by hand. Using a bullock, this task can be accomplished in only 8 days with an input of nearly 300,000 kcal (including human food energy and feed energy for the bullock). In this way the use of animal power not only reduces manpower requirements, but contributes to higher crop yields. Animals like the bullock play an important role in food production both during field preparation and later in weeding and harvesting. If it was characteristic of past peoples to revere life, then it might not have been a large step in human cultural change for them to come to consider these essential animals not only important, but sacred. Harris has suggested that it was probably a combination of biological reality (food production) and humans' desire not to harm living animals that culminated in the sacred-cow concept.

Changes in culture and technology are slow and gradual. Usually some one individual starts using a technique he or she has devised, and if it is successful it is soon adopted by others. This occurs frequently with many kinds of agricultural tools used by man. In fact, the adoption of either farm tools or technology is gradual, and so-called improved methods spread slowly through the agricultural community until they appear to be the standard practice.

The adoption of a technology by a culture, when viewed in an ecological context, always has benefits and costs, as is indicated by Simoons's assessment of the sacred cow in India. Bullocks provide power and cows provide milk and replacement bullocks. Labor (manpower) is required to manage these animals, however, and they must be fed forage and some concentrate when working hard in the fields. These are significant costs. The costs increase when hungry cattle gain entrance to fields and devour the crops.

Simoons links overgrazing to the sacred-cow concept. Although there may be some association, both serious overgrazing and soil erosion are problems elsewhere in the world where the sacred-cow concept does not exist. Simoons is correct in saying that the sacred cow costs society in land degradation due to overgrazing and in its consumption of some food meant for humans. The benefits of cattle, however, as draught animals and as providers of milk far outweigh their costs. These benefits exist in India today, and, as Harris has suggested, they have existed for centuries.

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Simoons's paper is an outstanding scholarly contribution to the continuing discussions of the sacred cow in India. It adds compelling evidence for the rejection of Harris's position in the sacred-cow debate. Harris must supply direct, convincing and well-documented replies or his theoretical views and empirical claims must be regarded as permanently negated. A polemical response by Harris to the points raised by Simoons would be a clear indication that Harris's position cannot be defended. This article, taken together with the work done by others, is a refutation of nearly every aspect of his efforts. The empirical base on which Harris erected his theoretical structure can now be seen to be significantly less substantial than sand.

Simoons's criticism of Harris comes from outside anthropology, as have others. To construe this as an attack from without upon the legitimacy of the field itself would miss the point entirely. Directly or indirectly, the criticisms are raising questions concerning research methodologies and epistemological framework that must be addressed if the primary items of interest are to be adequately understood or the central scientific requirement of testable hypotheses is to be satisfied. It should be very clear from the discussions of the cow in India that the primary questions will only be answered by means of a very sophisticated ecological analysis and a distinct but related historical/evolutionary analysis which include the fullest possible account of social-field effects. The use of multidiscipline techniques must be accompanied by searching and critical examination of the theory and the practice involved (Lewontin and Levins 1976; Rose and Rose 1976*a*,*b*; Habermas 1974; Lewontin 1974; Gould and Eldredge 1977). This examination must encompass the individual disciplines, as well as their combinations; it must be as comprehensive as possible; and the investigator's own effect on the inquiry must be examined with great care.

The work done here by Simoons and elsewhere by others is a preliminary investigation into the sacred-cattle question. The nature of the way in which Harris has presented and defended his ecological explanation has made it necessary to devote an unfortunate amount of time to analyses of his failure to account for the case. Harris's ecology was naive, misconceived, and too often simply erroneous. Many of the phenomena he sees as "positive-functioned" or "adaptive" are now seen as deviation-amplifying and unidirectional pressure mechanisms of social control and social exploitation contributing to the ecological degradation of the plant, animal, and human com-

munities of the subcontinent. These mechanisms have led to the progressive destruction of India's primary production capacity—to desertification and the loss of agricultural productivity. India is far from homeostatically balanced or positively adapted; contemporary India is the result of centuries of misuse. Harris's fallacious speculations have only obscured and confused the issues and have delayed the definitive investigations into India's ecology and the sacred-cattle question that still remain to be done.

As Simoons observes, much expert opinion asserts that the rapidly spreading Rajasthan Desert is "largely man-made" and traces the forces that produce and maintain the desert to the dust generated in that region by the actions of man and his animals on the plant cover and the soils (Hora 1952; Dryson and Barreis 1967; Bryson 1972, 1974; United Nations 1977; Bryson and Murray 1977). The effects of the crowded animals on the soils of India have often been dramatically described. Simoons rightly notes that the resulting erosion has been characterized as so severe that "it must be seen to be believed." In emphasizing the role of dung as fuel, Harris has simply ignored its value in promoting soil tilth, which is quite apart from its value as fertilizer. The use of dung as fuel and the enormous competition from the "stray" cows for every scrap of ingestible organic material is seen by Harris as evidence for a vast technoenvironmental efficiency but in fact results in the removal of organic matter that would contribute to soil quality. The quality is expressed in the soil's grain structure and its humus content, which together determine the absorption and retention of water. The trampling of animals and the removal of organic material lead to compaction of the soil and drastically increased water runoff and thus to reduced plant productivity and erosion. One consequence of this cycle has been described as "concrete-like grazing grounds" (Whyte 1968:8).

High-intensity grazing is often accompanied by changes in the species mixture that make up the pasture plant community. The plants that tend to dominate the pastures under heavy use are often those that have reduced growth rates, have reduced nutritional levels, are unpalatable to animals, or are directly toxic (Odum 1971; Whyte 1974; Dabadghao and Shankarnarayan 1973; Williamson and Payne 1965). Detailed examination of the situation by experts in the field leads to very different general conclusions from Harris's concerning "positive functioning" and "adaptability" (Dabadghao and Shankarnarayan 1973:1):

> . . . the natural vegetation of the ancient land of India has for millennia been exposed to a steady increase in intensity of unplanned, uncontrolled and therefore destructive use of land; what we are describing here in terms of grass cover is what was, what could be again, but certainly not what is there at the present day. . . . we generally know what should be done to raise a degraded [ecological] community to a higher level and to maintain it there, but, as in so many parts of the tropics and subtropics, we cannot put that knowledge into effect because of human, social and political factors beyond our control.

The crowding of animals into the available space contributes to the development of disease from nutritional deprivation or from specific organisms. Here too there is progressive loss of animal productivity as soils lose their available nutrient content, pasture plant communities change, disease infection pathways become more highly connected, and the overall nutritional and health status of the cattle becomes depressed (Williamson and Payne 1965; Rise et al. 1967; Snapp and Neumann 1960). Harris has argued that maintaining large numbers of cattle is necessary in order to produce an occasional calf. Reproduction variation in cattle is much more dependent on environmental than on genetic factors (Rice et al. 1967: 283). Well-maintained cattle have much higher reproduction rates and may calve yearly; in India calving frequency may fall to a small fraction of this potential. Since reproduction is so sensitive to nutritional levels, the reproductive rate may be substantially increased by decreasing cow numbers (Snapp and Neumann 1960, Rouse 1970). What Harris attempted to explain away as an efficiency resulting from ecological conditions is in fact an inefficiency resulting from social and political conflicts and contradictions. Epidemiological studies reveal that crowded cattle have higher disease rates than animals kept under less dense conditions (Williamson and Payne 1965:27). Crowded cattle may be forced to eat materials contaminated with dung and thus serve as their own disease vectors (p. 31); Johne's disease is a cattle malady transmitted in this way (Snapp and Neumann 1960:621). Calf mortality in the tropics is often as high as 50% as a consequence of the poor feeding conditions and the depressed health states in the cattle populations in general (Williamson and Payne 1965:171). "The ecology of ticks makes cattle very susceptible to them if crowded into natural grazing areas" (p. 42). The high-fiber and low-quality diet of Indian cattle, touted by Harris as ecologically efficient, not only increases disease risks through the interactive effects of protein and micronutrient deficiencies, but also depresses the value of whatever high-quality food these animals might obtain. The feeding of large amounts of fibrous food depresses the digestion of all other food constituents (Williamson and Payne 1965:55; see also Snapp and Neumann 1960:135–42; Rice et al. 1967:66–69). Harris has described Indian cattle as subsisting "principally [upon] rice straw, wheat bran, and rice husks" (1974:24); but "the energy required to consume fibrous foods may involve more expense of nutrients than is derived from its digestion, or its very bulk may make it impossible for the animal to eat enough to meet its nutritional needs" (Williamson and Payne 1965:54–55). Starving cattle, like starving people, are poor evidence for "positive functions."

Simoons discusses the breeding of cattle and the central role in it of selective slaughter. The productivity of the milking cow is much more sensitive to selection pressures applied to its sire than to its dam. As a consequence, the required slaughter for selection can be greatly reduced at the local level and concentrated on farms specialized for the purpose. The contribution to the improvement by selection has been estimated for the dams of future herd replacements at 6%. These are the local cows in the villages. For the dams of future young sires it is 33%, for sires of future herd replacements 18%, and for sires of future young sires 43% (Rice et al. 1967:291). Thus 94% of the opportunity for selective improvement of the local milk cow comes from genetic manipulation that does not need to be carried out locally, and, if necessary, the 6% effect of the local cows can be ignored. Other factors that can contribute to the rapid improvement of productivity are crossbreeding (Trenkle and Willham 1977), the careful use of temperate-zone genetic material (Rice et al. 1967, Singh 1966), and the interactive effects of improved nutrition and health as the local herd size diminishes and local pasture productivity increases. It should be noted that the Santa Gertrudis cattle breed developed on the King Ranch in Texas is widely known for its resistance to heat and disease and is 3/8 zebu and 5/8 shorthorn in its genetic makeup.

It would be quite wrong to infer from these observations that the agricultural problems in India are primarily technical. From comparison of the relative simplicity of technological factors as described above with the extreme convolutions and intractability of the actual problems, some insight can be gained into the complex web of social forces at play. The nature and the magnitude of the forces that have led to and maintain the status of the sacred-cattle complex in India can be fully appreciated only through an understanding of the ecological and social injury they have engendered. Pressed into a corner, the Indian farmer does the best he can under the circumstances

with the resources allowed to him, but, like a man pinned down by a high-pressure stream of water from a fire hose, he can scarcely be described as being "positively adapted" to his environment. Harris has claimed evidence of "positive-functioned and probably adaptive" traits and institutions in the Indian conditions of hunger, crowding, illness, exploitation, and ecological destruction. His naive and uninformed cultural ecology is focused on a world that never was and distracts attention from the world that actually was, is, and could be.

Harris (1964:vii) asserts that the cultural materialist "lacks only time, money and staff to prove this theory; given sufficient resources we could develop intersubjectively valid and culture-free descriptions of cultural things." This goal is chimerical and dangerous; knowledge that attempts to be "culture-free" would be, by its nature, inhuman and antiscientific. It would make claims of absolute certainty that have long been rejected by the physical scientists Harris seeks to emulate. "Science has progressed step by step . . . because it has understood that the exchange of information between man and nature, and man and man, can only take place with a certain tolerance" (Bronowski 1973:365). "There is much in the social habits of a people which is dispersed and distorted by the mere act of making inquiries about it" (Wiener 1948:164). In a very real sense, whatever understanding we can achieve is the result of an intense struggle with ourselves (Lewontin and Levins 1976; Gould 1978; Diener and Robkin 1978). It was observed long ago that there are no royal roads to geometry; nor are there any transcendent etic roads, paved with money or not, to an understanding of human problems.

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As a medical and agricultural biologist with 15 years' off-and-on experience of India, I cannot help but view this extended controversy about the holy cow (or is it about Marvin Harris?) somewhat differently than any of the social scientists so far involved. The request for my comments apparently stems from an opinion recently committed to print (Schwabe 1978*a*), but stated orally for a decade, that Marvin Harris performed a very valuable service in his 1966 article (and indirectly by the pro and con rejoinders it has stimulated). The chief value of Harris's papers, to me, is that he has exposed to view, and obviously to discussion, the very important point that, in Simoons's words, "one cannot merely look on cattle [in India] in Western terms, mainly as sources of meat and milk. In India they are important, even irreplaceable, in providing traction and fuel." In my opinion this exposure has been a good thing, and we surely need some people like Harris, who are not so afraid of erring on some points that they never dare cast a new perspective on important and timely questions. Reasonable scholars are always willing to stand corrected and suffer little in the process if their efforts are honest ones. While Simoons adds that "these are facts [about traction and fuel] long known to researchers in India," he acknowledges Harris's "service in calling them to the attention of Americans unfamiliar with the Indian scene." In this qualifier I think Simoons allows his reactions to Harris's ideological preconceptions and factual omissions to cause him to understate a real problem. Among these Americans (and Europeans) now "unfamiliar with the Indian scene" are persons influential in the formulation of agricultural, food, economic, and other policies that bear, at least indirectly, upon India's and the world's future. Some of these persons *do* see India's possession of one-fifth of the world's cattle and its widespread beef aversion entirely through "Western-colored glasses" as an unmitigated disaster and India as a hopeless case insofar as "development" is concerned. Furthermore, "experience of India" is no guarantor of a more balanced view; for some, it only confirms their preconceptions.

I see few really substantive differences in the *factual* contents of the several articles that have appeared. Mostly they support opinions with opinions, as Simoons has so clearly perceived. New to me as a natural scientist (except from readings of our 19th-century literature) are this working so hard through the literature to extract a few facts and the unnecessarily polemical pedantry of much of the discussion.

The main omissions up to now in this discussion of causes, rather than of causes in relation to remedies, are (1) acknowledgment of the dearth of real data on the present situation vis-à-vis cattle ownership and cattle utility in India and in comparison with the situation in the many non-Hindu countries in which cattle or other animals are the main sources of rural draft power and sometimes of fuel, and (2) recognition that cattle—like horses—have historically been too valuable for other purposes to be raised *primarily* for meat (and, similarly, that cow protection is surely not a uniquely Indian idea [von Lengerken and von Lengerken 1955]). Even in Europe's future, "beef production will continue to be a by-product of the dairy industry" (Trenkle and Willham 1977), while, as recently as the 18th and 19th centuries, when Europe was as dependent upon cattle for rural power as many Third World countries are today, King Frederick William of Prussia could rightly regard rinderpest's (cattle plague's) invasion of Europe from Russia as threatening "the ruin of the land" (Schwabe 1978*b*).

Not unexpectedly, therefore, I find that Simoons (with whose other work I am very familiar) has put together the most detailed, balanced, and perceptive account of the Indian cattle situation and its origins so far. While his reaction to Harris seems to me unnecessarily personal and a few of his points "picky," Simoons's broad field experience and careful approach to problems generally give force to his main points: (1) that "there are no reliable estimates of the numbers of wild and stray cattle in India," (2) that there has been only one survey "of the relative numbers of common cattle and water buffalo kept by Moslem and Hindu householders living at comparable socioeconomic levels" under conditions in which variables relating to draft uses and bullock trade are reasonably controlled, and (3) that there have been only "two local studies done in agricultural settings" in India on the inputs and outputs of cattle raising, i.e., cattle's overall utility.

Simoons rightly concludes, as Harris also holds, that "analysis of the available data suggests that the numbers, distribution, and composition of India's cattle population are mainly determined not by religion but by geographic and economic factors." In other words, religion is a significant complicating factor in India, maybe a crucial one, but in many respects not widely appreciated India's dependence on, and relations to, cattle do not differ markedly from those of a number of other countries. The reasons I think these points need repeated emphasis, despite Harris's apparent feeling that to make them he must deny the additional and peculiarly Indian religious influences that do go beyond rational and ecological causes, is that to regard Indian cattle usage as entirely or *largely* irrational gives important fuel to ill-advised and dangerously uninformed efforts now under way to downgrade animal agriculture not only in India but globally (e.g., Dumont [1975]: "By consuming meat, which wastes the grain that could have saved them, last year we ate the children of the Sahel, Ethiopia and Bangladesh"; in rebuttal, see the introduction to Schwabe [1979]).

Using this question of cattle use in India and elsewhere as a focus for some of my overall concerns in the food and health planning areas, I have recently urged (Schwabe 1978*a*) the need for the same degree of multidisciplinary cooperation in research on problems like this—involving not only social and natural scientists but humanists also—as we natural scientists have only comparatively recently begun to realize among ourselves.

In reference to similarly complicated and important cattle questions in Africa, I have reached the sad conclusion (1978*a*: 262) that "a perusal of the social science literature forces upon one the conclusion that social scientists' past work in Africa rarely considered . . . [significant questions] in need of answers and that they would have benefited at least as much from natural scientists' guidance as vice versa," just as "with few exceptions, [the humanist] has failed to help scientists to understand the historical background to or likely consequences of their intended actions."

The widely held view among American agriculturalists and policy makers that "over the past 200 years the U.S. has had the best, the most logical and the most successful program of agricultural development anywhere in the world" and that "other countries would do well to copy it" (Heady 1976:107) is encouraging, as part of total "Green Revolution" packages in India as elsewhere, the replacement of bullock and other animal power by fossil-fuel-consuming tractors. Fossil fuels are not available to replace the 54% of energy needs in Indian agriculture now being provided by cattle (Revelle 1976) or even the 453,000 kg of coal that Odend'hal (1972) found would be required in his West Bengal study area to substitute for locally produced dung as cooking fuel. Most Green Revolution–type advantages would be realizable using animal and human power, with ever scarcer fossil-fuel reserves being concentrated in governments' provision of a "wave" of supplemental tractor power and tractor drivers for use only during the one time of critical need, the planting season (as it progresses through the country).

Important technical questions like this one are relevant to cattle utility in India. Related questions as clearly in need of careful investigation are the positive or compensatory moral and humane aspects of current Indian religious beliefs regarding cattle, aspects related perhaps to Nair's (1961:191–92) suggestion that, in India,

> planners and economists tend to overlook . . . lack of consensus on economic values. It is assumed . . . that given equal opportunity, financial incentive and resources, all communities will respond . . . similarly in their productive efforts. . . . From what I've seen . . . it would seem that a great majority of the rural communities do not share in this concept of an ever-rising standard of living.

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On my first reading of Simoons's paper, I was not particularly attentive to the dates in his citations and wondered why, in light of the range and number of authorities referred to, it should have been necessary for him to write at all. Although I found his arguments persuasive, I thought, in much of his rebuttal of Harris, that he was beating a dead horse. While, when they were first advanced, Harris's views on the role of cattle in India (1965, 1966) undoubtedly provided a useful corrective to the prevailing stereotype, and while the seeming plausibility of his original case provided a useful stimulus to further research, it was my impression that subsequent writings had exposed essential flaws in his thesis and that few, if any, serious students of India still took it seriously. Closer study of Simoons's text, however, made clear why Simoons felt moved to write as he did. Harris's horse *ought* to be dead, but he refuses to let it die. To him that horse has become a sacred cow.

That Harris could continue to write as he did in 1974 and 1977, after having been exposed to such trenchant and generally valid critiques as those of Bennett (1967), Dandekar (1969*b*), and Heston (1971), reveals a remarkable unwillingness to learn from others more knowledgeable than himself. So *engagé* is he that he ignores the writings of some of the best-informed authorities on India, most notably Brown (1957, 1964), to whose views on the sanctity of the cow in Hinduism Heston made pointed reference (1971:191). His "cavalier dismissal of experts," noted by Simoons, quoting Bennett (1971), might have been excusable in an early speculative article but is hardly so after more than a decade of debate. If anything, Harris's arguments get worse with the passage of time. At first, they were merely *a*historical, but in *Cannibals and Kings* (1977*a*) they have become a travesty of history. There his chapter on "The Origin of the Sacred Cow" fairly bristles with inaccuracies and misconceptions about India's past.

On the whole Simoons gives Harris his due, acknowledging valid points where they are made, yet concluding, correctly, on the key issue of the "symbiotic relationship between men and cattle," that Harris has "overstated his case and failed to appreciate the competitive aspects of this relationship." I concur fully with Simoons's view "that the proper framework in which to place the sacred-cow controversy is one which permits traits to be positive-functioned, negative-functioned, or both." Further, one may demonstrate that in a given area a trait may be positive-functioned at one time and negative-functioned at another, or positive for one segment of the population and negative for another. What we now need to do is not merely continue to argue that India has a surplus of cattle, but conduct systematic investigations of the extent and location of the surplus and of ways of achieving a better distribution. Simoons properly calls for "more careful and more sophisticated economic and geographic study, involving comparison of districts as well as a much broader sample of Indian villages." Specifically, I would suggest detailed mapping and analysis of (*a*) the ratios of cattle and total bovine populations (expressed as standardized "animal units") to rural population and to gross sown acreage (here Sopher [1975] has made a useful beginning); (*b*) the ratios of draught and milch cattle to draught and milch buffaloes respectively; and (*c*) the rates of increase in numbers of specific types of bovines. The relationship of *a* and *b* to specific patterns of cropping and water availability and of *c* to the rates of increase in the rural population likewise demands attention.

Generally, Simoons's appraisal of his data is judicious, but an occasional slip may be noted. It is fallacious to equate absolute population density with population pressure as he appears to do with respect to Kerala and West Bengal. One should not take at face value the apparent decline in the number of "breeding bulls" from 5,100,000 in 1919–20 to only 400,000 in 1966; there is probably a definitional question involved here. Nor should one seriously credit the figures presented on the number of "wild cattle" in Uttar Pradesh or Punjab, especially in a source emanating from Himachal Pradesh. Indian statistics must be treated with considerable circumspection, and therein lies much of the difficulty in the sacred-cow controversy. India is so vast and variegated and has given rise to such a mass of diverse and noncomparable "official" data, not to mention impressionistic reporting, that persons with axes to grind can glean from the plethora of findings and observations considerable support for virtually any position they wish to advocate.

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Simoons has presented a lively discussion on the sacred-cow controversy. He is rightly critical of Harris's view of the Hindu ban on cow slaughter and beef eating as a positive reflection of technoenvironmental pressures and his failure to stress sufficiently the negative impact of the sacred-cow concept. How far Simoons has succeeded in throwing light on the origin of the sacred-cow concept and on whether it contributes

to waste and destructiveness in present-day India remains to be seen, however, in view of the following limitations:

1. After reviewing the data on the origin of the sacred-cow concept, Simoons states that "to weigh the merits of the two alternatives would require much additional collecting, sifting, and weighing of data."

2. The question of how much beef is going waste in India because of the sacred-cow concept is difficult to answer because there are no hard data on this aspect.

In the contemporary context, Simoons should have also considered (*a*) the contribution of the sacred-cow concept to ethnic-boundary maintenance by Hindus through the ban on cow slaughter; (*b*) changing values among Hindus towards the sacred cow in the present context of modernization and technological change; and (*c*) the extent to which it is justifiable to treat the issue of the sacred cow in India from a Western viewpoint, in terms of meat and milk. The observations of Schwabe (1978*a*) are relevant here.

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Simoons responds to Harris's evaluative statements with well-documented descriptive evidence that shows Harris's position to be extremely farfetched. In such a debate, absolute refutation may remain impossible, because the ultimate value premises of an argument like Harris's are not fully clarified. "Ecological harmony," given the complexity of the relationships invoked, tells more perhaps about the presuppositions and preferences of its observer than about empirical reality. Simoons appeals, however, to enough reliable authority to make the Harris argument scarcely tenable.

The image of symbiosis and cooperation among livestock and human beings would do very nicely for many pastoral societies, even perhaps for ranching sectors of Western societies, but despite the many pastoral overtones of Hindu society and the likely role of early pastoral invaders in shaping it, the modern agricultural context dictates different roles for cattle. The crux of the issue is the presence and costly maintenance of so many useless animals—the old, infirm, and unclaimed—which would probably not survive at all in most nomadic pastoral societies. It is curious that Harris would regard these cattle, which carry no discernible function in human livelihood but still impose costs, as "symbiotic." It also strikes me that Simoons could have indicted them as worse than merely "surplus."

On the other hand, if he chose to elevate the functionality of Hindu piety to absolute status, of course Harris could confute Simoons by claiming untestable ecological benefits deriving from group solidarity, respect for sound tradition, and the like. Ritual prescriptions are acknowledged on occasion as beneficial in practice in this way, but a functionalist ecological rationalization of the status quo in this case, as Simoons demonstrates, rests on dubious evidence and unclear premises.

Reply

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Among the various comments made in response to my article on the sacred cow, one of many that struck me was Mishra's observation that it is unlikely "that the sacred-cow controversy can ever be resolved in a scientific spirit." It would be understandable if Mishra were directing attention to the special difficulties in resolving the controversy within India, where Hindu religious commitment to the cow is powerful and emotional. The reader should be aware, however, that in fact Mishra is referring to the controversy initiated by Marvin Harris "a decade and a half ago" in this journal and that this controversy has mostly involved Western scholars. Why should a problem as interesting, many-faceted, and culturally, economically, and ecologically significant as that of the sacred cow remain as clouded as it now is? Many view the writings of a single investigator, Marvin Harris, as primarily responsible, as the major barrier to a dispassionate exchange of ideas on the sacred cow. This derives from the high ideological content of those writings, the result of which is that a complex sociocultural phenomenon is explained simply, in terms of an extreme form of technoenvironmental determinism. Scholars are aware of the ideological background of Harris's research on the sacred cow, and many remain skeptical of its conclusions or dismiss them. At the same time, his ideas have become quite popular with the general public through his books, articles, and talks. Some scholars believe that this popularity derives from the fact that his explanation of the sacred cow of India fits preconceptions harbored by many Americans. In any case, in this technoenvironmental perspective a phenomenon of rich diversity and associations is reduced to stark materialistic terms.

I have written this article not only to direct attention to the flaws in Harris's arguments and inadequacies in his marshalling of evidence, but in the hope that a less iconoclastic approach may be made to the sacred-cow problem. It is especially pleasing to me that most CA commentators, coming from a variety of academic backgrounds, agree that Harris is wrong and that a new beginning must be made.

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