In the preparation of this review of the contributions of North American geographers to an understanding of the livestock industries of Latin America and the Caribbean, I have begun with an acceptance of the analysis of the characteristics and trends of work in commercial agriculture which Hegen, Hoy, and Griffin presented to this assembly ten years ago (1971), and updated for this volume. In those papers the work on the livestock sectors was reviewed within the larger context of commercial agriculture. My extension of the benchmark paper into the livestock sectors has been developed from a survey of the literature as it has been identified in Deal's *Latin America and the Caribbean, A Dissertation Bibliography* (n.d.), in the volumes on the Social Sciences' published since 1965 in the *Handbook of Latin American Studies*, on the excellent "Latin American Bibliography" which Don R. Hoy so generously supplied to me, and in my own more modest file.

For the most part, the work on the livestock sectors by North American geographers has been in the stream of traditional cultural and economic geography. The bulk of the work has been about the beef cattle sector; dairying has received modest attention, and other sectors of livestock production and marketing have been all but ignored. Central America, the Llanos, and the Pampa, perhaps with some redundancy, have been the areas where the organization of the beef cattle industry has been most researched. The reference to regions reminds me to acknowledge the large and fine regional literature that is relevant to an understanding of the geography of livestock production and marketing, but which is excluded from this account, with a few exceptions. The exceptions are representative of the useful works with livestock content not revealed in the titles. My short regional list would include West's *The Mining Community in North New Spain: The Parral Mining District* (1949), Wagner's *Nicoya, A Cultural Geography* (1958), Parson's *Antioqueño Colonization in Western Colombia* (1968), and the more recent work of Harnapp, "The Mexican Huasteca: A Region in Formation" (1972). Chronology and proper perspectives require inclusion of such early genre as Tower's "The Pampas of Argentina" (1918) and Jones' "Agricultural Regions of South America" (1928).
On the introduction and spread of livestock breeds, Winsberg (1968; 1970) and Thompson (1978) have worked, the former with cattle in Argentina, and the latter with dairy stock in southeastern Brazil, as did Brand in Mexico (1961) and Parsons in Antioquia. In this vein on diffusion, Parson's papers (1970, 1972) regarding the Africanization of the New World tropical grasslands must be noted. The topic recalls to the writer seminal work of Oscar Schmieder on the nature of the Pampa grasslands (1929). A good sense for the production and marketing of cattle in the colonial era of Mexico is afforded in three works: Brand's "The Early History of the Range Cattle Industry in Northern Mexico" (1961), West's Parral monograph, and the study by Barrett on "The Meat Supply of Colonial Cuernavaca" (1974). Barrett's work is essential reading for anyone who would understand the contemporary system and politics of municipio-level meat marketing in Spanish America. Lobb's historical study of cattle regions along Brazil's southern frontier (1970) awaits complementing works on the core areas of Brazil to match the Mexicali papers. Perhaps North American geographers have not addressed the Brazilian counterparts to the Mexican studies because Brazilian and European investigators have produced a rich literature about the colonial livestock industry. Kehr's overview (1975) of cattle raising in Brazil is useful in the contemporary sense. Economic and cultural geographers have trod the Pampa to good effect for 60 years in their tracing of occupancy and land use themes but seem to have been little drawn to the operations or functions of the contemporary livestock industry. Among active geographers, James (1941) and Rolf Sternberg (1972) have done the most to synthesize the story of the occupancy of the Humid Pampa. Shaw (1945) and White (1945), delved into questions of Argentine beef and world affairs as they explored the problem of foot-and-mouth disease, but not since then has anyone looked into large questions of international movement of livestock or livestock products in the River Plate region. One aspect of such movement that never has been explored is the legal and contraband trade of livestock in the Cono Sur. For that matter it is untouched elsewhere. To return to the interest of Shaw in aftosa; he also wrote on the epizootic in Mexico (1949). The Mexican experience was studied again in the remarkably comprehensive work of Sigsworth 1(1975). The concerns that drew investigators to the Pampa have been supplanted by interest in tropical ranching areas of late, as suggested by Denevan's paper (1963) on cattle ranching on the Mojos Savannas and Brunnschweiler's entry (1972) into the llanos frontier of the Meta. The inquiries remind one of the leather britches and boots approach to data gathering that Christ espoused in a fruitful venture that led to articles on the cattle industry of Llanos and Maracaibo lowlands (1937; 1943; 1956). Although it is the
rare geographer who preceded Crist into the interior, it should come as no surprise that James addressed the question of cattle production possibilities in Venezuela (1924). White and Thompson (1955) and White (1956) later revived the topic.

If there is a thrust to the research interests of North American geographers concerned with the livestock industry, it is the work in tropical beef production and marketing that a group of young dissertation writers undertook in the 1970s. Kelsey's work on the industry in the Roraima Savannas (1972), Vernon Smith's on Guanacaste (1970), and Alderman's on the beef cattle industry of Honduras (1973) are at the center of the thrust. Smith's and Alderman's work break with tradition in adopting methodologies that quantifiers will find congenial. Their work, together with West's paper (1976) on cattle raising and the beef export trade of Middle America, Miller's study of beef production and trade in Central America and Panama (1974; 1975), Martinson's paper (1974) on the rise of Central American beef plantations, Parsons' paper on cotton and cattle on the Pacific lowlands of Central America (1965) and Thompson's papers (1961) on the beef industry of El Salvador afford a fairly comprehensive body of literature on the sector in Central America.

Although the matter of crop/livestock relationships is dealt with in the work of individuals cited heretofore, Henderson, in the context of Baja California (1964), and Wood, in the context of Guatemala (1967), focus on the theme. It comes through well, too, in Stewart et al., "Transhumance in the Central Andes" (1976), the lone study of the transhumance phenomenon. Study of the production and marketing of milk has involved some geographers. MacPhail's dissertation (1953) and immediately related articles (1955) and the recasting entitled "Puerto Rican Dairying: A Revolution in Tropical Agriculture" (1963) are good models. Akin, too wrote (1952; 1954) on the dairy industry of the San Juan area. Thompson added to the literature on dairying in Chile (1959; 1960) and El Salvador (1961), as did Patten with a paper on dairying in Nicaragua (1971), and Morris with a paper on dairying in Argentina (1972). The dairying areas of the Pampa are revealed in a less traditional approach in Winsberg's "Una regionalización estadística de la agricultura en la pampa argentina" (1970). Brown and Lentnek (1973) departed from the traditional, also, in an assessment of a model of the diffusion of innovation in the context of dairying in Aguascalientes, Mexico.

Except for Bergmann's paper on sheep farming and erosion in Patagonia (1977), Thompson's brief account of swine production and marketing in El Salvador
(1961), Aschmann's "Indian Pastoralists of the Guajira Peninsula" (1960), and Gade's explanatory "The Llama, Alpaca and Vicuna: Facts vs. Fiction" (1969), no other livestock-specific topic was found to have attracted the attention of North American geographers. It is a large void, considering the long-standing importance of swine in Mexico and Brazil; the recognition, at least by nationals, of hog races in some major countries; the astonishing scale of commercial poultry production in countries like Mexico and Brazil; and the importance of pastoralism involving goats in several areas. By and large, the Camelidae have been left to anthropologists. There is a need for research on the environmental impact and on the cost to society of the continuation of traditional grazing practices of all stock types owned by peasants and large-scale operators.

To conclude, we know very little about the process by which livestock breeds have been introduced, adopted, and modified. We know little of criollo races, or of the manner in which cattle have become azebuado, or crossed with the Brown Swiss in the tropical lowlands and Holsteins generally. A good deal is yet to be learned about the production and marketing of livestock and their products in most areas but Central America. The international and internal contraband trade are untouched. Little more has been done with the realities of milk production and distribution.

One is reluctant to suggest priorities for work in the future, recognizing that scholars have particular interests, resources, and mayordomos to please. I think that we and Latin Americans would benefit by relatively disinterested research on marketing systems that link rural enterprise to the factory and city. There is a need to look at the role of such institutions as the coyote or introductor, at state subsidized programs to convert ejidatarios and colonos into dairymen; and at the past experience with national and regional formulas to resolve persistent seasonal deficiencies in product availability and quality.

I am not suggesting that North American geographers offer formulas; I am suggesting that they are in a better position than are most nationals to review the historical experience with policies and practices that have a bearing on the production and marketing of perishable food products for urban and rural populations that are growing rapidly.

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