

in a number of critical ways in the years following the takeover of Bengal by the East India Company. But it is clear that there were also indigenous forces at work to maintain inequality.

My final comment to Sharma is that caste is not unique to feudalism. Caste and castelike institutions fit quite well with incipient and developing capitalism, just as ethnicity and race fit quite well with monopoly capitalism in the United States today. The Indian village scene today is not totally feudalistic. Indeed, in some areas it is predominantly capitalistic, with the majority of the land held by people who see agriculture as business and will do everything they can to economize on production costs and sell for as much as they can. However, these same farmers would not like to see their laborers of different castes unite, any more than a factory owner in Detroit would like to see black and white workers unite. Their ability to manipulate caste offers them a means of dividing laborers. Indeed, it has been said by one of India's leading Communists that if any one thing is to be pinpointed as the major problem in organizing it has been caste. This is not to deny any other problems, but rather to point up the extremely debilitating effect of caste.

## On Taung Revisited

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The archaeological/anthropological importance of Buxton-Norlim (see Butzer's article, CA 15:367-82) arises from the discovery of the Taung australopithecine skull in a clay-filled cavity within the Thabaseek Tufa, one of four tufa deposits at this locality. Although the original site has since been destroyed by quarrying, its precise environmental conditions are important as this is the most southerly australopithecine find and also the only one associated with tufa deposition. As the Buxton-Norlim tufa complex is only one of a series of Pleistocene tufa fans built out by karst waters issuing from the Kaap plateau during former wetter periods, reconstruction of environmental conditions can be approached through analysis of undisturbed tufa sequences elsewhere.

Detailed analysis has been concentrated at Ulco Grootkloof, where four stages of tufa deposition and two breccia terraces are visible. Although Grootkloof is anomalous in being deeply incised and having only minor tufa development, Butzer presumes that similar gorges underlie the major tufa fans and that the Grootkloof minor tufa carapaces are analogous with the huge fans. Even Gorrokop, an extensive unquarried tufa fan south of Grootkloof, is estimated to contain a mere 13 million tons of lime, as compared with the 128 million tons at Ulco prior to quarrying or the equally vast deposits of Buxton-Norlim (L. Matter, personal communication, 1972). Can extrapolation from a site of restricted tufa formation be justified?

Butzer elucidates a Pleistocene sequence of events for Grootkloof substantiated by C<sup>14</sup> dates. He interprets the breccia terraces as cold-climate mechanical-weathering deposits and suggests a mean winter temperature depression of 2.5° C. His deduction is substantiated by recent evidence from the northeastern Transvaal where analyses of carbonate deposits in Wolkberg Cave indicate a temperature

## References Cited

- HABIB, IRFAN. 1969. Potentialities of capitalistic development in the economy of Mughal India. *Journal of Economic History* 29(7).  
 HENDERSON, J. W., H. A. BARTH, J. M. HEIMANN, P. W. MOELLER, F. S. SORIANO, and J. O. WEAVER. 1970. *Area handbook for Malaysia*. Washington: U.S. Government Printing Office.  
 MAYER, ADRIAN C. 1963. *Indians in Fiji*. London: Oxford University Press.  
 MENCHER, JOAN P. 1974. Problems in analysing rural class structure. *Economic and Political Weekly* 9:1495-1503.  
 ———. n.d. "Peasant movements, agricultural wages, and class structure: A hypothesis of some of the critical ecological, social, and political variables at work," in *Festschrift for Prof. Aiyappan*. Edited by B. N. Nair. New Delhi: Vikas. In press.  
 MUKHERJEE, RAMAKRISHNA. 1955. *The rise and fall of the East India Company*. Berlin: VEB Deutscher Verlag der Wissenschaften.  
 RAMACHANDRAN, A. n.d. Indians in a plantation setting: A study of class, caste, and unity. MS.  
 SANDHU, KERNIAL SINGH. 1969. *Indians in Malaya*. Cambridge: Cambridge University Press.  
 SHARMA, HARI P. 1973. "The Green Revolution in India: Prelude to a Red one?" in *Imperialism and revolution in South Asia*. Edited by Kathleen Gough and Hari P. Sharma, pp. 77-102. New York and London: Monthly Review Press.

depression of at least 5° C. approximately 25,000 years ago (Partridge 1973). However, no similar confirmation for the second cold period of Breccia Terrace II is forthcoming, although the Wolkberg Cave results span the appropriate period.

Grootkloof Tufa I is correlated with the entire Ulco quarry deposit, despite the existence of four distinct phases of tufa deposition separated by sand-filled karst cavities indicating changes of environment between phases. Furthermore, all the Ulco tufas predate 40,000 years B.P. (Marker 1974). The lack of correlative tufa deposition at Grootkloof raises unanswered questions.

The Grootkloof sequence is applied to the complex tufa sequence at Buxton-Norlim. Butzer accepts that the Thabaseek Tufa is older than the Grootkloof sequence. The Norlim Tufa is taken as equivalent to Grootkloof Tufa I and contemporaneous with the flowstone and clay cave-fill associated with the australopithecine find. That the australopithecine cave deposits must be younger than the Thabaseek Tufa in which the cave was located is rightly emphasised. Since the skull is associated with fills of humid provenance, it is also logical to accept that it was cemented in place, if not emplaced, during the ensuing wet tufa period. The correlation presented in table 5, however, fails to explain the lack of tufa deposition at Grootkloof contemporaneous with the Oxland Tufa at Buxton-Norlim, so that one is tempted to ask why Grootkloof Tufa I cannot be contemporaneous with the Oxland Tufa rather than with the Norlim Tufa.

Minor points aside, an interesting review of Pleistocene events has been formulated. The suggestion that the Taung australopithecine skull may be contemporaneous with the later Swartkrans and Kromdraai deposits rather than early is of particular interest in view of a similar recent suggestion on geomorphological dating grounds (Vogel and Partridge 1974). Butzer has made a valuable contribution in redirecting attention to an area of particular importance for Pleistocene chronology in South Africa. Grounds for continuing discussion are provided by the postulated correlation of tufa successions, archaeological sequences, and the Vaal terrace deposits.

## Reply

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I am pleased that a karst geomorphologist of Marker's calibre is in basic agreement with the model of spring cycles and tufa development that I proposed for the Gaap Escarpment. In regard to possible gaps in the stratigraphic argument, considerable fieldwork has since been carried out at Gorrokop and Mazelsfontein, with another visit to Buxton-Norlim. These morpho-stratigraphic and chronometric results, which will be reported elsewhere in conjunction with Robert Stuckenrath and A. J. Bruzewicz, both strengthen and refine my earlier arguments. Gorrokop now provides the most complex sequence (a minimum of 8 and probably more than 11 tufa generations), whereas Grootkloof offers the most lucid evolutionary model. It is hoped that after completion of the pending analyses more detailed and satisfactory correlations can be offered with respect to D. M. Helgren's forthcoming Vaal-gravel stratigraphy.

At Buxton-Norlim the base of the Thabaseek tufa locally fills a deep, bedrock channel and otherwise rests on a pediment cut back into the dolomite. T. C. Partridge kindly drew my attention to the significance of these features in extensive discussions and showed me a wealth of meticulous analytical data from other australopithecine site "contexts" that I was able to verify in the field. Publication of these materials will enhance our understanding of the South African australopithecine sites. The upshot for Taung is that Partridge is quite correct that the localized scarp retreat and an incised Thabaseek river predate the

Thabaseek Tufa, thus allowing for a long period of prior erosion. Although I remain sceptical that the relevant knickpoint has absolute-dating value, detailed application of many of Partridge's procedures to the erosional development of the Harts Valley can potentially provide a sophisticated stratigraphic framework within which to counterpose the Vaal-Harts terraces with the scarp tufas.

Double or triple the annual average precipitation fell along and above the escarpment in the first three months of 1974, bringing the most protracted and intensive rains since at least 1898–99. The resulting surge of geomorphic activity produced innumerable, temporary waterfalls, of limited efficacy, whose waters were derived from great sheets of runoff ponded on top of the plateau. Minute increments of lime, commonly linked to algal mats, were deposited on old tufa cascades and dolomite cliff faces and in drainage lines below the escarpment. Repetition of this once-in-a-hundred-years rain pattern several times a decade can be firmly projected to produce an environmental system comparable to Phase 3 of my model. Interestingly, the surface waters spawned a plague of mosquitoes unknown in living memory and introduced stock epidemics that generated antibodies now found in the Rift Valley.

## References Cited

- MARKER, M. E. 1974. Dating Quaternary climatic oscillations using cave and tufa deposits. *South African Archaeological Bulletin*. In press.  
PARTRIDGE, T. C. 1973. Geomorphological dating of cave opening at Makapansgat, Sterkfontein, Swartkrans and Taung. *Nature* 246 (5428):75–79.  
VOGEL, J. C., and I. C. PARTRIDGE. 1974. Isotopic contents of some Transvaal speleothems and their palaeoclimatic significance. *South African Journal of Science* 70(5):135–40.

## On the Cross-Cultural Survey Method

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Vermeulen and de Ruijter (CA 16:29–37) do a useful job in directing attention to important questions that are often ignored by practitioners of the cross-cultural survey method. I wish to add only two related points.

First, they explain why Flower's problem has been overlooked while Galton's has been discussed by several commentators; but though they proclaim that both problems have remained important, they continue to scrutinize Galton's and ignore Flower's. In my view, Flower's query merits more serious analysis than it has received. Elsewhere I have attempted to grapple with it (Barnes 1971:66, 72–84), but obviously I have not settled the matter.

Second, I think they misrepresent Murdock. They maintain that "what characterizes the inductivist and empiricist orientation of the comparativist is the belief that classification is or can be atheoretical," and they seem to assume that for the comparativist the only sources of theory are the "experimental laws," i.e., inductive generalizations, that are derived from observed correlations between traits. This characterization may be true for some comparativists, but is not true for Murdock. For example, in *Social Structure*, chap. 10, he puts forward a theory about the origin and perpetuation of incest prohibitions which he derives, with deliberate eclecticism, from a cluster of eminent psycholog-

ical and sociological writers. In several other chapters there are shorter expositions of theory preceding the examination of ethnographic data. Murdock's dedication of his book to, inter alia, Dollard, Freud, Hull, and Keller clearly indicates his commitment for at least part of the time to an epistemological strategy which is radically different from that attributed to the comparativists by Vermeulen and de Ruijter.

There is no reason, a priori, why empirical generalizations derived by the comparative method, however naively based the classification scheme may be, should not confirm or falsify a theory derived from another source. In Murdock's case, however, his empirical generalizations impinge only tangentially on his chosen theory. Had he chosen to test his theory of incest directly, he would have had to face up to Flower's query. "Units of comparison" have or do not have "equivalent value," as Flower put it, only with reference to some specified theory. Murdock's theory is basically about the way individuals learn; incest prohibitions within the nuclear family are, he says elsewhere (Murdock 1950:200), "arrived at everywhere by a process of mass trial and error." Yet, as everybody knows, the units of comparison used by Murdock, and by virtually all the numerous other writers who work from the Human Relations Area Files, are not individuals, as his theory would seem to require, but societies and cultures, more or less arbitrarily delimited. The shortcomings of Murdock's attempts to test his own theories, however misleading an example these may have been to others, should not blind us to the fact that he begins his argument with theories, even if he ends with only empirical generalizations.

Finally, I would enter a plea against the use of the