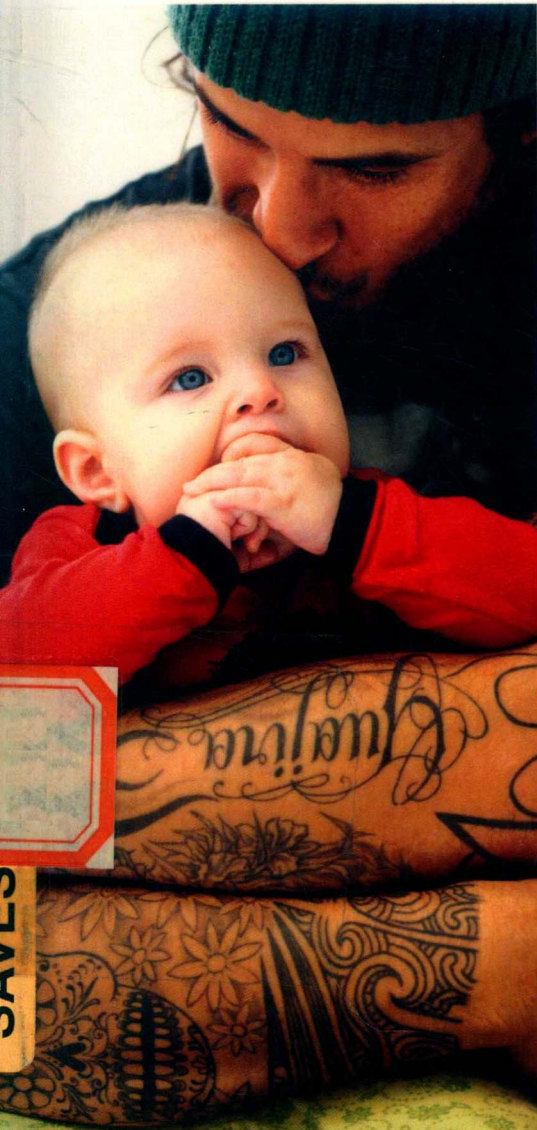


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# The Cultural Ecology of India's Sacred Cattle

*Marvin Harris*

*The relationship between human and bovine population in India has hitherto been widely regarded as an important example of resource mismanagement under the influence of religious doctrine. It is suggested that insufficient attention has been paid to such positive-functioned features of the Hindu cattle complex as traction power and milk, dung, beef and hide production in relationship to the costs of ecologically viable alternatives. In general, the exploitation of cattle resources proceeds in such a way as not to impair the survival and economic well-being of the human population. The relationship between the human and bovine population is symbiotic rather than competitive; more traction animals than are presently available are needed for carrying out essential agricultural tasks. Under existing techno-environmental conditions, a relatively high ratio of cattle to humans is ecologically unavoidable. This does not mean, that with altered techno-environmental conditions, new and more efficient food energy systems cannot be evolved.*

IN THIS paper I attempt to indicate certain puzzling inconsistencies in prevailing interpretations of the ecological role of bovine cattle in India. My argument is based upon intensive reading—I have never seen a sacred cow, nor been to India. As a non-specialist, no doubt I have committed blunders an Indianist would have avoided. I hope these errors will not deprive me of that expert advice and informed criticism which alone can justify so rude an invasion of unfamiliar territory.

I have written this paper because I believe the irrational, non-economic, and exotic aspects of the Indian cattle complex are greatly overemphasized at the expense of rational, economic, and mundane interpretations.

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My intent is not to substitute one dogma for another, but to urge that explanation of taboos, customs, and rituals associated with management of Indian cattle be sought in "positive-functioned" and probably "adaptive" processes of the ecological system of which they are a part,<sup>1</sup> rather than in the influence of Hindu theology.

Mismanagement of India's agricultural resources as a result of the Hindu doctrine of *ahimsa*,<sup>2</sup> especially as it applies to beef cattle, is frequently noted by Indianists and others concerned with the relation between values and behavior. Although different antirational, dysfunctional, and inutile aspects of the cattle complex are stressed by different authors, many agree that *ahimsa* is a prime example of how men will diminish their material welfare to obtain spiritual satisfaction in obedience to nonrational or frankly irrational beliefs.

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." The Hindu beef-eating taboo is one of Simoons' most important cases. Venkatraman (1938:706) claims, "India is unique in possessing an enormous amount of cattle without making profit from its slaughter." The Ford Foundation (1959:64) reports "widespread recognition not only among animal husbandry officials, but among citizens generally, that India's cattle population is far in excess of the available supplies of fodder and feed . . . At least 1/3, and possibly as many as 1/2, of the Indian cattle population may be regarded as surplus in relation to feed supply." Matson (1933:227) writes it is a commonplace of the "cattle question that vast numbers of Indian cattle are so helplessly inefficient as to have no commercial value beyond that of their hides." Srinivas (1952:222) believes "Orthodox Hindu opinion regards the killing of cattle with abhorrence, even though the refusal to kill the vast number of useless cattle which exist in India today is detrimental to the nation."

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<sup>1</sup>The author (1960) suggested that the term "adaptive" be restricted to traits, biological or cultural, established and diffused in conformity with the principle of natural selection. Clearly, not all "positive-functioned," i.e., useful, cultural traits are so established.

<sup>2</sup>*Ahimsa* is the Hindu principle of unity of life, of which sacredness of cattle is principal sub-case and symbol.

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According to the Indian Ministry of Information (1957:243), "The large animal population is more a liability than an asset in view of our land resources." Chatterjee (1960) calculates that Indian production of cow and buffalo milk involves a "heavy recurring loss of Rs 774 crores. This is equivalent to 6.7 times the amount we are annually spending on importing food grains." Knight (1954:141) observes that because the Hindu religion teaches great reverence for the cow, "there existed a large number of cattle whose utility to the community did not justify economically the fodder which they consumed." Das and Chatterji (1962:120) concur: "A large number of cattle in India are old and decrepit and constitute a great burden on an already impoverished land. This is due to the prejudice among the Hindus against cow killing." Mishra (1962) approvingly quotes Lewis (1955:106): "It is not true that if economic and religious doctrines conflict the economic interest will always win. The Hindu cow has remained sacred for centuries, although this is plainly contrary to economic interest." Darling (1934:158) asserts, "By its attitude to slaughter Hinduism makes any planned improvement of cattle-breeding almost impossible." According to Desai (1959:36), "The cattle population is far in excess of the available fodder and feeds."

In the *Report of the Expert Committee on the Prevention of Slaughter of Cattle in India* (Nandra, et al. 1955:62), the Cattle Preservation and Development Committee estimated "20 million uneconomic cattle in India." Speaking specifically of Madras, Randhawa (1961:118) insists, "Far too many useless animals which breed indiscriminately are kept and many of them are allowed to lead a miserable existence for the sake of the dung they produce. Sterility and prolonged dry periods among cows due to neglect add to the number of superfluous cattle . . ." Mamoria (1953:268-69) quotes with approval the report of the Royal Commission on Agriculture: ". . . religious susceptibilities lie in the way of slaughter of decrepit and useless cattle and hence the cattle, however weak and poor are allowed to live . . . bulls wander about the fields consuming or damaging three times as much fodder as they need . . . Unless the Hindu sentiment is abjured altogether the Indian cultivators cannot take a practical view of animal keeping and will continue to preserve animals many of which are quite useless from birth to death." Despite his own implicit arguments to the contrary, Mohan (1962:54) concludes,

"We have a large number of surplus animals." The National Council of Applied Economic Research (1963:51) notes in Rajasthan: "The scarcity of fodder is aggravated by a large population of old and useless cattle which share scant feed resources with working and useful cattle."

The Food and Agriculture Organization (1953:109) reports, "In India, as is well-known, cattle numbers exceed economic requirements by any standard and a reduction in the number of uneconomic animals would contribute greatly to the possibilities of improving the quality and condition of those that remain." Kardel (1956:19) reported to the International Cooperation Administration, "Actually, India's 180 million cattle and 87 million sheep and goats are competing with 360 million people for a scant existence." According to Mosher (1946:124), "There are thousands of barren heifers in the Central Doab consuming as much feed as productive cows, whose only economic produce will be their hides, after they have died of a natural cause." Mayadas (1954:28) insists "Large herds of emaciated and completely useless cattle stray about trying to eke out an existence on wholly inadequate grazing." Finally, to complete the picture of how, in India, spirit triumphs over flesh, there is the assertion by Williamson and Payne (1959:137): "The . . . Hindu would rather starve to death than eat his cow."

In spite of the sometimes final and unqualified fashion in which "surplus," "useless," "uneconomic," and "superfluous" are applied to part or all of India's cattle, contrary conclusions seem admissible when the cattle complex is viewed as part of an *eco-system* rather than as a sector of a national price market. Ecologically, it is doubtful that any component of the cattle complex is "useless," i.e., the number, type, and condition of Indian bovines do not per se impair the ability of the human population to survive and reproduce. Much more likely the relationship between bovines and humans is symbiotic<sup>3</sup> instead of competitive. It probably represents the outcome of intense Darwinian pressures acting upon human and bovine population, cultigens, wild flora and fauna, and social structure and ideology. Moreover presumably the degree of observance of taboos against bovine slaughter

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<sup>3</sup>According to Zeuner (1954:328), "Symbiosis includes all conditions of the living-together of two different species, provided both derive advantages therefrom. Cases in which both partners benefit equally are rare." In the symbiosis under consideration, men benefit more than cattle.



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and beef-eating reflect the power of these ecological pressures rather than *ahimsa*; in other words, *ahimsa* itself derives power and sustenance from the material rewards it confers upon both men and animals. To support these hypotheses, the major aspects of the Indian cattle complex will be reviewed under the following heading: (1) Milk Production, (2) Traction, (3) Dung, (4) Beef and Hides, (5) Pasture, (6) Useful and Useless Animals, (7) Slaughter, (8) Anti-Slaughter Legislation, (9) Old-Age Homes, and (10) Natural Selection.

### MILK PRODUCTION

IN INDIA the average yield of whole milk per Zebu cow is 413 pounds, compared with the 5,000-pound average in Europe and the U.S.<sup>4</sup> (Kartha 1936:607; Spate 1954:231). In Madhya Pradesh yield is as low as 65 pounds, while in no state does it rise higher than the barely respectable 1,445 pounds of the Punjab (Chatterjee 1960:1347). According to the 9th Quinquennial Livestock Census (1961) among the 47,200,000 cows over 3 years old, 27,200,000 were dry and/or not calved (Chaudri and Giri 1963:598).

These figures, however should not be used to prove that the cows are useless or uneconomic, since milk production is a minor aspect of the sacred cow's contribution to the *eco-system*. Indeed, most Indianists agree that it is the buffalo, not the Zebu, whose economic worth must be judged primarily by milk production. Thus, Kartha (1959:225) writes, "the buffalo, and not the Zebu, is the dairy cow." This distinction is elaborated by Mamoria (1953:255):

Cows in the rural areas are maintained for producing bullocks rather than for milk. She-buffaloes, on the other hand, are considered to be better dairy animals than cows. The male buffaloes are neglected and many of them die or are sold for slaughter before they attain maturity.

Mohan (1962:47) makes the same point:

For agricultural purposes bullocks are generally preferred, and, therefore, cows in rural areas are primarily maintained for the production of male progeny and incidentally only for milk.

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<sup>4</sup>The U.S. Census of Agriculture (1954) showed milk production averaging from a low of 3,929 pounds per cow in the Nashville Basin sub-region to 11,112 pounds per cow in the Southern California sub-region.

It is not relevant to my thesis to establish whether milk production is a primary or secondary objective or purpose of the Indian farmer. Failure to separate emics from etics (Harris 1964) contributes greatly to confusion surrounding the Indian cattle question. The significance of the preceding quotations lies in the agreement that cows contribute to human material welfare in more important ways than milk production. In this new context, the fact that U.S. cows produce 20 times more milk than Indian cows loses much of its significance. Instead, it is more relevant to note that, despite the marginal status of milking in the symbiotic syndrome, 46.7% of India's dairy products come from cow's milk (Chatterjee 1960:1347). How far this production is balanced by expenditures detrimental to human welfare will be discussed later.

#### TRACTION

THE PRINCIPAL positive ecological effect of India's bovine cattle is in their contribution to production of grain crops, from which about 80% of the human calorie ration comes. Some form of animal traction is required to initiate the agricultural cycle, dependent upon plowing in both rainfall and irrigation areas. Additional traction for hauling, transport, and irrigation is provided by animals, but by far their most critical kinetic contribution is plowing.

Although many authorities believe there is an overall surplus of cattle in India, others point to a serious shortage of draught animals. According to Kothavala (1934:122), "Even with . . . overstocking, the draught power available for land operations at the busiest season of the year is inadequate . . ." For West Bengal, the National Council of Applied Economic Research (1962:56) reports:

However, despite the large number of draught animals, agriculture in the State suffers from a shortage of draught power. There are large numbers of small landholders entirely dependent on hired animal labour.

Spaté (1954:36) makes the same point, "There are too many cattle in the gross, but most individual farmers have too few to carry on with." Gupta (1959:42) and Lewis and Barnouw (1958:102) say a pair of bullocks is the minimum technical unit for cultivation, but in a survey by Diskalkar (1960:87), 18% of the cultivators had only 1 bullock

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or none. Nationally, if we accept a low estimate of 60,000,000 rural households (Mitra 1963:298) and a high estimate of 80,000,000 working cattle and buffaloes (Government of India 1962:76), we see at once that the allegedly excess number of cattle in India is insufficient to permit a large portion, perhaps as many as 1/3, of India's farmers to begin the agricultural cycle under conditions appropriate to their techno-environmental system.

Much has been made of India's having 115 head of cattle per square mile, compared with 28 per square mile for the U.S. and 3 per square mile for Canada. But what actually may be most characteristic of the size of India's herd is the low ratio of cattle to people. Thus, India has 44 cattle per 100 persons, while in the U.S. the ratio is 58 per 100 and in Canada, 90 (Mamoria 1953:256). Yet, in India cattle are employed as a basic instrument of agricultural production.

Sharing of draught animals on a cooperative basis might reduce the need for additional animals. Chaudhri and Giri point out that the "big farmer manages to cultivate with a pair of bullock a much larger area than the small cultivators" (1963:596). But, the failure to develop cooperative forms of plowing can scarcely be traced to *ahimsa*. If anything, emphasis upon independent, family-sized farm units follows intensification of individual land tenure patterns and other property innovations deliberately encouraged by the British (Bhatia 1963:18 on). Under existing property arrangements, there is a perfectly good economic explanation of why bullocks are not shared among adjacent households. Plowing cannot take place at any time of the year, but must be accomplished within a few daylight hours in conformity with seasonal conditions. These are set largely by summer monsoons, responsible for about 90% of the total rainfall (Bhatia 1963:4). Writing about Orissa, Bailey (1957:74) notes:

As a temporary measure, an ox might be borrowed from a relative, or a yoke of cattle and a ploughman might be hired . . . but during the planting season, when the need is the greatest, most people are too busy to hire out or lend cattle.

According to Desai (1948:86):

. . . over vast areas, sowing and harvesting operations, by the very nature of things, begin simultaneously with the outbreak of the first showers and the maturing of crops respectively, and especially the former has got to be

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put through quickly during the first phase of the monsoon. Under these circumstances, reliance by a farmer on another for bullocks is highly risky and he has got, therefore, to maintain his own pair.

Dube (1955:84) is equally specific:

The cultivators who depend on hired cattle or who practice cooperative lending and borrowing of cattle cannot take the best advantage of the first rains, and this enforced wait results in untimely sowing and poor crops.

Wiser and Wiser (1963:62) describe the plight of the bullock-short farmer as follows, "When he needs the help of bullocks most, his neighbors are all using theirs." And Shastri (1960:1592) points out, "Uncertainty of Indian farming due to dependence on rains is the main factor creating obstacles in the way of improvements in bullock labor."

It would seem, therefore, that this aspect of the cattle complex is not an expression of spirit and ritual, but of rain and energy.

DUNG

IN INDIA cattle dung is the main source of domestic cooking fuel. Since grain crops cannot be digested unless boiled or baked, cooking is indispensable. Considerable disagreement exists about the total amount of cattle excrement and its uses, but even the lowest estimates are impressive. An early estimate by Lupton (1922:60) gave the BTU equivalent of dung consumed in domestic cooking as 35,000,000 tons of coal or 68,000,000 tons of wood. Most detailed appraisal is by National Council of Applied Economic Research (1959:3), which rejects H. J. Bhabha's estimate of 131,000,000 tons of coal and the Ministry of Food and Agriculture's 112,000,000 tons. The figure preferred by the NCAER is 35,000,000 tons anthracite or 40,000,000 tons bituminous, but with a possible range of between 35-45,000,000 of anthracite dung-coal equivalent. This calculation depends upon indications that only 36% of the total wet dung is utilized as fuel (p. 14), a lower estimate than any reviewed by Saha (1956:923). These vary from 40% (Imperial Council on Agricultural Research) to 50% (Ministry of Food and Agriculture) to 66.6% (Department of Education, Health and Lands). The NCAER estimate of a dung-coal equivalent

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of 35,000,000 tons is therefore quite conservative; it is nonetheless an impressive amount of BTU's to be plugged into an energy system.

Kapp (1963:144 on), who discusses at length the importance of substituting tractors for bullocks, does not give adequate attention to finding cooking fuel after the bullocks are replaced. The NCAER (1959:20) conclusion that dung is cheaper than coke seems an understatement. Although it is claimed that wood resources are potentially adequate to replace dung the measures advocated do not involve *ahimsa* but are again an indictment of a land tenure system not inspired by Hindu tradition (NCAER 1959:20 on; Bansil 1958:97 on). Finally, it should be noted that many observers stress the slow burning qualities of dung and its special appropriateness for preparation of *ghi* and deployment of woman-power in the household (Lewis and Barnouw 1958:40; Mosher 1946:153).

As manure, dung enters the energy system in another vital fashion. According to Mujumdar (1960:743), 300,000,000 tons are used as fuel, 340,000,000 tons as manure, and 160,000,000 tons "wasted on hillsides and roads." Spate (1954:238) believes that 40% of dung production is spread on fields, 40% burned, and 20% "lost." Possibly estimates of the amount of dung lost are grossly inflated in view of the importance of "roads and hillsides" in the grazing pattern (see Pasture). (Similarly artificial and culture- or even class-bound judgments refer to utilization of India's night soil. It is usually assumed that Chinese and Indian treatment of this resource are radically different, and that vast quantities of nitrogen go unused in agriculture because of Hindu-inspired definitions of modesty and cleanliness. However, most human excrement from Indian villages is deposited in surrounding fields; the absence of latrines helps explain why such fields raise 2 and 3 successive crops each year (Mosher 1946:154, 33; Bansil 1958:104.) More than usual caution, therefore, is needed before concluding that a significant amount of cattle dung is wasted. Given the conscious premium set on dung for fuel and fertilizer, thoughtful control maintained over grazing patterns (see Pasture), and occurrence of specialized sweeper and gleaner castes, much more detailed evidence of wastage is needed than is now available. Since cattle graze on "hillsides and roads," dung dropped there would scarcely be totally lost to the *eco-system*, even with allowance for loss of nitrogen by

exposure to air and sunlight. Also, if any animal dung is wasted on roads and hillsides it is not because of *ahimsa* but of inadequate pasturage suitable for collecting and processing animal droppings. The sedentary, intensive rainfall agriculture of most of the subcontinent is heavily dependent upon manuring. So vital is this that Spate (1954:239) says substitutes for manure consumed as fuel "must be supplied, and lavishly, even at a financial loss to government." If this is the case, then old, decrepit, and dry animals might have a use after all, especially when, as we shall see, the dung they manufacture employs raw materials lost to the culture-energy system unless processed by cattle, and especially when many apparently moribund animals revive at the next monsoon and provide their owners with a male calf.

#### BEEF AND HIDES

POSITIVE CONTRIBUTIONS of India's sacred cattle do not cease with milk-grazing, bullock-producing, traction, and dung-dropping. There remains the direct protein contribution of 25,000,000 cattle and buffalo which die each year (Mohan 1962:54). This feature of the *eco-system* is reminiscent of the East African cattle area where, despite the normal taboo on slaughter, natural deaths and ceremonial occasions are probably frequent enough to maintain beef consumption near the ecological limit with dairying as the primary function (Schneider 1957:278 on). Although most Hindus probably do not consume beef, the *eco-system* under consideration is not confined to Hindus. The human population includes some 55,000,000 "scheduled" exterior or untouchable groups (Hutton 1961:VII), many of whom will consume beef if given the opportunity (Dube 1955:68-69), plus several million more Moslems and Christians. Much of the flesh on the 25,000,000 dead cattle and buffalo probably gets consumed by human beings whether or not the cattle die naturally. Indeed, could it be that without the orthodox Hindu beef-eating taboo, many marginal and depressed castes would be deprived of an occasional, but nutritionally critical, source of animal protein?

It remains to note that the slaughter taboo does not prevent depressed castes from utilizing skin, horns and hoofs of dead beasts. In 1956 16,000,000 cattle hides were produced (Randhawa 1962:322).

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The quality of India's huge leather industry—the world's largest—leaves much to be desired, but the problem is primarily outmoded tanning techniques and lack of capital, not *abimsa*.

PASTURE

THE PRINCIPAL positive-functioned or useful contributions of India's sacred cattle to human survival and well-being have been described. Final evaluation of their utility must involve assessment of energy costs in terms of resources and human labor input which might be more efficiently expended in other activities.

Direct and indirect evidence suggests that in India men and bovine cattle do not compete for existence. According to Mohan (1962:43 on):

... the bulk of the food on which the animals subsist . . . is not the food that is required for human consumption, i.e., fibrous fodders produced as incidental to crop production, and a large part of the crop residues or byproducts of seeds and waste grazing.

On the contrary, "the bulk of foods (straws and crop residues) that are ploughed into the soil in other countries are converted into milk" (p. 45).

The majority of the Indian cattle obtain their requirements from whatever grazing is available from straw and stalk and other residues from human food-stuffs, and are starved seasonally in the dry months when grasses wither.

In Bengal the banks and slopes of the embankments of public roads are the only grazing grounds and the cattle subsist mainly on paddy straw, paddy husks and . . . coarse grass . . . (Mamoria 1953:263-64).

According to Dube (1955:84, ". . . the cattle roam about the shrubs and rocks and eat whatever fodder is available there." This is confirmed by Moomaw (1949:96): "Cows subsist on the pasture and any coarse fodder they can find. Grain is fed for only a day or two following parturition." The character of the environmental niche reserved for cattle nourishment is described by Gourou (1963:123), based on data furnished by Dupuis (1960) for Madras:

If faut voir clairement que le faible rendement du bétail indien n'est pas un gaspillage: ce bétail n'entre pas en concurrence avec la consommation

de produits agricoles . . . ils ne leur sacrifient pas des surfaces agricoles, ou ayant un potential agricole.

NCAER (1961: 57) confines this pattern for Tripura: "There is a general practice of feeding livestock on agricultural by-products such as straw, grain wastes and husks"; for West Bengal (NCAER 1962: 59): "The state has practically no pasture or grazing fields, and the farmers are not in the habit of growing green fodders . . . livestock feeds are mostly agricultural by-products"; and for Andhra Pradesh (NCAER 1962:52): "Cattle are stall-fed, but the bulk of the feed consists of paddy straw. . . ."

The only exceptions to the rural pattern of feeding cattle on waste products and grazing them on marginal or unproductive lands involve working bullocks and nursing cows:

The working bullocks, on whose efficiency cultivation entirely depends, are usually fed with chopped bananas at the time of fodder scarcity. But the milch cows have to live in a semi-starved condition, getting what nutrition they can from grazing on the fields after their rice harvest (Gangulee 1935:17).

At present cattle are fed largely according to the season. During the rainy period they feed upon the grass which springs up on the *uncultivated* hillsides. . . . But in the dry season there is hardly any grass, and cattle wander on the *cropless* lands in an often halfstarved condition. True there is some fodder at these times in the shape of rice-straw and dried copra, but it is not generally sufficient, and is furthermore given mainly to the animals actually *working* at the time (Mayer 1952:70, italics added).

There is much evidence that Hindu farmers calculate carefully which animals deserve more food and attention. In Madras, Randhawa, et al. (1961:117) report: "The cultivators pay more attention to the male stock used for ploughing and for draft. There is a general neglect of the cow and the female calf even from birth . . ."

Similar discrimination is described by Mamoria (1953:263 on):

Many plough bullocks are sold off in winter or their rations are ruthlessly decreased whenever they are not worked in full, while milch cattle are kept on after lactation on poor and inadequate grazing . . . The cultivator feeds his bullocks better than his cow because it pays him. He feeds his bullocks better during the busy season, when they work, than during the slack season, when they remain idle. Further, he feeds his more valuable bullocks better than those less valuable . . . Although the draught



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animals and buffaloes are properly fed, the cow gets next to nothing of stall feeding. She is expected to pick up her living on the bare fields after harvest and on the village wasteland. . . .

The previously cited NCAER report on Andhra Pradesh notes that "Bullocks and milking cows during the working season get more concentrates . . ." (1962:52). Wisner and Wisner (1963:71) sum up the situation in a fashion supporting Srinivas' (1958:4) observation that the Indian peasant is "nothing if he is not practical":

Farmers have become skillful in reckoning the minimum of food necessary for maintaining animal service. Cows are fed just enough to assure their calving and giving a little milk. They are grazed during the day on lands which yield very little vegetation, and are given a very sparse meal at night.

Many devout Hindus believe the bovine cattle of India are exploited without mercy by greedy Hindu owners. *Ahimsa* obviously has little to do with economizing which produces the famous *phooka* and *doom dev* techniques for dealing with dry cows. Not to Protestants but to Hindus did Gandhi (1954:7) address lamentations concerning the cow:

How we bleed her to take the last drop of milk from her, how we starve her to emaciation, how we ill-treat the calves, how we deprive them of their portion of milk, how cruelly we treat the oxen, how we castrate them, how we beat them, how we overload them . . . I do not know that the condition of the cattle in any other part of the world is as bad as in unhappy India.

### USEFUL AND USELESS ANIMALS

HOW THEN, if careful rationing is characteristic of livestock management, do peasants tolerate the widely reported herds of useless animals? Perhaps "useless" means 1 thing to the peasant and quite another to the price-market-oriented agronomist. It is impossible at a distance to judge which point of view is ecologically more valid, but the peasants could be right more than the agronomists are willing to admit.

Since non-working and non-lactating animals are thermal and chemical factories which depend on waste lands and products for raw materials, judgment that a particular animal is useless cannot be supported without careful examination of its owner's household budget. Estimates from the cattle census which equate useless with dry or