Part 2 1998.

RESULTS

Descriptive findings.

Constancy.

Table 3 summarises 275 records of the 51 qualitative traits that were commented upon by three or more visitors, spread over two or more quarters of the century. Table 4 reports on 9 quantitative measures.

Table 3 gives a strong impression of constancy, with only twelve dissenting records out of 275. The 12 dissenting records concern 9 traits, in all but one ?two of these a clear majority account can be seen. The foraging and subsistence data (Table 3a) show agreement on 16 traits, among the more interesting being men's night time hunting, the unreliability of hunting, foraging by children, and the comment that women forage daily (a consistent contrast with Lee's reports of !Kung women). Scavenging is also reported throughout the century.

The reports about trade, and relationship with the political system (12 "traits", Table 3b) agree that in all periods, in trade Hadza gave honey and meat and received iron, beads, pots, tobacco and clothing. In three periods, including the earliest and the latest they were reported to pay no taxes, flee from strangers, and be granted exemption from the strictest version of the game laws. Table 3c shows good agreement between reporters and consistency across the century in 18 "traits" of social and ceremonial behavior. Hadza shared food widely, day to day interactions suggested absence of stratification, freedom to forage anywhere, high mobility, and greater dispersal in wet than in dry season. Most visitors agreed that most Hadza were monogamously married most of the time, that marriages were not arranged, although a small brideprice was payed, and divorce was easy for either husband or wife. Visitors in each period commented that a few men had two wives. Three authors report that if a man dies his wife and children are cared for by his brother. We note several such families in our census data. But one elderly informant claimed that this practice was no longer obligatory (his family cannot "take" the woman and children any more). Bleek denied that the levirate is practiced. Violent sanctions on adultery were mentioned in three of the periods.

Visitors in three periods report that God is the sun (Ischoye), though Bagshawe denied that Hadza had any religion. The Epeme dance and feast have been described by several visitors. So has the special equipment of men who dance in the Epeme. The gambling game Lukuchuko has been reported in the last three quarters of the century. The trait "simple repetitive songs", reported by Obst (who made phonograph recordings!) and still true today, deserves explanation. Obst "the refrain is mostly the same" transcribes "Ischoye we have no meat, Ischoye there is no meat", Bleek "All the songs are repeated over and over again" transcribed "Here we go round, go round". Smith reports words such

as "we are going to that hill over there, over there", repeated indefinitely. Songs collected by Gudo Mahiya and translated by Sands (Bala 1998) show just the same feature.

Housing and technology shows some vivid constancy. Photographs of camps by Obst, Bleek, Cooper would be hard to distinguish from our own pictures. House construction is unchanged. Visitors in each period also report occasional use of rock shelters. Both kinds of arrow poison in use today were reported in every period, the earliest chemical analysis being conducted by "Dr Braun, lately a member of the German Research Staff at Amani Institute" (Baghawe 1923:124). The apparently unique Hadza method of climbing Baobab trees (using pegs cut from a nearby bush) was reported by Bauman (1984), Woodburn (1970), and is seen almost daily by us. Arrow technology is a topic for analysis that we have barely exploited. Illustrations by several early authors suggest to us that little has changed but a close and systematic examination might be rewarding. There must be many other cultures in which change or constancy in technology could be systematically examined.

Table 4 includes adult height and weight. We see no evidence for a bygone age of "six foot Hadza" to correspond with the six foot Bushmen of the Kalahari debate. Nor is there any indication that Hadza have been becoming shorter as would be expected if they were increasingly poor or exploited. But they have grown no larger, missing out on whatever advantages the march of progress may have offered (but we know no data on secular change in stature for other populations in Tanzania). The lengths of bows seems individually variable, though they have remained large by African standards. Digging stick data suggest less variation. Data given by Woodburn on matrilocality matches ours closely (present where?). Even his figure for divorce rate is virtually identical to our figure for 1985 - 90, which is not statistically significantly different from our slighly higher figure for 1990-1995 (Blurton-Jones et al in prep Cronk).

Food lists given by the previous authors (and the diary kept by one of Kohl-Larsen's field assistants) all include the large game animals which we have observed Hadza taking. But there are also inconsistencies. Bagshawe, Kohl-Larsen and others write that Hadza eat many small animals including insects (termites), reptiles, and molluscs. With two exceptions we have seen adult Hadza eat only mammals and birds, and few of them small. One exception is Tortoise, (these are reptiles) which we have seen women capture, cook and eat, other authors also mention Tortoise. The other is fish, which we found temporarily settled Hadza eating at Mongo wa Mono, after visits from trading Isanzu fishermen who dig lungfish from the dried out mud of Yaeda plain. During previous visits many Hadza had expressed disgust at the idea of eating fish (just as Kohl-Larsen recounts), and refused our canned fish when offered. Subsequent visits showed that the taste for smoked lung-fish stayed with some of those who acquired it. Some authors report that Hadza do not eat Vultures or Hyaenas. We have seen Hadza children cook and eat several smaller animals and birds, and Hyaena and Vulture. They were scolded by adults for eating the last two, with the explanation that these animals eat people. We have heard Hadza telling non-Hadza that they eat meat uncooked, eat snakes, frogs, etc., apparently relishing the audience reaction. Perhaps diet is an area of Hadza life

in which the possible and the usual, or the emic and the etic sharply diverge. Perhaps horrifying and disgusting their neighbours is part of Hadza technique for maintaining independence.

Change.

The case for change seems strong for only four characters: population size, clothing, a switch from clay to aluminum cooking pots, and (not entered in the table because never reported in print) in the mid 1990s the manufacture of beads from broken plastic containers. Although cooking pots, and cloth clothing are reported as received in trade during every quarter of the century, the accounts point to an increase in availability of both. Hadza have obtained more and better household equipment (including water containers) and worn more clothes as time passed. Bagshawe said they had no cooking pots but Reche, describing Obst's collection of Hadza artefacts (Reche 1915:254) says women cook the meat of large animals in clay pots which they get by trade from the Isanzu. Bleek says they use clay pots. Kohl-Larsen illustrates clay pots. Today we observe people using aluminum pots, and these are frequently demanded as presents (though too expensive to give to the numbers who want them). Gourds are still in use as water containers but plastic jerries are becoming widespread.

Nowadays all Hadza have some western clothing. Early authors describe Hadza men and boys as going naked, or at most with a short leather skirt. We have never seen the men's civet skin loin cloth illustrated by Woodburn, though contemporary informants remember these garments and others have described them. Nowadays most men favor shorts for daily use, with or without shirt, and long trousers and shirt for visits and travel. Most adults have a set of "smart" clothes kept hidden for visits to a village. Most own sandals made of motor tires, available from the travelling rural markets. Women and girls were more elaborately dressed, and Obst's quite detailed description can be exactly matched by many individuals today (Marlowe pers comm. observed in 1988 renewed manufacture of leather clothing at a camp regularly visited by tourists) . But many have added items of western clothing, and for daily use a "shuka" of "Amerikani", a cotton sheet used as clothing, carrying device, and sleeping sheet. In the 1980s some older women used leather sandals of their own construction and apparently identical in design to those illustrated by Kohl-Larsen ('58:pl 66&67), perhaps similar to those seen by Dempwolff in 1911 (Dempwolff 1916). Most children go barefoot. The amount of clothing visible in photographs from different periods could be measured (and would to our eyes show a sharp increase) but photographs are selective, and while Hadza probably wished to don their best clothes for the pictures, visitors may have exerted different amounts of effort to dissuade them.

The manufacture of plastic beads is an interesting innovation. Women who make beads attribute the invention to a Hadza woman in Sukumaland but the practice has spread rapidly. Broken plastic bowls or jerries are cut up into pieces about an inch square and impaled on a six inch wire spike. The plastic is heated over a flame and as the spike

is slowly turned, the melting plastic can be divided to form several roughly spherical beads. These are used in decoration in much the same way as glass beads have been used throughout the 20th century.

Blurton Jones et al (1992), like Dyson (1977), concluded that Hadza population had been increasing for some decades. If we calculate back from our 1985 estimate of about 750 eastern Hadza and a population growth rate of 1.3% p.a. we get a figure of 500 eastern Hadza in 1960 (Woodburn 1968 estimated 400 plus some 100 more settled people in 1960), and we extrapolate to 400 in 1935. Kohl - Larsen's estimate from sometime in the 1930s was 430 eastern Hadza. Both Kohl - Larsen, and Woodburn seem to have carefully and quite systematically tried to estimate the population and their estimates are surprisingly close to our extrapolation. Extrapolating back to 1920 we estimate 335 which does not match well with Bagshawe's "5-600" (perhaps eastern plus western). For 1910 we estimate 295, which is almost triple Obst's "no more than 100 souls" east of L.Eyasi. Obst and Bagshawe give little indication of what their estimates were based upon. Thus evidence for increase over the last 50 years seems good but we cannot be so confident about the previous 50 years.

In our 1992 demography paper we suggested that Hadza were increasing because they were recovering from some misfortune. Obst's informants emphasized their losses to the Masai, which is supported by comments by Bleek's informants, and by Siedentoff's Masai informants (ref). Perhaps the recent report (Harpending et al 1993) that mitochondrial DNA data from the Hadza show "the pattern expected following a bottleneck in a previously large population" should not be linked to our demographic observations. "Recent" may mean thousands of years, or very few (Rogers and Harpending pers comm). Be that as it may, rinderpest, flu and the colonial era might have weakened the surrounding societies just in time to save the Hadza from extinction early this century.

Dissenting records.

There are disagreements about twelve traits (d1 to d12: trapping, whether dry season is easier than wet, whether Hadza trade skins, or pay any tax, have chiefs, prevalence of polygamy, levirate, whether Hadza have a religion, whether rock shelters are used,are old and infirm deserted? burials, residence of children after divorce). We will discuss them here, while occasionally referring back to the mass of agreement among which they are set. In addition there is even more confusion about circumcision, male and female, than about burial. Only Bagshawe among early authors mentions female circumcision, described to us as ‘voluntary’ - some do some dont. Obst comments that an Isanzu performs circumcisions for Hadza, and Bagshawe says “Boys and girls are cicrumsized when very young...without the elaborate ritual observed in other tribes”. Bleek says circumcision does not occur. Our observations show that some men are circumcized and some are not [dont they?].

The first disagreement (d1) concerns trapping. Four visitors agree that adult Hadza do not trap their food. But Bagshawe disagrees, to the extent that "The Kangeju never dig game pits or make nets. The only trap which they use is a running noose with which they catch guinea-fowl and other birds.(p124)" but contradicts himself further with "They use only their silent bows and arrows...(p123)". All agree that Hadza do not use pits or nets. Hawkes et al.(1991) found that Hadza men know how to make and use nooses when asked (presumeably remembering their childhood use of this method - we have quite often seen boys trapping birds with a noose, as has Woodburn 1970:*) but we do not normally observe adult men trapping. Bleek translates one of the songs as "Made is trap by father with ropes and the bird caught I eat".

A more complex disagreement concerns the differences between the wet and dry seasons that Woodburn suggested shaped several aspects of Hadza social and ceremonial life (1968). There is some evidence for a regional difference in the yearly round and its rewards. Tomita (1966) and McDowell (1981), who both worked in the Balai-Mangola area (relatively short of game and rich in berry bushes), suggest that the dry season is the most difficult time of year. Obst (1912), working mostly in Tli'ika like us and Smith, describes the dry season as a time of relative plenty and the wet as one of difficulty. Obst, and Smith (pers comm) link this to the availability of water for game animals. In the dry season there are fewer water holes and game are easy to locate. In the wet, game are more dispersed and take longer to find. However, while our quantitative data show that water hole hunting only occurs in dry season, the kg meat acquired by hunting and scavenging per hunter-day show relatively little difference between dry and wet seasons (Hawkes et al. 1991). Furthermore, the most talked-about berry species mainly fruit during or near to the rainy season.

The reports about trade, and relationship with the political system (12 "traits") are consistent but for two points, both candidates for recent change. Earlier visitors describe Hadza as trading skins. We have no indication that this occurs at all nowadays (d3). Two changes may have closed the market - neighbors can purchase modern clothing and bedding at the travelling rural markets; conservation laws are more and more vigorously enforced and skins represent permanent evidence. Throughout the century, authors remark that the Hadza pay no taxes and that successive governments have judged this fair and proper. But in 1991-92 many Hadza voluntarily contributed membership subscriptions to CCM (not exactly a tax but we are trying to be hard on our favored hypothesis, so let's count it as d4), an essential step to the recognition of a large segment of Hadza country as a village (an administrative unit). The achievement of this village, under tutelage from Canadian Universities Service Overseas, comprises a marked increase in awareness of the political system and belief in Hadza ability to gain by becoming part of it.

Features in Table 3c show good agreement between reporters and consistency across the century in 18 "traits" of social and ceremonial behavior. The disagreements are quite interesting. The disagreement about "chiefs" or men of influence (d5, two dissenting out of 8 reports) seems to us to reflect both a complexity of Hadza behavior excellently

described by Woodburn (min politics), and differences in the thought and origin of the visitors (Obst merely names two "leaders" from the "war" with the Masai, Kohl-Larsen seems never to question his view that there are regional chiefs, and succession in the male blood line, though he gives no information on what chieftainship entails). We note, like Woodburn before us that despite the day to day appearance of egalitarianism, older men have a role in ceremonial that is distinct from young men, and camps are named and referred to after an older or well known man. In 1992 and 1995 informants who we asked where Cooper went (in 1945) replied not with locations but with the names of men 'whose' camps he visited. Occasional would-be despots arise. Significantly for the revisionist debate, Woodburn (19--) pointed out that these despots derive their power from their personal access to the outside world. Subsequent to Woodburn's publication we have seen another particularly oppressive episode of the process he describes.

Five or more visitors agree that most Hadza are monogamously married most of the time, and that polygyny occurs at a low frequency. Bleek however, comments that most (d6) men had two wives. The partial genealogies in Bleek's notebooks show that most of her key informants did report more than one wife but it is seldom clear whether these wives were sequential or simultaneous. Contrasting with 4 other reports, Bleek denied that the levirate was practiced (d7).

Bagshawe denied that Hadza had any religion (d8). Any anthropologist would find this hard to believe and Obst's account shows they clearly did at that time. But Obst's informants claimed that they did not have proper knowledge of their religion because so many older men had been lost in the wars with the Masai. Do we take his description of a ceremonial at a kill-site that no other visitor has reported (despite many early arrivals at kills by O'Connell, and by Bunn), as evidence that Hadza were re-inventing their religion, which subsequently stabilised? On the other hand, Morris (19**) has written about the tendency of small, potentially vulnerable cultures to report a version of the rites and beliefs of their neighbors as their own. This encourages us to take Obst's accounts as indicating that Hadza preferred not to let him into their closest secrets.

Contradicting four other visitors, Cooper (1947) claimed that Hadza use no rock shelters (d9). From what informants have told us he mostly visited the south western end of eastern Hadza country. Here few suitable rocks are found and we too have never seen rock shelters used in this region, although even here rocks often form one or more wall of a house.

Bagshawe and Woodburn both describe old or handicapped individuals being left behind. We have no evidence for this (d10). We probably would not observe this because Hadza know that we can be persuaded to take a seriously ill person by car to clinic or hospital. Informants tell us that Woodburn spent much of his time in the field with no car, and thus without the ability to intervene in such cases. The availability of rural health clinics, and the possibility of transport from these to hospital in our absence may have produced a change in this aspect of Hadza behavior, although we note that many people are reluctant to use these facilities.

Bagshawe claims that dead people are not buried (d11). We cannot take this as evidence for change when reports of burial pre- and post- date his account. The majority report is that older men and women are buried; younger people left in the hut where they died, the hut bent down over them, and the camp deserted.

Bagshawe and Kohl-Larsen both claimed that upon divorce, children stayed with their father (d12). Today we see a strong tendency in the opposite direction, which Woodburn (1992) also reports. We cannot account for this discrepancy in the record, other than to suggest it arises from the early authors asking, and the later ones observing.

RESULTS - 2

Testing the hypotheses.

1. The simplified neighbor hypothesis: Where there is contact there must be change.

We showed that throughout this century the Hadza have known, been known to, and traded with their several neighbouring populations. These neighbors have experienced an accelerating series of economic and political changes. The Hadza have been visited by, and their country traversed by several parties of foreigners. If such events have the pervasive influence that many contemporary anthropologists assume, then we should expect the record to show evidence of change in Hadza behavior. Furthermore, we should expect accelerating change. Hadza at mid- century should differ more from Hadza at the end of the century than from Hadza early in the century.

With only four traits showing clear evidence for change, and 12 dissenting observations out of the 275 entries, support for the "simplified neighbor hypothesis" must be at best extremely weak. The twelve dissenting observations are distributed through the century in proportion to the number of observations. (1900-25: 3 disagreements / 75 agreements; 1926-50: 4 disagreements / 79 agreements; 1951-75: 1 disagreement / 57 agreements; 1976-: 3 disagreements / 61 agreements). These seem to represent no evidence of systematic or accelerating change in Hadza behavior.
9 / 75; 8/ 79; 2/57; 3/61.

2. Does the record support the contention that the ethnogrpahers background has such large effects on his record that each record is unique and no concensus account of a culture is possible?

The tiny number of dissenting reports means that no real statistical support can be given for this hypothesis. But let us try! For instance, did academics report differently from military personnel and government officials? Ten minority views were expressed by the 12 groups of academics, seven by the 4 soldiers and officials. Officials disagree

with the majority report at twice the rate of academics. But against a background of 264 items of agreement there is little support for the view that this particular contrast of supposed observer interests had much influence.

Since anthropologists are said to be tools of the imperialist powers, we might ignore the distinction between officials and academics, and instead compare representatives of the competing colonial powers. Since Germany was either at war with, or competing for colonial possessions with Britain (allied to its commonwealth, including at the time Bleek's South Africa as well as Vincent's Australia, and the USA) for much of this period we might wonder whether accounts of the Hadza differ by nationality. The British allies are the source of most dissenting reports! - 13 versus Germany's 3. Does this mean anything against the background of 264 agreements? Does it mean anything when only three of the sources are German (we added Tomita to the German count despite his being a young post-war Japanese anthropologist!), and 12 are British allies. It is difficult to claim that the data support the view that reporters were significantly biased by their national or imperial affiliations.

But Bagshawe is the source of four disagreements, which may lend some support to the view that colonialist attitudes might predispose individual visitors to incautiously believe more "denigrating" things (things that his own culture would not approve, like leaving corpses unburied, and having no religion) about a people than a visitor from other backgrounds. As we implied in our introductory section on the sources, Bagshawe seems quite an extreme case despite Barns' commendations (fn). Other officers of colonial powers (Dempwolff, Cooper, Fosbrooke) were as temperate as anthropologists. That disdain as patent as Bagshawe's was not universal among colonial administrators can also be supported from the memoirs collected in Allen's (1979) "Tales from the Dark Continent" (eg from our area of Tanzania p90 in 1986 paperback edition).

3. Does the record support the view that our observations represent a longer standing condition?

The overwheleming agreement between visitors in all quarters of the century answers this question in the affirmative. We have no strong evidence that what we (or Woodburn) have reported, represents only the brief years in which we collected data. On the contrary, the data suggest that our accounts may represent Hadza behavior at any time during the 20th century.

The data do not entitle us to claim that our observations represent Hadza behavior during previous centuries. Nor does the Hadza data entitle us to claim that ethnographic accounts of any other people represent a long standing condition. But our data might encourage other anthropologists to see what can be gleaned from earlier accounts of the people that they study. It might be possible to build up a broader picture of the extent to which cultures change, and the pace at which they change. This would be much better than either our traditional assumption that anthropological subjects never change their

behavior, or the assumption that because few if any cultures were isolated from their neighbors, change must have been ceaseless and universal.

4. Does the record tell us anything about patterns of change?

Even though Hadza culture has proved remarkably conservative, is there support for a) the view that when one thing changes, others must follow (culture as a unit); b) that culture can be divided into pieces, eg a flexible economic stratum, and a more conservative symbolic or ceremonial section. We argued above that Hadza population and population density has increased (and suggested this may represent a recovery from a period of hardship at the hands of neighbors late in the 19th century), and that Hadza have more manufactured clothing, and metal pots. Should we expect these to have lead to other changes in Hadza behavior?

Current Hadza attitudes imply that ownership of clothing makes it much easier to visit a village (even if the clothing must be borrowed). Dempwolff's informants had mustered enough clothing for a visit to the village of Maganga, and Reche mentions cloth obtained by trade but we may surmise that the poor availability of clothing acceptable to villagers may have restricted Hadza options in the past. But in every other way, the impressive thing about the change in clothing is how little this change seems to have affected any other recorded aspect of Hadza behavior.

Our data imply that change in these arenas (total population and its density, clothing and household goods) did not lead to extensive change in other observed arenas of life. This should perhaps be as surprising to us, who pursue materialist and ecological assumption, as it should be to those who hold that culture is an integrated unitary whole in which a change in one part must lead to a change in other parts. Our data do not readily support the view that day to day economic aspects of a culture are inevitably more flexible than social or ceremonial apsects. While Hadza have switched from leather to cloth clothing, and from clay pots to aluminum, from leather sandals to "tyri", and their ceremonial, mythology and social arrangements seem to have changed little, another aspects of their technology - the detailed construction of bows and the different styles of arrow, instruments of subsistence, appear to have changed not at all. This leads us to suspect that no safe generalisations can be made yet about which are the most or least conservative parts of a culture. Even if there is an underlying tendency in this direction, it is likely to be overwhelmed by the nature of the agencies for change. If cheap guns and ammunition became available and game laws were no longer enforced, arrow technology might disappear overnight. If missionaries become more enduring and successful than in the past, then the epeme dance and origin myths may be lost. We would not bet that the epeme feast would neccessarily disappear at the same time. We imply that culture may be much more piecemeal, indeed a collection of "traits", than most anthropologists, rightly searching to impose order upon apparent chaos, have believed.

5. Does the historical record cover enough features of Hadza culture?

If the record covered only a few, or the least interesting or relevant, aspects of Hadza behavior or culture our rejection of the "simplified neighbor hypotheses" would be uninteresting. How well do our data cover Johnson's list of characteristics which a panel of ethnographers found important for describing a culture (Cultural Context Checklist of HRAF and Johnson's "Cross-cultural Studies in Time Allocation" e.g. Johnson & Johnson 1987)?

Johnson uses 8 major headings (geography & environment, subsistence and economics, social structure, kinship and descent, political organization, family life, welfare-illness & death, recreation, religion & cosmology). Each of these has several sub-headings, excluding geography and environment, there are 30 sub-headings, and within these 124 items. The Hadza historical record is strong on 80 of the 124 items listed under Johnson's headings. Thus we have information on about two-thirds of the descriptors that were considered important by Johnson and his collaborators.

The record is weakest on kinship, law& order, family and childhood, illness, and religious beliefs. But there is some information about these. Bleek's notebooks indicate that current kinship nomenclature and usage was in existence in 1930. Reports are consistent concerning settlement patterns, spatial distribution, community size, household form, marriage practices, arrangement, and payment, frequency of divorce. We cannot decide whether to interpret epeme dances or feasts as "ceremonies of solidarity" but all sources would score Johnson's "ceremonial elements" the same - none claim sacrifices, masochism, or shows of power in these. But Obst describes an offering of meat to Ischoye, which no one else reports. No source reports noticeable mental illness or use of alcohol (but this has become commonplace at camps visited by tourists), all report tobacco and several report marijuana use. Sources are not totally clear about funeral procedures or mourning, although there is some consistency to reports that older people are buried and younger left where they died and the camp deserted. There is little detailed information about leisure, though several describe gambling ("lukochuko") and frequent song and dance, and none describe contests of strength or skill. Sources would agree that outside major religions play a negligible role in Hadza life (although they motivated several of the settlement schemes, and missions are still exploited for aid by one of the community development officers), and that epeme feasts and epeme dances are sacred activities, the former attended only by adult men, the latter by all, and that men who dance in the epeme dance own special artefacts for this purpose but there is little information with which to complete Johnson's other religious items about cosmology and kinds of religious experience. Despite these interesting gaps, the historical accounts can thus be said to cover a reasonably broad sample of the aspects of behavior that anthropologists find of interest.

DISCUSSION - PART 1

Throughout the century Hadza have known and been known by their neighbors, and traded with them. Much has changed in the surrounding countryside and many visitors have passed through Hadza country. But throughout this century Hadza behavior seems to have changed little. Hadza have lived by hunting and gathering, men taking large prey by hunting with bow and poisoned arrows of designs that changed not at all, at night from blinds and at dawn and dusk by walking about, seldom trapping but often scavenging from Lions and Hyaenas. Women and children foraged for roots, berries and Baobab fruit. Honey was collected by men and traded for tobacco, iron (for arrow heads), some clothing and cooking pots. Nuclear families lived in small grass houses, or a clearing under a bush, and occasionally used rock shelters. Most marriages were monogamous, a few were polygynous, divorce and remarriage was easy. A widow, and her children were sometimes married by her dead husband's brother. People moved often and shared widely. No one was denied access to localities or resources. Hadza religious rituals continued. While attaining this remarkable feat of cultural survival, the Hadza have increased in number, worn more clothes, replaced clay pots with aluminum, and invented a way to make beads from plastic scrap, and they probably acquired more knowledge of the world beyond their neighbors, but they lost much land. Destruction of habitat continues and it remains to be seen what of Hadza culture endures the combined forces of tourist cash, the traders it attracts, and the imminent devastation of the environment.

After briefly discussing some methodological issues, the relevance of these data to understanding patterns of change, and some implications of the data for revisionism, we return to “time depth” and its implications for behavioral ecology and other theories. This leads us to touch on the use of modern hunter-gatherer studies in archaeology and human evolution. Then we end with some more general issues in the revisionist critique.

1. Ethnographer’s background.

We were unable to show statistical effects of reporter profession (academics versus administrators) or colonial power block (Germany versus Britain and allies). Particular exceptions were the uncritical nomination of leaders by Obst and by Kohl-Larsen, and some comments by administrator Bagshawe that could not be reconciled with other accounts. Other issues surrounding the ethnographer’s background remain unexamined, but it appears (surprisingly) that their interests and theoretical orientation had little influence on the descriptions. These results may depend upon our having focussed on descriptions of "what do Hadza do?", not “why do they do it?” and not "how do Hadza see the world?".

The paucity of quantitative data is an important limitation. This is not unusual for ethnography, where quantitative methods are a relatively recent addition (johnson text, Lee... Caro & MBM etc). But it limits our comparison to reports that take the form of "absolute" statements, and this can be dangerous. Thus if an author generalizes "they hunt at night from blinds near water holes" we score a plus sign. If an author said "they never

go out at night", or "they hunt in the early morning" we would score a minus sign for water hole hunting. In reality some men often hunt at night, some seldom, all do it more in dry season than wet. If there had been a change in the frequency of night hunting we would have missed it. Our method is insensitive to such changes (except for measures in table 4).

The lack of quantification also limits our use of comments such as Woodburn's (1968:) about the separateness of men's and women's subsistence. Like him we see women eat from their haul in the bush before returning to camp, and men snacking on berries as they go hunting, or eating at a kill site. We observe that on most days adult men and women do not accompany each other into the bush. Thus we and Woodburn observe a separation that might be striking from the viewpoint of our own culture. But we find the impression a reader could take from Woodburn's account, that men and women exchange no food, quite misleading. Should we call this a change in behavior or not? As with many ethnogrpahies, in the absence of quantitative observation, we have to scout around for other remarks elsewhere in the account. Then we find that men must give meat to their mother in law, that a man must be a good hunter to get a wife, and other indications of exchange of food between the sexes. Given the lack of quantification in anthropology, almost unique among the sciences, we find it remarkable just how confident a careful reader can be about comparing the different accounts of the Hadza.

2. Enough features of behavior? In enough detail?

We showed that our data cover something over two-thirds of the descriptors in Johnson's cultural context checklist. Tables 3 and 4 represent many of the features of cultures that anthropologists report, reported at the level of complexity at which anthropologists customarily report them. If revisionists claim that we missed the key aspects of behavior, they imply that ‘neighbor hypotheses’ can only account for those few aspects of behavior. There could have been changes at a level of detail that the observers did not report, for example, as clothing became more available, gifts of clothing from men to women could have become a more important part of courtship. We have no way to tell whether this happened. If revisionists claim that we had insufficient detail to capture change in Hadza behavior, they imply that ‘neighbor hypotheses’ can only account for fine details of behavior. Revisionists clearly intended to do much more than this!

3. Units of change.

While there was evidence for increased clothing, metal cooking pots, and numbers of people, this had not led to change in other traits. Thus we can offer no support for the view that cultures must change as unified wholes [fn re fetishizing]. Nor can we offer a replication of Sharpe’s (1952) claim that arrival of steel axes had far reaching effects on Yir Yoront culture. Nor does the Hadza combination of change and constancy coincide

clearly with the distinction between infra-structure and super structure. If historical records such as we have assembled for the Hadza were collected for more populations, it might be possible to test such generalizations, and other ideas about processes by which new traits are adopted and spread. The Hadza switches between village and bush, between a variety of occupations and foraging, and not least the full time foragers raised by farming Hadza parents, widens the scale of changes in behavior to which theories must attend.

4. Simplified neighbor hypothesis

The outcome of the test of our “simplified neighbor hypothesis” seems clear. Despite contact with the changing world, much behavior of the Hadza remained the same throughout the century. The historical data do not support the view that we merely have to show contact in order to assume change. But other "neighbor hypotheses" might be developed that would fare better when matched to our data.

Perhaps the previous century was the most formative, with raids by Sukuma and Isanzu, and war with the Masai, the development and ending of the slave trade, rinderpest, and the German colonial conquest. But was the subsequent colonial period, and independence, of no significance? Perhaps revisionists will begin to develop hypotheses about when contact and trade is expected to affect behavior, and which behavior it will affect.

Perhaps we assessed surrounding change incorrectly. For example, perhaps the replacement of the Masai war with Isanzu raids, and then with settlement attempts, should be seen not as a series of changes but as a continuous risk of persecution. It could be claimed that the end of the slave trade was irrelevant, after all Hadza live at the point equidistant from two major 17-19th century trade routes (and thus as far from them as anyone lived). But if this is claimed, then "neighbor theorists" need more information to determine who was or was not influenced. It takes more evidence that just a reminder of the existence of the trade to show what its effects were. Presumably some changes are more significant than others: the change from one colonial power to another may have been quite insignificant to the Hadza. In contrast, the economic liberalisation of the mid 1980s looks likely to have far reaching effects upon them.

The assumption that any contact must bring change, and that since all cultures (even in a "world of hunters among hunters") have always had neighbors, then all cultures must have been in ceaseless flux, was derived from the early idea of "the dialectic". In its time this was a valuable insight but understanding of the possible interactions between interacting parties has developed a long way in the past 100 or so years. Economists and games theorists can show us a wide variety of likely interactions, including some which generate flux, as the dialectic is assumed to do, and others which generate stability. We should be trying to understand when we expect one, and when the other, when and why we see stability, when and why we see flux.

We do not claim that there are no influences of one population upon another. Such a claim would be as outlandish as the claim that Hadza (or !Kung, or Ache) behavior can only be understood in terms of their interaction with their neighbors. We claim that these influences should be and can be the subject of empirical investigation. As we suggested in Blurton Jones et al 199* Kent), we suspect the most fruitful way to do this would be to attempt to model costs and benefits to forager and neighbor of alternative courses of action, construct models, derive predictions from them, and test the match of the predictions to observed behavior and economy. In other words, we see no obstacle to adding the machinations of neighbors or visitors to the costs and benefits set by the natural environment and other individual foragers.

An explanation for constancy of Hadza behavior can be constructed around Woodburn's description of Hadza as "encapsulated". Given that Hadza have some reason for wishing to stay separate from their neighbors, and given that the mechanisms for achieving this that Woodburn describes are effective, then beyond the features of their behavior that function to keep them independent of neighbors, Hadza have nothing to adjust to but each other, and the natural environment.

For some readers, the indication that several generations of Hadza have behaved in much the same way as their parents (Hadza conservatism in the face of change) will be best interpreted as an example of the conservative force of “conformist transmission” (B&R 1985, Boyd&Henrich 1998). B&R argue that if costs of acquiring an adaptive behavior by individual learning (eg trial and error) are high, evolution may favor various forms of social learning, including blind imitation of the majority. The outcome may be an apparently maladaptive resistance to change. But in the Hadza case, as no doubt in many others, we find some traits (if we can call wearing more clothes and using more aluminum and fewer clay pots traits) that changed and many that did not. We have also seen temporary, reversible changes as during settlement periods. We need more than conformist transmission to account for the observations. The theories have to account for: i) the failure of Hadza as a whole to adopt novel, or “advanced” traits such as farming or herding that they have been able to observe throughout this period; ii) the observation that not only are there many Hadza who have spent a year or so farming, or laboring, or guiding, and returned to full time foraging but that iii) there are expert and full time hadza hunters who are the children of nearly full time farmers. B&R describe several forms of cultural transmission and mechanisms by which new behavior is acquired and spreads. By further developing the concept of costs of learning, cultural transmission theorists may become able to predict which mechanism will be employed when, which behavior is most likely to be acquired by which mechanism, and how the several different means by which behavior is acquired are expected to interact. This might lead us toward a greater ability to predict behavior from principles of transmission. Meanwhile, its use seems confined to post hoc interpretation. The utilitarian, opportunistic assumption behind behavioral ecology may at present be easier to use to generate predictions and to offer accounts of such observations.

5). Time depth and its significance. How long? How many breaks?

The behavior we reported for the 1980s and early 1990s, and that Woodburn reported for the late 1950s to early 1960s, appears to be the same as most Hadza have shown most of the time throughout the 20th century. Any time slice between 1910 and 1990 closely represents any other time slice in that interval.

Our interest in the time depth of our observations had two origins i) if the modern context was important, then presumably behaviour was different some time ago, and ii) if we proposed to link behavior to unchanging aspects of ecology, we would be proved wrong if previous Hadza behavior differed from that we observed in the 1980s. Our approach appears to have survived these two tests. But if key ecological variables had changed, our paradigm predicts change in behavior not constancy. Since we suggest that Hadza population density increased during this century, and substantial areas of land had been lost or altered, we need to discuss whether this might have affected the costs, benefits, and trade-offs which our work has focussed on [fn]. This also provides a context in which to discuss briefly another major issue in the revisionist critique, the use of modern hunter-gatherer studies by archaeology and human origins researchers.

In the Kalahari debate, revisionists attached great importance to the probability that some hunting and gathering San peoples had previously lived by herding. If one's theory is that behavior represents an accumulation of traditions with little shaping by circumstances, changing only by diffusion from other populations, then any interruption of those traditions, or contact with outsiders, or "corruption" with other lifeways, clearly damages one's ability to "extrapolate backwards". In this perspective, presumably we should expect brief interruptions such as Hadza experience of settlements and individual experiments with other ways of earning a living to also have left significant marks.

Behavioral ecologists assume that adaptive behavior is reached quite rapidly by some mixture of reasoning, pre-adapted emotion, individual learning, and selective cultural transmission. Interruptions, and previous economies would then be less important. From this perspective we could learn as much from secondary foragers as from "primary" (if there are any). Even if most !Kung were herders once upon a time, it does not invalidate our use of the data gathered by Lee and colleagues. Even if Hadza had been irrigation farmers until they had to flee from Maasai, their behavior as foragers is informative about hunting and gathering adaptations.This view depends upon an assumption that adaptive behavior is reached quite quickly, an assumption may not always be justified {footnote}. But this does not prevent research on the behavioral ecologist's empirical question: given costs A,B and C, and benefits X, Y, and Z and some particular trade-offs, adaptive behavior would be of form P, do we see form P or something else? If we see something else, then we would ask whether we had understood the trade-offs or measured the costs and benefits correctly, improve our measurement of costs and benefits, produce a new model and test its predictions. As last resort, the weakest response to a failed prediction, we might wonder whether the mechanisms of

change were too slow to produce adapted behavior in this setting. Cultural transmission theorists may be developing a way to replace this weak response with empirical tests to identify the form of transmission responsible for the character that apparently failed to adapt.

So were key costs and benefits changed by increasing population density or loss of land? If not, then constancy in Hadza behavior during the 20th century would be in line with behavioral ecological expectations. Are the costs, benefits and trade-offs to which we are directed by research among the Hadza likely to have been significant for foragers in the remote past? If so, revisionists may have over-estimated the damage they have done to the use of modern hunter-gatherers to inform studies of the remote past. When revisionists criticize the naive assumption that hunters in the past have done what hunters do today, we agree, how could one decide which hunter-gatherer population one would take as the model? Why would one suppose the level of key features of their environment were the same in the past? But our use (like other contemporary ethno-archaeologists and taphonomists, Yellen, Blumeschine, who else?) of findings from modern hunter-gatherers is very different, and more easily defended (refs. To O'Connell). Let us review some of our published claims about costs, benefits and trade-offs behind Hadza behavior.

We collected our behavioral and ecological data in the area least invaded by non-Hadza. It is our impression that in invaded areas, while newcomers reduced subsistence resources they offered alternative resources like employment guarding maize fields (Hadza get to eat the invading animals, and ad lib ripening maize). But even in Tliika, Hadza population density may have been greater than, for example during Kohl-Larsen or Obst's visits. Had this change induced significant hardship we should have seen change in height and weight. Density might influence ease of acquiring food, which might requre people to work longer hours, move camp more often, or raise fewer children. It might increase the significance of help to mothers. But it would not affect the opportunity for teenagers or older women, given that they have digging sticks and minimal knowledge of plant foods, to provide such help. The same goes for the foraging activity of smaller children. This is influenced by their strength and / or skill at extracting different kinds of food. This in turn is shaped by the nature of the food plant, its spatial distribution (habitat preferences), and the tool kit available. We do not see how small changes in population density would alter women's trade-off between accessing difficult to obtain but highly productive resources, and having to provide for juveniles, a crucial difference between humans and other primates (Hawkes et al. 1995).

If hunting was formerly much more productive and reliable, it might weaken two parts of our argument against the long-held idea that men hunt to provision wife and children and that monogamy/ pair-bonding arises from costs of desertion. (No costs of desertion found among Hadza, pursuit of small game provides adequate daily protein for wife and children, a sharp contrast with Hadza big game specialization). But O'Connell (1988) shows that game density was close to that predicted from rainfall (Coe et al 1976). Early writers give ample evidence that Hadza hunting success was always very variable.

It is difficult to see how increased population density could affect our conclusions about scavenging and bone transport. Note that our application of our observations to the remote past is not the simple "literalist" imposition of today's observations onto the pleistocene. We do not argue that because Hadza do quite well by scavenging then early hominids scavenged. Quite the opposite - because returns from scavenging depend so much on a quick arrival and supplanting of predators, it is unlikely that hominids without heavy arrows could supplant predators rapidly unless in large numbers. Because ways to increase scavenging opportunites interfere with other foraging, we suggest that even though it pays to pursue a scavenging opportunity when one is encountered (vultures seen falling, squabbling predators heard), it would seldom pay to make scavenging a specialized strategy. The bone transport studies do not conclude that Hadza assemblages allow us literalist interpretations of archaeological assemblages. Instead we argue that knowing some of the factors that influence which parts are transported allows us to make better interpetations of archaeological material. We also suggest influences of technology. Increased availability of cooking pots, which improve the ability to extract fat from some kinds of bone, might have an effect.

We conclude that the behavioral ecology stance does not predict change among Hadza living in the bush during this century. The costs, benefits, and trade-offs which we have proposed are responsible for scavenging, big game hunting, some aspects of women and children's foraging, and their link to post reproductive life and elongated juvenile period, have not evidently changed during the 20th century. The observed constancy in Hadza behavior does not pose a problem for our approach. The revisionist critique of the use of data from contemporary foragers for thinking about the past misses the mark, it seems directed at an earlier and much more naive use than is made in contemporary archaeology.

3. Revisionist critiques of Evolution, Lee, and Ecology.

We disputed the revisionist view that contemporary foragers are best understood as shaped by the modern world, and disputed the view that contemporary foragers have nothing to teach us about the remote past. What else in the revisionists' seemingly all encompassing critique of "evolutionary approaches", and "ecology", is relevant to our "evolutionary ecology"? Wilmsen's critique of ecology was especially directed toward Lee's ecology, which differs from ours and we must discuss these differences. Wilmsen seemed to target three distinct aspects of Lee's work: his emphasis on adaptation to the natural environment rather than to the political environment; the nature of his ecological explanation of his observations; and the messages that others may have taken from his reports.

A. Evolution.

It is not always clear what kinds of evolutionary thinking are the target of revisionist criticism. But among them is a kind of typological thinking that surely has

outlived its usefulness. Hunter-gatherer as a category purports to subsume many variables whose association with obtaining food primarily from wild resources remains undemonstrated. But revisionists are especially hostile to the belief that placing a people into the hunter-gatherer "grade" implies they are incapable of learning anything new, or of living by any other means. A piece of taxonomy is a statement about correlations among descriptors and need not imply any such thing. But revisionists feel they have identified such implications in the literature, or in the action of those in a position to make decisions affecting forager people's lives.

B.Ecology vs politics as causal factors.

Like ecologists, Wilmsen and others often take a materialist approach (economic facts and power relations influence behavior). Such materialism is quite compatible with our approach (among economic facts are those set by the natural environment, power relations are complex and subtle and well modelled by economists and biologists whose work we often cite like Hirshcleifer, Maynard Smith). But revisionists clearly emphasize material factors resulting from neighbor action and the modern setting over factors resulting from the natural environment and co-residents. While it may be useful to push researchers toward more balanced expectations about the importance of these factors, it seems at least as unreasonable to exclude all ecological influences as to exclude all neighbor influences. But this question of balance between natural environment and economic-political environement comprises only a part of revisionist opposition to Lee's ecology.

C.Why are there still foragers?

Revisionists contend the claim that foragers forage because it is the best economic option where they live. Lee has claimed that foraging is a good, or viable option for the !Kung. Our behavioral ecology position should claim that it is the best option. In both the !Kung and the Hadza case it is easy to claim that foraging has been a better option than farming in most localities in most years. But in the Hadza case, this is because others had taken the irrigable land at Yaeda and Mangola. Furthermore, in both the !Kung and the Hadza case it would be difficult to argue that foraging was a better option than herding. Both populations are being rapidly outnumbered by herders. The influence of these herders is surely a main reason why !Kung and Hadza forage and do not herd. Wilmsen documents some of mechanisms in the !Kung, and broader San, cases. Hadza believe that Datoga would take any livestock they acquired, and kill some people at the same time. Only in 1995 did we come across a Hadza who owned a few Goats. The Eyasi basin was formerly densely populated by Tsetse flies, which may have made herding a less superior economic option. This is no longer the case. It seems hard to argue that revisionists are wrong to claim that foragers still forage in the 20th century because alternatives are not open to them. But given that the farming and herding options are not available, it may be that the costs, benefits, and trade-offs set by the foraging economy exert an influence on the behavior of foragers.

D. Ecological theory.

Lee's ecological theory is different from ours. Lee took his ecological guidance from an era in biology when it was believed that populations were able to stabilize themselves at a level below carrying capacity, either by evolved social mechanisms, or by adaptation to very long-term environmental fluctuation (i.e. population was that which could survive the worst times, and thus in average and good times was well below carrying capacity). Lee's quantitative data on !Kung work schedules, and his quantitative analysis of !Kung birth spacing appeared to confirm this view. Egalitarianism, and widespread food sharing seemed to be a helpful variance-reducing component of this adaptation.

Revisionists found this account at odds with their view that [shit flows downhill] interactions between groups are always exploitative, the richer exploit the poorer, and in the San case, the existence and lifeway of San, !Kung included, was an outcome of the depredations of the industrial nations. In their view, !Kung leisure was misinterpeted, and the dietary adequacy claimed for Dobe was contradicted by Wilmsen's data from nearby /'ai/'ai. Indeed Wilmsen's nutritional data appear to constitute a powerful argument that !Kung egalitarianism did not everywhere remove variance in nutritional status, and that at his study site !Kung well-being was indeed strongly influenced by the ties they had managed to create with Herero and Tswana.

Behavioral ecological research on people (refs S&W, MBM, H&H&H) owes much to the success of Lee's use of quantitative methods and his careful attention to subsistence ecology. But we took our ecological inspiration from a later development in Biology that questioned whether evolution could produce either restrained population, or adaptation to the extreme worst year and instead proposed that it produced creatures that, often flexibly and opportunistically, maximised their fitness, or approximately, the reproductive success of the individual and its close biological kin. BJ&S 1978, BJ 86,87 examined !Kung birth-spacing from this point of view, and claimed to have shown that the apparent restraint was instead a maximisation of the number of children a woman raised to near adulthood. In BJ et al 199- and 199* we challenged other aspects of "original affluence", such as the view that !Kung children did little "work" because their number was kept below the level which adults could easily support.

E. Messages to the wider public.

Harpending & Draper (19**ref) comment that the Kalahari Debate seemed to be about 'what we tell science writers'. Revisionists' most vibrant language seems directed at messages that were or they think might be derived from Lee's data and reports. They suggest that Lee's ecological theory leads too easily to the view that !Kung are incapable of change, or are better off the way they are, and therefore can be left out of development efforts or hindered in their efforts to acquire livestock or otherwise increase their

economic resources. At very least, they claim, Lee's account can be used as rationalization by those who wish to oppress or ill-treat San peoples.

Concern with such "messages" that are (or more often, might be) taken from scientific research has grown in recent decades, and although one of us has come across it repeatedly in developmental psychology before any psychologist ever heard of post-modernism, this concern most strongly characterizes post-modernist writings from which revisionists take some of their inspiration. They claim that the messages cannot be distinguished from the science, and as evidence use the often rather obvious parallels between the zeitgeist and the aspects of science that become popularly known. Thus revisionists commented that the image taken from the !Kung studies was a close fit to the "flower child" image of the time. Revisionists seem to feel that this image is derived from erroneous ecology, and could be too easily misused by those with power over San people. The appeal of this image in western society is a legitimate topic for investigation by those who study western society. It is interesting that populations other than the !Kung did not get cast in this role. Why are the Ache and the Hadza less appealing to westerners?

Unlike revisionists, we think we can discriminate between the scientific description and explanations for human behavior, and the quasi-moral messages made out of these descriptions by a wider audience. The choice between Lee's ecological model and ours can be made by deriving predictions and testing them against empirical data, without reference to the moral value of any message someone else might make out of Lee or our accounts. But we also notice a consequent public relations problem for Anthropology. Anthropology owes its place in liberal arts curricula to the popularity of its received messages, most noticably the message of infinite possibility and ethnic equality taken from cultural relativism. Popular, and student, support for anthropology depends on audience use of descriptions of other cultures to change, or to justify, the audience 'world view'. If these messages are not inherent in ethnographic descriptions and theories but are gained by processing them, we potentially threaten the role of anthropology in academic and cultural life. Can Anthropology have it both ways? Can it on the one hand pursue scientific investigations and report them with no concern for the 'life messages' others may take away, and on the other hand continue to expect to fill large classrooms and have a public voice? Does it have a message or doesnt it? If it does, by what logic do we, or our audiences, derive messages from descriptions and theories? Exploring this process might be more productive than continued effort to deny the obvious successes of the scientific method. It is an exploration that would benefit from the insights and skills of anthropologists.

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Table 1. The early German explorers who travelled through Hadza country.

Year	Author	Occupation	sponsors	Documents
1892-93	Baumann		German Anti-slavery Commission, G East Africa Railway company,	1894 Book 1894 Journal article
1892-93	C.W.Werther	1st Lieutenant 2nd Pomeranian Field Artillery Regt 17		1894 book
1893-94	G.A.Graf von Götzen	Lieut Royal Prussian 2nd Gard ülanenregiment	?	1895 book
1896-97	C.W.Werther	1st Lieutenant 2nd Pomeranian Field Artillery Regt 17	Irangi Gesellschaft	1898 book
1906-7	Dr. Fritz Jaeger	Privatdozent in Geography, U of Heidelberg	German Nature Preservation Society	1911 Book

Table 2. The sources of observations on the Hadza. (double line separates each quarter of the century).

Year	Author	Occupation	Sponsors	Documents
1910	Dempwolff	Army physician Linguist	German colonial army	Journal article
1911	Obst	Privatdozent, Geography, U.of Marburg	Geog. Soc. of Hamburg	Journal papers and book
1917-23	Bagshawe	District officer	British Government	Journal article
1930	Dorothea Bleek	Linguist		Journal articles. Field notes
1931-38	Kohl-Larsen	Physician, Explorer	?	Books, Photos, Collection
1945-47	Cooper	Game Officer	British Government	J. article photogrpahs
1950	Fosbrooke	District Officer govt sociologist	Mus of Dar es Salaam	J.article Photos Collections
1958-61	Woodburn	Anthropologist		J. articles etc
1959	Jelliffe	Paediatrician	U of Kampala Med Sch	J article Photographs
1966	Tomita	Anthropologist		J article
1966-67	Nigel Barnicot	Physical anthropologist	Internat.biol. Program	J articles Bennett, et al
1974-77	Lars C.Smith	Anthropologist	Harvard Univ.	Census data
!980-81	W.McDowell	Anthropologist		Reports toTanzania gov
1982-84	Annie Vincent	Archaeologist	UC Berkeley	J article, thesis
1982, 1985-97	NBJ, KH, JO'C	Anthropologists, Archaeologist	UCLA, U. of Utah	J articles
1986, 1989	Henry Bunn	Archaeologist	U of Wisconsin	J articles
1990	Ladefoged, et al	Linguists	UCLA	Working paper

1992	Sands	Linguist	UCLA	PhD thesis

Table 3 a. Subsistence.

	1900 - 25	1926 - 50	1951 - 75	1976 -
Men hunt	+++	+++++	++	++
At night	++		+	+
Men no trap	++-		+	+
Know traps	+	+	+	+
Meat jackets	+	+		+
Scavenge	++		+	+
Take honey	++	+++	++	++
Women dig roots	++	++++	++	++
Pick berries	++	++++	++	++
Collect Baobab	++	+++	++	++
forage daily	++		+	++
Children forage	++	+++	+++	++
No livestock	++	+++		+
Many in bush not farming	++	+++	+++	++
Dry season > wet	+	+	+ - -	-

Table 3b. Trade and neighbors.

	1900 - 25	1926 - 50	1951 - 75	1976 -
H give honey	++	+	++	++
H give meat	++	++	+	+
H give skins	++	+++	++	-
H receive iron	++	++	+	+
H receive beads	+++	+++	+	+
H receive pots	+	++	+	+
H receive tobacco	+++	+	+	+
H receive clothes	+	+	+	+
H receive farm food		++		++
Pay no tax	+	+		+ -
Flee strangers	++	+		+
Game law arrangement	+	+		+

Table 3 c. Social, ceremonial and religious traits.

	1900 - 25	1926 - 50	1951 - 1975	1976 -
Sharing	++		++	++
No chiefs	-+	-++	+	++
Forage anywhere	+	+	+	++
Often move	++	++++	+	+
Dispersed in rain	+	+	+	++
Mostly monogamy	+	++-	+	+
Some polygyny	++	++	+	+
Levirate	++	-		+
Brideprice	++	++	++	+
divorce easy	+		+	+
violent sanctions on adultery		+	+	+
God is sun	+-	++		+
Epeme meat			++	++
epeme dance		++	+	+
Haine		+		+
No after life	+	+		
Lukuchuko		+	+	++
Very simple repetitive songs	+	+	+	+

Table 3 d. Housing and Technolgy

	1900 - 25	1926 - 50	1951 - 75	1976 -
House type	+	+	+	+
Rock shelters	+	+ -	+	+
Climb Baobab by Pegs	+		+	+
Bow "deco" rings	++	+	+	+
Arrow poisons, panjupe	+++	++	++	+
" " shanjo	+	+	+	+

Table 4. Quantitative characters.

	1900 - 25	1926 - 50	1951 - 75	1976 -
Height, men	161	161 / 160	161 (n=126)	161 (n=80)
Ht, women	150	145 / 150	150 (n=100)	150 (n=66)
Bow length rim	177, 180	180-207	183	150 - 180
Bow, string	160-165	154-160		159.5 (140-175)
Divorce rate			49/1000	50/1000, '85-'90 60/1000, '90-'95
Numbers, east	100 / 500	450	500 / 500	750
" " east + west	500	450	700	1000
% "children" in camps	40%	44%	42%	39%

APPENDIX 1

1.Scavenging.
1901-1925
Obst 1911(22:27-29): "Men,women and children look up longingly to the sky. If they see somewhere a flock of Vultures they hurry there, to eat the game killed by Lion or Leopard."

Bagshawe 1923(121:15-19): "They are gruesome scavengers, and I have known them to gorge themselves, with evident relish and no apparent ill results, upon the carcass of a rhinoceros which was polluting the atmosphere for half a mile."

1926-1950
Kohl-Larsen 1958 (p79) (obs in 1930s) Informant Schungwitscha: "Ich ging mit meinen drei Söhnen in die Steppe. Als ich in die Steppe komme, treffe ich eine Löwin mit fünf Kindern. Diese Löwin hatte schon ihre Beute für ihre fünf Kinder, und zwar hatte sie ein Zebra geschlagen. Wir hatten die Vögel gesehen (gemeint sind die Aasgeier in der Luft)...Ich habe dann meinen giftpfeil abgeschossen." This apparent scavenging attempt ended in a battle with the Lioness in which the informant was injured but one Lion cub killed and taken.

1951-1975
Woodburn 1968c:342. "I think Professor Washburn may perhaps be understating the importance of scavenging. The Hadza, living in an area at least as rich in both predatory and herbivorous animals as anywhere else in the world where hunters and gatherers survive, often obtain meat by scavenging. The meat is located by watching the movements of vultures flying overhead. The interpretation of the movements of vultures is very skilled..... They eat the meat of animals that have died by themselves as well as those killed by predators...."

1976-. O'Connell et al. 1988.

2. Children's foraging.

Obst 1911(9:22-23): "Notizbuch und Bleistift stets in der Tashe begleitete ich die Männer auf der Jagd, folgte den Frauen, wenn sie mit den Kindern in die Beeren gingen,..."
1911(21:30-31): "Früh gegen 7 Uhr - die Wakindiga sind sämtlich Langschläfer - gehen die Frauen und Kinder in den Busch, um gegen 9 bis 10 Uhr mit Wurzelfrüchten oder Beeren oder dn Früchten des Affenbrotbaums beladen zurückkehren."
"I...followed the women when they went out with their children to collect berries" Obst 9:22-23."the women and children go into the bush... they return with root fruits or berries or the fruits of the baobab"Obst 21:30-33.

Bagshawe 1923(120:17): "The life of a Kangeju family is a struggle for food, the members scattering daily in search of what can be found, the men with bows and arrows, and the women and children with digging-sticks."

Bleek 1931:274. "their vegetable food the roots, bulbs, and wild fruit gathered by the women and children."

Kohl-Larsen 1958 (Pl 89) "Tindigafrau mit Kindern beim Beerenpflücken.", and Pl 91. Also photograph in Renner 1991.

Cooper 1947:12. "The photographs of small boys with their toy bows used for shooting small birds, etc., will serve to illustrate how early they begin to develop this art."

Woodburn 1968:51 "Vegetable food is collected almost every day by the women of the camp who go out as a group or groups with their children." 1979:246 "If the carcass is found, a message will be sent..., and men, women, and children will, if they wish, come out to carry in the meat...". 1970:45 "By the age of about ten, boys are already skilled at making their own bows and arrows and are able to provide themselves with an appreciable amount of meat in the form of birds, squirrels, hyrax and other small animals."

Tomita 1966:161 "Large flocks of birds...Together with the women and children they arm themsleves with stones and sticks and lie in a bush concealed...They hurl stones and sticks at a large flock of birds, then kill and eat them." p167 "tafabe fruit...It is gathered by the women and children twice a day in the morning and evening. All the women and children form a group go out together to pick the fruit". "madabe fruit...is gathered twice a day in the morning and evening by the women and children." a root "Children were seen eating it raw on their way home from the gathering."

Matthiessen 1972:231 "Soon the akwetepi, the "little people," come past the cave, first boys with bows, then younger children seeking berries...They pull berry branches down and strip them, laughing." p215 "The boy Saidi, preparing his small arrows,...Then he rises and goes off after dik-dik and rock hyrax," p221 "Four naked children have

clambered up into a grewia bush and hunch there...munching sweet berries while they watch us."

McDowell 1981a:5 "Groups of women go out to pick berries, gather fruits, or to dig tuberous roots. Children of all ages go with the women or stay at the camp with older sisters or grandparents."

Vincent 1984:139. Writing about root digging. "Young suckling babies will be carried on the back on digging trips, but once they are able to walk, children are generally left in camp with older female relatives, especially if their mothers are going on longer trips. girls will begin to participate actively in digging trips by their early teens." "Young teenage girls and women into their sixties will regularly dig,...".

Blurton Jones et al.1989, Hawkes et al.(1995).

3. Trade

Obst 1911 (22:fn1): "Nur selten tauschen die Wakindiga bei den Waissansu gegen Löwen- oder Leoparden Felle und andere Jagdprodukte oder Honig Tabak ein." (23:17-20): "Die riesige mit Widerhaken versehene Spitze besteht aus Eisen und wird aus alten, bei den Waissansu eingetauschten Feldhaken ohne Anwendung von Feuer gehämmert und an Steinen geschliffen."

Bagshawe 1923 (120:34): "he makes his arrow-heads by grinding down old spears obtained from other tribes"; (121:5-7): cited in "Sources".

Bleek 1931: 278. "Besides tobacco they buy iron, pots, calabashes, beads, copper rings, and stuffs from their neighbours, giving in exchange meat, skins, honey, and beeswax. The latter they sometimes take to the Indian stores and sell for money."

Kohl-Larsen 1938 (36): "other tribes...gave hemp and maize to the tindiga for furs and horns." "...Mais auch Hanf anbauten, den sie an die Tindiga gegen Felle und Gehörne abgaben."

Cooper 1947:13:"...iron implements..., or they may be obtained from the Wanyisanzu in exchange for items of barter such as skins, or meat." 14: "Some barter of game skins, for millet and other articles, was temporarily stopped but may begin again." 10: "Those living close to the comparative civilization of Isanzu have even been seen wearing ragged shirst and shorts." "The women have a few bead ornaments..."

Fosbrooke 19**:3 "Domestic equipment consists of clay pots, and gourds, obtained by barter, supplemented by leather bags of local manufacture. For personal adornment beads and wire are bought or bartered;"

Woodburn 1968a:50 "Unlike most other East African hunters and gatherers, the Eastern Hadza are relatively independent of their agricultural and pastoral neighbors. Although they ely on trade and begging to obtain tobacco, cloth, beads, iron, and other goods, they have not entered into an elaborate dependence on, or interdependence with heir neighbors." 1970:12 "Some artifacts and some materials are obtained by trade with neighbouring tribes. honey, the tails of wildebeeste and giraffe, herbal medicines and other bush products are given by the Hadza in exchange for beads, gourds, pots, cloth, iron blades (for axes, knives and kasama arrows) and pieces of iron for making arrowheads and other objects."

Tomita 1966:164 "At present only a very small part of the game hunted and killed by the Hadzapi is used as barter objects for trade with other tribes in Mangola."...In this way the Hadzapi maintain friendly relationship with these agricultural people and are able to obtain corn from them. The agricultural people ask them for zebra fat and the pastoral people request the horns of the male Eland. Dig dig hourns [sic] are sold to other tribes

who use them as containers for snake potion." Tamarind fruit..."The Hadzapi bring it to Swahili farmers...to barter it for corn..." also Baobab.
Barnicot et al.1972:111"Virtually all Hadza men smoke tobacco and, until they became settled, they also smoked hemp (cannabis). Prior to the settlementvery few women smoked tobacco, though most chewed it, and noen smoked hemp."

McDowell 1981a:7. "Hadza men also take advantage of the active local demand for honey by selling or trading some of their production each year." p8: "Honey is one food that is sometimes accumulated by individuals, as it is often sold to non-Hadza for cash or cloth". Also Fig 1. 1981b:2 "...the Hadza assert that they have always used iron arrow-heads and knives for hunting big game, having obtained iron in trade with the Isanzu people and cold-pounded it themselves."

Hawkes et al. measured agricultural food entering camp hrouhgout 1985-86. Less than 5% of calorie intake was from agricultural food, obtained by trade. Tobacco, beads, clothing and cloth, knives, and six inch nails to make arrow heads are the items most often and ardently requested from us.

4.Sharing.

Obst 191(22:1): meat carried back to camp where "wo sich Frauen und Kinder mit wahrer Raubtier-gier auf das Fleisch stürzen und es roh oder nur eben angeröstet bis auf den letzen Rest verzehren, wenn im Magen auch nur einigermassen Raum dafür vorhanden ist."

Bagshawe 1923 (120:19-20): Ïf game be shot or food discovered which cannot be carried conveniently to camp, all move to the neighbourhood and eat until it is finished..."

Kohl-Larsen 1958:96 "80 Menschen assen in knapp zwei Tagen ein Nashorn auf".

Woodburn 1968a:53. "In camp meat is widely ditributed and rapidly consumed...fmiliar with echniques for drying meat.. But in practice...Meat should be shared with those who ask for it....To...store it would be largely wasted effort...other people would simply demand meat... and it would be wrong to refuse them."

Tomita 1966:162 "Usually a small animal is not divided up and shared with other members of the tribe, but eaten by the hunter's family. But if it is an animal larger than the impala it is evenly divided up and shared with other members of the tribe who have contributed to the share by helping carrying the meat." .163-164. "The meat is divided up at this time and the share of each member is decided and is then carried home. All the members of the group who can help, participate in the work of carrying the meat." Next a long session on epeme meat "God's meat"which only adult men may eat. Then: "A large animal is cut up into small pieces and the meat is laid on top of the roofs or on wooden boars to dry in the sun. But dried meat never lasted over 4-5 days however as the Hadzapi are always hungry and have big appetites."

Matthiessen 1972:213 "In a day the zebra is already gone,"

McDowell 1981a:7-8, a detailed section beginning "The traditional Hadza food distribution process is based on the custom that food must be shared with anyone who asks for it, and no one is afraid to ask."

O'Connell et al. routinely weigh shares of meat arriving at housholds and have observed food transfers between children and others. Meat appears to be very evenly shared between housholds as previous authors claim.

5. Levirate.

Obst 1911 (9:14): "mit der von seinem Bruder ererbten Frau Kinder..." (26:1-2): "Der Witwe und der Kinder des Verstorbenen sich anzunehmen, ist Pflicht der ältesten Bruders."

Bagshawe 1923(127:14-15): "A widow is forbidden to all but her deceased husband's brothers." (127:23-24): "If a man dies his brother takes over his family complete, together with their scanty property."

Bleek 1931:279. "When anyone dies...A man's possessions are divided among his brothers or cousins; his wife and children wander about seeking food; no special relative seems to be responsible for them." Her notebooks include a series of remarks by one woman about how difficult her life had been when her husband died. She reported having wandered here and there looking for food.

K-L 1943:257 "Dann wird die witwe von einem ihrer Schwäger übernommen. Das erste Anrecht auf sie hat der älteste Bruder des Toten."

Blurton Jones et al. noted two marriages in which a dead husband had been replaced by his living brother. Both these marriages have lasted several years.

6. Epeme dance.

Bleek 1930 notebook. sketch of the Ostrich feather headress on p661.

K-L 1958:44-45. "Der Epembe-Tanz (nach Dr.Berger linguistich richtiger als Epemmetanz bezeichnet) wird mit der Bitte um Jagderfolg verbunden..."much interpetation follows with little further observation. Pl 104 "Straussfedernschmuck beim Epemmetanz." Pl 105 "Der Hordenführer trägt beim Epemmefest einen länglichen Stein in seiner linken Hand."

Woodburn 1972:200 "The monthly sacred dance, to which great importance is attached by the Hadza, can also be held much more effectively in a camp where there are plenty of people." 1970:57 "Objects used in connection with the Epeme dance. Specimens 103-112 Plates 31 & 32. Each month on moonless nights the Hadza living in all but the smallest camps perform a sacred dance to which they attach a great deal of importance...."

We witness epeme dances regularly while in the field, they are held at least monthly, often more often. The headress and other objects are still in use.

7. Rock shelters.

Obst 1911 (22:21-22): "one of the numerous protruding gneiss-granite tiles, provide enough protection against sun and rain for one or a few days"

Bagshawe 1923 (122:39-123:1): "Constantly on the move, they have no permanent residences and build no houses. If unable to obtain shelter amongst rocks or under suitable bushes, they sometimes construct flimsy huts of twigs and grass..."

Kohl-Larsen 1958:37. "In Regenzeiten gibt es aber für die tindiga in ihrem Lande noch natürliche Zufluchtsstётten, Höhlen, unter deren schützendem Dach sie nicht nur oft rasten, sondern auch für längere oder kürzere Zeit wohnen." "Natural refuges exist for the Tindiga during the rainy season, these being caves in which they could not only rest, but occupy for longer or shorter periods."

Cooper 1947:10 "No use appears to be made of rock shelters, although a few are to be found in the area."

Woodburn 1972:194 "When really heavy rains occur, some of the Hadza choose to move into rock shelters of which there are large numbers in their country." 1970:11 "During heavy rains in the wet season, camps may be made in rock shelters. Many of these shelters have been used intermittently over vast periods by people, perhaps including the ancestors of the Hadza...deposits of the shelter floors."

Matthiessen 1972:206 "forming an open-sided shelter five feet high; similar rock shelters...at the hearth is a cracked gourd,a rag, a dik-dik skin,"

Blurton Jones photographed and measured rock shelters used in two locations during rainy season 1989. Informants implied that this was their regular practice, and offered to take us to more such sites.

8. Percent of children in camp.

Obst 1911 (6:1): "Von den fünfezehn Männern, achtzehn Weibern und zweiundzwanzig Kindern, die ich im Lager antraf, konnten sich nämlich nur die knappe Hälfte - sieben Männer, ebenso viel Frauen und elf Kinder - als echte Wakindiga ausweisen." (22/55 = 40%, 11/25 = 44%).

K-L 1958:38 "Die Horde setze sich aus 30 Männern, 20 Frauen und 40 Kindern zusammen." "The band included 30 men, 20 women, and 40 children". 40/90 = 44%.

Cooper 1947:13. "I was surprised at the numbers of children, and nearly half the women appeared to be pregnant."

Dyson 1977 Table 1. 42% < 15.

McDowell 1981a Table 7b. 39% < 16 years old.

Blurton Jones et al.1992: Table 1. 39.1% < 15.

APPENDIX 2

Reference sources for Table 3. These have the format "abbreviated author name [(year of publication if more than one publication by this author, and a or b if more than one in same year);page:lines]. "Nt" refers to Bleek's notebooks in Capetown University Library. P refers to unpublished photographs. Published photographs or drawings are referred to by page and figure number. Note that year of publication is later than year of field visit, especially for Kohl-Larsen. "Us" refers to unpublished informant comment to, or observations by Hawkes, O'Connell, or Blurton Jones. "LCS" is pers comm. from Lars C. Smith.

Subsistence

Men hunt: +Demp[319:15], +Obst['12;21:9], +Bag[120:10][121:9-10]
+Bleek['31a;273:3]&['31a;274:19], +Berger[97:1], +KL['58;63],+Coop[9:26], +Fos[3:9]
+JW['68a;51:20], +Tomita[160:26]
+ McD['81a;5:17], +Us

Sometimes hunt at night by water from blind: +Obst['12;23:26], +Bag[123:24-30], /
+Bleek[Nt;191], +(blind by water,?night)KL['58;63:21-26],
+JW['68a;51:40], /
+Us

No trapping: +Obst['12;23:28], +Bag[124:11]&[123:22](but noose GuineaFowl123:12), /
+KL['58;63:8&10]/
+JW['68a;51:23]&['70;17:10-13],
+Us

Boys trap or men know traps: +Bag[123:12] / +Bleek['31a;280:5],
Western Hadza JW['70;47:& specimen 77]
+Us[KH'91]

Meat jacket: +Bag[124:15-19], / +Coop[10:1] / / +Us

Scavenge: +Obst['12;22:27-29], +Bag[121:15-19]/
+KL['58:79:16]
+JW['68discussion;342]& ['70;17:7], +Jell[907:9&909:17],
+Us[JOC'88]

Take honey: +Obst['12;22fn1], +Bag[121:27],/
+Bleek['31a;278:19], +KL['58;112], +Coop[9:21],/
+JW['68a;50:7], +Jell[907:3], +Tomita[165:24]&[169:40-41]/
+McD['81a;5:18], +Us

Subsistence

Dig roots: +Obst['12;21:9-10]&['12;22:24-26], +Bag[120:18&121:12], /
+Bleek['31a;274:19-20], +KL['58;109], +Coop[9:17], Fos[3:29] /
+JW5['68a;50:49], +Jell[907:1],+Tomita[168:7]/
+McD['81a;5:18], +Us[KH'89]

Pick berries: +Obst5[9:22-23]&12[21:9-10]&62[22:24-26], +Bag8[121:11] /
+Bleek[31a;274:19-20], +KL['58;111&113], +Coop[9:21], +Fos[3:16] /
+JW5['68a;50:49], +Jell[907:2], +Tomita[167:10-168:5,&169:9-22]
+McD['81a;5:15], +Us[KH'89]

Collect baobab: +Obst['12;21:32], +Bag[121:30],
+Bleek[Nt;406],+KL['58;111-112], +Coop[9:12], +Fos[3:16]
+JW5['68a;50:49-]& ['70;40:col2],Jell[909:15], +Tomita[165:39]&[169:23-31],
+McD['81a;table 1, fig 1], +Us[BJ'89]

Daily forage: +Obst['12;21:28], +Bag[120:16],
+KL['43:261&'58;110]
+JW['68a;51:26], Barnicot['72a;113:17]
+McD['81a;5:13&6:5-9], +Us

Children forage: +Obst['12;9:22-23]&['12;21:30-31], +Bag[120:17]
+Bleek['31a;274:20], +KL[photos in Renner&'58;110], +Coop(boys)[12:25]
+JW['68a;51:28]&['79;246:27carry meat]&28&29['70;45-47], +Jell[908:36&Fig6],
+Tomita[168:3-4&168:12]&[161:35]&[167:23-25]/
+McD['81a;5:16], +Us[BJ'89]

No livestock: +Obst['12;21:15-16], +Bag[121:32&33:4-5]
+Bleek['31a;274:18], +Coop[14:22], +Fos[3:14]
+JW['70;11:column 1:line 20], +Bennett[246:24]
+McD['81a;4], +Us

Many in bush with no crops: +Obst['12;21:20-21], +Bag[121:31-32&33:4],
+Bleek['31a;274:18], +Coop[14:41 by implied contrast with Isanzu localities]&[8:44-
9:1]&42[14:22], +Fos[3:14]
+JW['68a;50-51], +Tomita[157], -few Bennett[244:37-245:7]
+LCS, +McD['81a;4], +Us

Some farm: /-/ Bleek(indirect, see text), +Coop[14:41]&[8:44-9:1]
+JW['68a;49:14-17], +Jell[907:16], +LCS,
+McD['81a;18:9-11](eastern higher land and mikocheni)], +Us

Seasonality, dry better hunt than wet +Obst['12;22:15-19], /+KL['58;37:24-26],/

(+)JW['68a;52:24-27]&['68b;106:38-39], +Jell[908:6], -Tomita1[169:35-41],
+Barnicot['72a;113:30-33]
+-McD['81a;7:6-7 and Table 5 & Table 2 notes], -Us[KH'91]

Trade

Hadza give honey: +Obst['12;22:fn1], +Bag[121:6-7],
+Bleek['31a;278:29](and wax),
+JW['68a;52:12-15], +Jell[907:16], -Tomita[169:1-4 and tamarind],
+McD['81a;7:24-26&8:6-8&21:23], +Us

Hadza give meat: +permit to hunt Obst['12;18:20], +occasionallyBag[121:7],
+Bleek['31a;278:29], +Coop[13:25],
+Tomita[165:1-5], /+ Us

Hadza give skins: +Obst['12;22:fn1], +Bag[121:6-7],
+Bleek['31a;278:29], +KL['58;37:2-3], +Coop[14:44&13:25],
+JW['70;12:6-7], +Tomita[165:1-5], /- Us

Hadza receive iron: +Obst['12;18:22], +Bag[120:34&121:5],
+Bleek['31a;275:31-32&278:27], +Coop[13:23-25],
+JW['68a;50:6], +Jell[907:17], / +Us

Hadza receive beads: +Obst['12;18:22], +Bag[120:35&121:6], (armrings
Demp[324:fn16])
+Bleek['31a;278:27], +Coop[10:14-15], +Fos[3:34]
+JW['68a;50:6], Jell[907:17], /+Us

Hadza receive pots: -+Bag[121:24], +Reche[254]
+Bleek['31a;278:27](clay), +KL['58;pl61&88 (clay)], +Fos[3:36] /
+JW['70;12:9], / Us(aluminum)

Hadza receive tobacco: +Demp[324:word 120], +Obst['12;22:fn1], +Bag[121:5], /
+Bleek['31a;278:27&Nt;454], +KL['58;131:1-17] /
+JW['68a;50:6], +Barnicot['72a;111:11], +Jell[907:17&909:30], / +Us'85-'92

Hadza receive cloth/clothes +Demp[324:fn12],
+Bleek['31a;276:10&278:28],+Cooper[10:3-4 if live near farmers]
+JW['68a;50:6], Jell[907:17&909:30],
+McD['81a;8:7(& cash)] +Us'85-'92

Hadza receive farm food: +KL['58;37:2-3(maize&hemp)], +Cooper millet[14:45],
-JW ['68a;50:6] +Jell[909:23], +Tomita[165:7&169:3] +Barnicot['72a;94:3]
+McD['81a;fig 1] +Us'85-86maize, '92maize&millet

Pay no tax +Bag[123:13]/ +Coop[9:4],
+JW ['79;247:16 and 248:13, '70;11: col2: lines28-29] +Us85-91,CCMsubs

Game law arrangement +Bag[123:17-19]

+KL['58;114fn27],+Coop[14:45-15:6]/ +JW['79;247:16"unadministered" and 248:19-21]
+McD ['81a;20:20-35] +Us (Alan Shanny pers comm '90-'92)

Flee or hide from newcomers: +Obst['12;8:25], Bag[118:14-15&117:22-
23&127:27&119:19], +JW ['79;250:4-13], /Us

Hadza work for farmers or outsiders
-Bag[121:fn1]
-JW ['68a;50:6] + Barnicot['72a;94:3(west)]
+McD['81a;3:29-31] +Us '82 Mangola, '85 Siponga,'92 Mikocheni.

Hadza smoke hemp
+Bag[122:24],
+KL['58:97:31],
+JW['70;34:col2:3], Barnicot['72a;111:10-12],
+Us.

Social organisation

Widespread sharing: +Obst['12;22:1], +Bag[120:19-20], //
+JW['68a;53:10-27], +Tomita[163:9-39(big prey not small)&164:25-27]/
+McD['81a;7:28-30], +Us

No chiefs: +Bag[123:6-7&fn1],
+Bleek['31b;424:7], -KL['58;31:34&129:5"hordenfuhrer"] +-Coop[14:11-15]
+JW['68b;103:15]and extensive discussion in '79 very relevant to late '80s early '90s]
/+Us

Property rights, anyone forage any place: (free to come & go +Bag53[123:5-6],)
+-KL['58;38:12-22]
+JW['68a;50:24-28&'68b;103:16-19&'79;250:17-20],
+McD['81a;9:17-18&15:8-10], +Us}

Continually move: +Obst['12;21:11], +Bag[118:13&122:38&120:10-14],
+Bleek['31a;274:23-28], +KL['58;37:11-25], +Coop[10:20-21],+Fos[3:14]/
+JW['72;193:31-32&201:19(1per2weeks)]['68b;105:49(few weeks)-107],
+McD['81a;8:27(1or2 per month)] +Us

Dispersed in rain/conc in dry: +Obst['12;22:15-24 but mobility not dispersal]&['12;21:23-25 but mobility not dispersal],
+KL['58;37:17-32],
+JW['68a;52:28-31&'68b;106:32], -Tomita[168:1-2],
+LCScensuses, regional variation, ??McD['81a;6:33-34&fig2].

Marriage

Monogamy mostly: +Obst(implied['12;25:4]),
-Bleek['31a;279:14-18], +KL['58;129:1-2], +Coop[13:35],
+JW['68b;107:47-68,18-20 col1-2],
McD[pers.comm household list] +Us

Polygyny occurs: +Obst['12;25:4], +Bag[127:6],
+Bleek['31a;279:14-18], +KL['58;129:1-7],
+JW23['68a;103:19-21&'68discussion:151:43-52],/ +Us'85

Levirate: +Obst['12;9:14&26:1-2], +Bag[127:14-15&127:23-24],
-Bleek['31a;279:11], +KL['43v.II:256-257(Bro-in-law feed and may marry)&'58;133]/ /
+Us'85census, -(no longer)Informant'92

Brideprice: +Obst['12;24:38], +Bag[127:9],
+Bleek['31a;279:21-23], +Coop[13:33-34],
+JW['68b;109:18-21], +Tomita[161:2]/ +Us [Inf'92]

Divorce easy: +Bag[127:12]/ +KL['58;131-133] +JW23['68b;107:6-15&'79;256-257],
+Us'85 census

Violent sanctions on adultery: +KL['58;129:11&'43volII;254], +JW['82;439&449fn7],
+Us

God is sun +Obst['12;26:10], -Bag[126:31-34], +Bleek['31a;279:1]&52['31b;424:1],
+Berger[113:19], +KL['58;44-45] / +Us

Haine mythic hero Berger(p102), +KL['58;45:41-44]; +Us

Epeme meat ?Obst['12;26:10], /
+JW['68a;53:fn15], Jell[908:22-24], +Tomita[163:11-21] / +McD['81a;7:33-34],
+Us'85-92

Epeme dance +Bleek(headdress Nt;661), +Berger[102:12&102:fn4], +KL['58;44-
45&119-122], +JW['72;200:35-36]&['70;57], / +Us'84-92

no after life +Obst['12;25:20], +Bleek['31a;279:13],

Lukuchuko (gambling): +Bleek['31a;280:18-19], +KL['58;116-118&Plates55-58]
+JW['68a;53:39-58:4,&'70;pl 2&3] +Jell[908:21], Bennett['72;246:8],
+McD['81a;6:36], +Us'84,'90&95

Very simple songs: +Obst['12;27:2],/ Bleek['31a;280:4-17],/ LCS,/ Us
Table 3d. Housing and Technology.

House pattern and materials: +Obst['12;5:25& photo p9:fig7], +Bag[123:2],
+Bleek['31a;274:21&Photos Capetown U Lib], +KL['58;plates 51,52][Renner:photos
p247] +Coop[10:20&10:34-39&Photos],
+JW['72;194:18-35] & photos[BM:'70;pl. 1,18,&20], Jell[Fig3], +Bennett[245:10],
+Us'84-92

Camp in kopjes +Obst['12;5:14&9:8,+Bag[122:39-123:1],/ +Jell[908:21-22], /+Us

Rock shelters used: Obst['12;22:21-22], ?Bag[122:39-123:1],
+KL['58;37:40], -Coop[10:25-26],
+JW['72;194:21,&'70;11:col2 line11],+Us'89

Bow "decoration": +Demp[323:fn6], +Obst['12;23:2],
+Bleek['31a;274:35], +KL['58;plate 64]
+JW(functions to prevent splitting)['70;14 col 1: l 21-28], +Us

Arrow poison: "panyupe" Demp[323:#104,fn9:"Adenium"],
"two kinds, one is Adenium" Obst['12;23:21], Strophanthus..."panjupe" Bag[124:31-39] /
"pandzube"...Strophanthus" Bleek['31a;275:19-23], Adenium KL['58;plate 70]
Strophanthus and Adenium Coop[12:28-13:16] /
Shanjo = Strophanthus & panjube = Adenium JW['70;28-31] /
"Shanjo" and "Panjube" Us

Climb baobab trees with pegs: +Baumann[1894;63:19], +JW['70;33:specimen 41], +Us.

Table 4. Quantitative characters.

Height of men: 161cm Demp[321:fn3], 161cm Obst['12;16:28-29]/
Bleek 161.2cm(N=11)['31a;274:5&Nt;66], 158.2; 1.47-1.64,KL['43 vol II;210 & 1.582 m
(1.47-1.64 & Western Hadza 160-165 KL['58:160:31], 160cm(n=1) Cooper[12:17]/
160cm Fos[3:22,?original], 161cm Hiernaux[Table 1] (N=126),
161cm Us '86-'91

Height of women: 150 cm Obst['12;16:32-33]/
156 cm Bleek[Nt;67, taller were those Bleek elsewhere noted as with Isanzu kin],
145 cm KL[n=22,'43 vol II;210,inclgirl1.13m]& 145cm (1.13-155, N=22)['58:39:41-44],
150 Fos[3:22,?original], 150 n=110 Hiernaux[341Table1]
149-151 (n=66) Us 1985-91

Bow sizes: 177&180 (krimmung) Demp[323:fn5], cord 160-165 Obst[23:4],
160 cm to 154 when strung, so arc? Bleek['31a;274:32]
165-189 cm KL['58;67-69]&1.60m,drawing 1/12 gives 180cm rim KL['43;vol I;83]
78inch string = 198cm, 81 1/2inches rim = 205cm rim (100lbs),Cooper[11:4-5]
180-190cm rim, Fos[5:8-9], 6ft = 183cm (100lbs)JW['70;14 col2:l 11-19],
159.5 (mean of 6, range 140 - 175 cm) Us'92

Digging stick length
140cm KL['58;l47a]&95cm,109cmKL['58;111],
123-154cm "four or five feet" JW['70;41:11]
136cm (106-164cm) Vincent['84;table 6]

Estimated population of eastern H: 100 Demp(citing Obst)[319:15], 100 Obst['12;15:22],
5-600 inclWest Bag[119:26],
400-450Berger[97:2], 450 in 1939 KL['58;38],
"a few100but<1K in Eyasi trough" so includes West Fos[3:10],
500 JW['68a;49:12-24], "800 in all" Jell[907:2] & Bennett:244:6], 566
IBP'67Dyson(estimated in BJetal92), 5-600 Tomita16(citingJW, 80 Mangola region),
750 BJetal'92

Est pop of western Hadza: 100 Wahi Berger[97:5],
250 JW['68a;49:28] 150 Barnicot['72b;621:29], 150-200IBP32[Bennett244:28]

% children in camp composition: (!Kung model 31%)
40% "children" Obst['12;6:1],
44% KL['58;38:3], "many" Cooper[30-31],
42%<15 IBP [Dyson Table1]
39%<15 BJetal; 39%<16 McD['81a;table 7b]

Size of camps:
"1-3families" Obst['12;21:9-10], "2-3men+families - several families" Bag[120:11-14],
"2-3families of relations" Bleek ['31a;274:23], "5-12 huts,5-7fam" Coop[10:22]
"1-100, ave 18 adults" JW['68b;105:45], "1-15fams" Jell[908:28], "18adults" Bennett
['72;246:12 and Table1], "6-11members" Tomita[157:14]
22.6-31.0 persons McD['81a;fig 2], Us census mean 16.5 individuals, range 2-48).