

The Ladder of Social Evolution:  
Archaeology and the Bottom Rungs

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THE concept of social evolution has been one of the most powerful and persistent legacies of nineteenth-century thought. Its received version accounts for the particular way in which we in the West tend to view and evaluate the historical development of human society. At the bottom end of the evolutionary scale, we see the small, thinly distributed, technologically and organizationally simple societies of hunters and gatherers captive to their environment; at the top end our own environmentally masterful industrial society, in sharp contrast in this and every other respect. We have been inclined to look upon the progression from one to the other as not only a historical but a moral one and to judge the worth of any society by its presumed position along it. As elaborated last century in the works of men like Tylor and Morgan,<sup>1</sup> the theory was a satisfying intellectual system that gave order to the variety of human societies historically and anthropologically attested by seeing them as occupying different rungs along a single ladder reaching to the nineteenth-century Western European present. Thus Tylor:

The condition of culture among the various societies of mankind, in so far as it is capable of being investigated on general principles, is a subject apt for the study of laws of human thought and action. On the one hand the uniformity which so largely pervades civilization may be ascribed, in great measure, to the uniform action of uniform causes; while on the other its various grades may be regarded as stages of development or evolution, each the outcome of previous history and about to do its proper part in shaping the history of the future.<sup>2</sup>

The 'uniform action of uniform causes' is guaranteed for Tylor and his contemporaries by the identity of the brain inherited from the past by all the races of mankind. The stages of development into which human history is divided are those of Savagery, man the hunter and gatherer, Barbarism, man the farmer, and Civilization, man the scribe, the city dweller, the citizen of the formal political state. Not all societies have, however, run this course. As a result, says Morgan:

<sup>1</sup> E. B. Tylor, *Researches into the Early History of Mankind and the Development of Civilisation*, Murray, London 1865; *Primitive Culture: researches into the development of mythology, philosophy, religion, language, art and custom*, 2 vols, Murray, London 1871; *Anthropology: an introduction to the study of man and civilisation*, Macmillan, London 1881; L. H. Morgan, *Ancient Society: or researches in the lines of human progress from Savagery through Barbarism to Civilisation*, Kerr, Chicago 1877. On this question see G. W. Stocking, Jr, *Race, Culture and Evolution: essays in the history of anthropology*, The Free Press, New York 1968, especially pp. 110-32.

<sup>2</sup> Tylor, *Primitive Culture*, p. 1.

The domestic institutions of the barbarous, and even of the savage ancestors of mankind, are still exemplified in portions of the human family with such completeness that, with the exception of the strictly primitive period, the several stages of this progress are tolerably well preserved.<sup>3</sup>

Like many concepts for which Darwinian evolutionary theory later provided a satisfactory model, the notion of stages of savagery, barbarism and civilization in human history, including the terms themselves, goes back into the eighteenth century.<sup>4</sup> It makes a brief appearance amongst the writings of that remarkable group of Scandinavian scholars who in the second quarter of the nineteenth century were laying the theoretical and methodological foundations of prehistoric archaeology. At the time, however, the Danish workers were only just grappling with the problems of archaeological chronology, on which the historical proof of the proposed sequence would eventually depend. Their achievement was the Three Age System, of Stone Age, Bronze Age and Iron Age, that allowed the chronological ordering of the relics of the prehistoric past, which by definition come to us with no dates attached.<sup>5</sup> With important subsequent adjustments, this system has continued to provide the framework for Old World prehistory into our own days. Despite the fact that these adjustments involved a division of the Stone Age into Palaeolithic, Mesolithic and Neolithic that incorporated some economic criteria, Tylor and Morgan, while acknowledging the system's archaeological usefulness, thought it too limited for their wider evolutionary purposes. In our own century V. Gordon Childe devoted much intellectual effort in an attempt to give the archaeological ages the sort of significance in technical, economic and even political terms of which Tylor and Morgan had decried the lack.<sup>6</sup> In this particular endeavour Childe failed, as he was bound to,<sup>7</sup> if only because the Three Ages had *any* sort of validity only for Europe and some areas of Asia and Africa. But rigor mortis has served only to strengthen the system's stranglehold on some parts of the discipline. The International Union of Pre- and Proto-historic Sciences still structures its world congresses in this way, organizationally inhibiting intelligent discourse along other lines. For the last congress, in Nice, a French colleague, a specialist in Oceanic archaeology, proffered a symposium linking Southeast Asia, Australia and the Pacific and was initially told that this was impossible: *mais voyez, mon gars: l'Australie, c'est paléolithique; l'Océanie, c'est néolithique; et l'Asie du Sud-Est, c'est l'âge des métaux*. A compromise was eventually reached and the symposium was assigned, for reasons not

<sup>3</sup> Morgan, *Ancient Society* . . . , p. 7.

<sup>4</sup> V. Gordon Childe, *Social Evolution*, Watts, London 1951, p. 2.

<sup>5</sup> On the Three Ages see G. E. Daniel, *The Three Ages*, Cambridge University Press, Cambridge 1943, and *150 Years of Archaeology*, Duckworth, London 1975 (first published as *A Hundred Years of Archaeology* in 1950), pp. 38-54, 85-9, 128. See also Childe, *Social Evolution*, pp. 17-20.

<sup>6</sup> Childe, *Social Evolution*, pp. 22-6.

<sup>7</sup> Childe, *Social Evolution*, pp. 26-7.

altogether clear, *au néolithique*. The incident is not as trivial as may appear. Southeast Asian prehistory is only now freeing itself of the impediments and distortions with which fifty and more years of such attitudes have saddled it.<sup>8</sup>

Let us return, however, to the more innocent Scandinavians of the early nineteenth century, particularly to Sven Nilsson,<sup>9</sup> Professor of Zoology at the University of Lund, who besides arguing like his colleagues for the sequential ages of Stone, Bronze and Iron, introduced into his book on Scandinavian prehistory (published 1838-43) a classification of prehistoric societies based on their mode of subsistence: in his case a four-fold one, comprising an initial *savage* stage, with subsistence based on hunting, fishing and gathering; a *nomad* stage, when man became a herdsman; an *agricultural* stage; and finally a stage of *civilization*, defined by coined money, writing and the division of labour. Though Nilsson failed to develop these ideas and particularly to marry them with the Three Age System, he enunciated methods for the study of the prehistoric past of some theoretical consequence. Amongst these was what he called the comparative method:

To collect the remains of human races long since passed away, and of the works which they have left behind, to draw a parallel between them and similar ones which still exist on earth, and thus cut out a way to the knowledge of circumstances which have been, by comparing them with those which still exist.

This interest in the relevance of ethnography to the interpretation of the past developed strongly in the latter half of the nineteenth century, particularly under the influence of Sir John Lubbock, Nilsson's translator and an authoritative commentator in his own right.<sup>10</sup> It was, however, shortly to become less a matter of the ethnographic analogy as an aid to archaeological interpretation than wholesale borrowing of information from the ethnographic record, particularly on matters of social structure and spiritual and religious life, on which the archaeological record is apt to be silent or ambiguous.<sup>11</sup> Sollas' *Ancient hunters and their modern representatives* (1911) is a good example of the genre; as Megaw notes,<sup>12</sup> it lists the Aborigines of the Australian mainland as 'Mousterians', a term taken directly from the terminology of European Palaeolithic archaeology. The intellectual context for such exercises, where they were more than the use of ethnographic examples to support an argument, was the

<sup>8</sup> See the essays grouped under the title 'Stone tools and social judgements' in *Sunda and Sahul: prehistoric studies in Southeast Asia, Melanesia and Australia*, J. Allen, J. Golson and R. Jones (eds), Academic Press, London 1977, pp. 11-109.

<sup>9</sup> On Nilsson see Daniel, *150 Years of Archaeology*, pp. 42, 47-9, 186. The quotation is on p. 49.

<sup>10</sup> Sir John Lubbock (Lord Avebury), *Pre-historic Times as illustrated by Ancient Remains and the Manners and Customs of Modern Savages*, Williams and Norgate, London 1865; *On the Origin of Civilisation and Primitive Condition of Man*, Longmans, Green, London 1870.

<sup>11</sup> Daniel, *150 Years of Archaeology*, pp. 182-8.

<sup>12</sup> J. V. S. Megaw, *Archaeology from Down Under: a personal view*, Leicester University Press, Leicester 1973, pp. 12-13. Sollas' book was published in London by Macmillan.

more or less explicit conviction that appropriate combinations of technologies, social customs and beliefs characterized the different stages of the social evolutionary process.

In the event the practitioners had got so far away from the data that their structures collapsed for lack of empirical support. The immediate future, both in ethnography and archaeology, belonged to the fieldworker, the student of societies as they exist and the reconstitutor of societies as they once were. Inevitably the results of both tended to emphasize the diversity of human arrangements, no matter what the similarities of technology, subsistence or environment. Concerned with the study of societies in their own right, ethnography and archaeology moved intellectually apart in Europe, where most archaeologists tended to work at home while all ethnographers worked abroad. The empirical results of archaeology were of little interest to ethnographers working in the realm of non-material culture, while archaeologists found that the frequent neglect of the details of technological culture and of subsistence activities in studies of living societies removed a potential area of common interest. I must make an exception here of American anthropology, where archaeological and ethnographic effort concentrated on the same subject, the Amerindians. For this reason anthropology has always been a more unified discipline in the New World and today the rest of us are reaping its theoretical and methodological benefits.

In the meantime the increasing scale and scope of archaeological work was building up a formidable body of data. Culture sequences, partial or complete, were being constructed not merely now for Europe but for the Near East and Egypt, for India and China and for parts of Africa and the New World.<sup>13</sup> The accumulated discoveries clearly documented the historical progression from Savagery, through Barbarism to Civilization. Everywhere man was a hunter-gatherer before in places he became a farmer and everywhere a farmer before in places he became a city dweller. It was becoming possible to propose a number of lines of independent development to farming and civilization since the best documented sequences showed continuities in regional history. The data provided abundant evidence of the operation of diffusion between societies, but put diffusion in proper context, not as denying the independence of the various regional developments but as marking the ability of receiving societies to accept and absorb the techniques and ideas which were diffused. The end products of prehistoric development in the civilizations of Egypt, Mesopotamia, the Indus Valley and North China were sufficiently distinctive to guarantee the essential integrity of their histories. And if this was true of the Old World, how much more so was it of the New, where agriculture based on specifically New World crops was the foundation for civilizations for which no convincing evidence of external stimulus, let alone establishment, has ever been advanced.

<sup>13</sup> The discoveries are charted in Daniel, *150 Years of Archaeology*, Chs 6-8.

Having thus empirically established in several independent cases the historical progression from Savagery to Civilization proposed by the social evolutionary theorists, it seemed that at last archaeology might begin, despite the limitations of its data, to feed back to, instead of merely feeding on, the anthropological sciences with which, in principle, it was allied. In contradistinction to Lubbock's view of 'the Van Diemener and South American [being] to the antiquary what the opossum and sloth are to the geologist',<sup>14</sup> Childe could now hope that archaeology might become, what theoretically it is, the palaeontology of human society.<sup>15</sup> Interestingly enough, a similar opinion was expressed by one of the leaders of the new social anthropology, which on theoretical grounds had generally shown itself indifferent, if not downright hostile, to the study of the past. 'History', said Evans-Pritchard, 'is not merely a succession of changes, but . . . a growth . . . Furthermore . . . history alone provides a satisfactory experimental situation in which the hypotheses of functional anthropology can be tested.'<sup>16</sup>

Perhaps the most ambitious attempt to generalize from the data of archaeology to the evolution of society has been that of the American anthropologist, Julian Steward. The proponent of the theory of multilineal evolution, Steward has attempted, in a preliminary way, to discover regularities in the development of the early civilizations of Mesopotamia, Egypt, China, MesoAmerica and Peru.<sup>17</sup> However, here I shall confine myself largely to the similar work of Childe, even though at his most ambitious Childe restricted himself to a small and intercommunicating area of the Old World, the Near East and Europe, whose archaeology he knew in great detail. I do so for a number of reasons. Firstly, in subsequent discussion I shall be concerned more with the question of the changes from a hunter-gatherer to an agricultural economy, that is from Savagery to Barbarism, the bottom rungs of my title, than with that from Barbarism to Civilization. Secondly, Childe was the author of the concept of the Neolithic or Agricultural Revolution, which has won general professional acceptance, while his concept of the Second or Urban Revolution has not. Thirdly, through popular writings of immense influence,<sup>18</sup> Childe's ideas have passed into current thinking about the evolution of man in society.

To Childe the Neolithic Revolution was not a single event but a long drawn out process through which the potential of the new economy was realized,

<sup>14</sup> Lubbock, *Pre-historic Times* . . . , p. 416.

<sup>15</sup> Childe, *Social Evolution*, pp. 15-16.

<sup>16</sup> E. E. Evans-Pritchard, *Social Anthropology*, Cohen and West, London 1951, p. 60.

<sup>17</sup> J. H. Steward, 'Development of complex societies: cultural causality and law: a trial formulation of the development of early civilisations' in *Theory of Culture Change: the methodology of multilineal evolution*, University of Illinois Press, Urbana, Chicago and London 1955, pp. 178-209.

<sup>18</sup> Childe, *Man Makes Himself*, Library of Science and Culture, London 1936, slightly revised for Thinker's Library, London 1941; *What Happened in History*, Pelican Books, Harmondsworth 1942; *Progress and Archaeology*, Thinker's Library, London 1944.

initially in the form of larger populations more densely distributed over the landscape, living in larger settlements of longer duration, subsequently as permanent settlement and the development of the division of labour. The key is the greater productivity of the new economy, and particularly its ability to produce and guarantee a surplus over subsistence needs. Subsistence systems based on hunting and gathering on the other hand are seen as lacking any such potential. Braidwood describes their practitioners as living 'in a completely elemental catch-as-catch-can state, as small predatory bands of food-collectors'.<sup>19</sup> Sahlins lists a series of views typical of the generally low regard with which anthropologists have looked at hunter-gatherer economies: 'incessant quest for food', 'maximum energy from a maximum number of people', 'economic resources . . . of the scanniest . . . so slight that only the most intense application makes survival possible'.<sup>20</sup> This type of characterization, however, owes less to the ethnographic data than to 'invidious comparison'<sup>21</sup> with agricultural economies, whose widespread appearance on the world stage was a historical fact demanding explanation.

The viewpoint created theoretical difficulties of its own, never satisfactorily resolved. Amongst these is the evident fact that some hunter-gatherers have not only never developed a neolithic economy, but have not adopted it when offered the opportunity. The Australian Aborigines are a very large case in point, maintaining hunter-gatherer economies, as they did, across a huge and diversified continent into modern times, while hunter-gatherer economies over the rest of the world succumbed to agriculturalists in all but a few scattered and often marginal localities. The old explanations for the remarkable Australian situation are insufficient. It is untrue that the Australian environment lacks domesticable forms that might have formed the basis of an independent or induced neolithic. No less than eleven species used for food in Australia are domesticated to some degree in Southeast Asia, and of these, eight were used for food there also. These eight include a species of yam, another tuber, Polynesian arrowroot, and several important fruits.<sup>22</sup> It is also untrue that Australian Aborigines were so isolated from the rest of the world that they were never brought into contact with neolithic societies. If we reject the seasonal visits of Indonesian trepangers to the Arnhem Land coast, because they did no planting, we cannot ignore the long history of juxtaposition of Aborigines with partly agricultural economies at Torres Strait and the implications of

<sup>19</sup> R. J. Braidwood, *The Near East and the Foundations for Civilisation: an essay in appraisal of the general evidence*, Condon Lectures, Oregon State System of Higher Education, Eugene 1952, p. 1.

<sup>20</sup> Marshall Sahlins, *Stone Age Economics*, Aldine-Atherton, Chicago and New York 1972, pp. 2-3.

<sup>21</sup> Sahlins, *Stone Age Economics*, p. 5.

<sup>22</sup> J. Golson, 'Australian Aboriginal food plants: some ecological and culture-historical implications' in *Aboriginal Man and Environment in Australia*, D. J. Mulvaney and J. Golson (eds), Australian National University Press, Canberra 1971, p. 209.

Papuan influences in the cultures of the Cape York tribes.<sup>23</sup> Indeed there is a plant growing wild in rainforest regions in that area, traditionally used by local Aborigines for food, that may mark the intrusion, and rejection, of the neolithic in Australia. This is taro, *Colocasia esculenta*, an important crop in agricultural economies of New Guinea and the Pacific, which the botanical evidence suggests is indigenous to regions much further west, whence it must have been brought by man.<sup>24</sup> Neither is it want of the requisite technology that has prevented Aborigines becoming neolithic. The tool kit of the most sophisticated New Guinea agriculturalists is very simple: axes and/or adzes, traditionally of ground stone, for clearing bush, fire for burning it and providing the fertilizing ash, digging sticks of various forms for working ground, planting, weeding and harvesting, and human hands.<sup>25</sup> The Aborigines had all these, or their equivalents, and had done so for many thousands of year on the archaeological evidence.<sup>26</sup> More importantly they possessed the kind of knowledge of the plant world underlying the very rationale of agriculture. It is well recorded that Arnhem Landers during harvesting of wild yams leave the top of the tuber still attached to its vine intact in the ground, saying in explanation that the yam will grow again, thus allowing another harvest.<sup>27</sup> Rhys Jones has recently described how the discard of wild fruit seeds at camping sites in Arnhem Land is responsible for, and well known by the Aborigines to be responsible for, the spread of food plants.<sup>28</sup> Aborigines just do not choose to apply this knowledge in the way specified by social evolutionary theory.

The data for explaining behaviour such as this are currently being provided by a most important series of detailed studies of the actual conditions of production, distribution and consumption amongst human groups, agricultural as well as hunter-gatherer. I have mentioned above how this has been a somewhat

<sup>23</sup> D. R. Moore, 'Cape York Aborigines and Islanders of western Torres Strait' and S. A. Wurm, 'Torres Strait—a linguistic barrier?' in *Bridge and Barrier: the natural and cultural history of Torres Strait*, D. Walker (ed.), Publication BG/3 (1972), Department of Biogeography and Geomorphology, Research School of Pacific Studies, Australian National University, Canberra 1972, pp. 327-43 and 345-66 respectively.

<sup>24</sup> For example, R. F. G. Spier, 'Some notes on the origin of taro', *Southwestern Journal of Anthropology*, 7, 1951, pp. 69-76.

<sup>25</sup> J. Golson, 'Simple tools and complex technology: agriculture and agricultural implements in the New Guinea highlands' in *Stone Tools as Cultural Markers: change, evolution and complexity*, R. V. S. Wright (ed.), Australian Institute of Aboriginal Studies, Canberra (in press).

<sup>26</sup> C. White, 'Man and environment in northwest Arnhem Land' in *Aboriginal Man and Environment in Australia*, Mulvaney and Golson (eds), pp. 145-6, 152-3, for axes; R. A. Luebbers, 'Ancient boomerangs discovered in South Australia', *Nature*, 253 (5486), 3 January 1975, p. 39, for digging sticks.

<sup>27</sup> For example, R. Jones, 'Man and land in the Antipodes' in *Quaternary Studies: selected papers from IX INQUA Congress, Christchurch, New Zealand, 2-10 December 1973*, R. P. Suggate and M. M. Creswell (eds), Bulletin 13, Royal Society of New Zealand, Wellington, 1975, p. 23.

<sup>28</sup> Jones, 'Man and land in the Antipodes', p. 24.



neglected subject for anthropological research. The new interest is largely a reflection of the ecological dimension which has entered studies of man over the past generation and which has provided a theoretical framework which synthesizes a whole range of cultural, biological and physical variables and unites the work of biologists, geographers, ethnographers and archaeologists. For the archaeologist the resulting studies of functioning economic systems constitute the new, more soundly based ethnographic analogy and provide the data needed to take a renewed look at the large persisting problems in human prehistory, like that of the transition to food production with which we are now concerned.

Already the belief in the unremitting drudgery of hunter-gatherer life has collapsed in the face of the detailed evidence. 'A good case can be made', says Sahlins, 'that hunters and gatherers work less than we do; and rather than a continuous travail, the food quest is intermittent, leisure abundant, and there is a greater amount of sleep in the daytime per capita per year than in any other condition of society.'<sup>29</sup> For the Bushmen Richard Lee derives figures which show that ample subsistence was provided for a total camp by the sixty-five per cent who were effective producers in an average of two and a half days labour per week, a day's work averaging about six hours; and this during the second and third years of one of the severest droughts in South African history.<sup>30</sup> This picture of sufficiency of food, allied with intermittent effort in its procurement and abundance of leisure, is plentifully confirmed in historical descriptions of hunter-gatherer societies in Australia and North America before their subsistence systems were disrupted by the advent of Europeans.<sup>31</sup> There is archaeological evidence to the same effect, from Tasmania,<sup>32</sup> where at contact scale fish were not eaten, a circumstance which, added to the overall simplicity of their technology and material culture, caused the relegation of the Tasmanian Aborigines in the nineteenth century to the very bottom of the social evolutionary ladder.<sup>33</sup> Jones has shown that scale fish were initially a not unimportant part of the Tasmanian diet but that around 4,000 years

<sup>29</sup> Sahlins, *Stone Age Economics*, p. 14.

<sup>30</sup> Richard Lee, '!Kung Bushman subsistence: an input-output analysis' in *Environment and Cultural Behavior*, A. P. Vayda (ed.), Natural History Press, Garden City (N.Y.) 1969, pp. 62-74. The quoted figures are summarized in Sahlins, *Stone Age Economics*, p. 21.

<sup>31</sup> For a selection, Sahlins, *Stone Age Economics*, Ch. 1; L. J. Bean and H. W. Lawton, 'Some explanations for the rise of cultural complexity in native California with comments on proto-agriculture and agriculture' in *Patterns of Indian Burning in California: ecology and ethnohistory*, H. T. Lewis, Ballena Press Anthropological Papers No. 1, Ballena 1973, pp. xxxi-xxxv.

<sup>32</sup> R. Jones, 'Why did Tasmanians stop eating fish?' In *Frontiers of ethnoarchaeology*, R. A. Gould (ed.), School of American Research, Santa Fe and University of New Mexico Press, Albuquerque (in press).

<sup>33</sup> E. B. Tylor, 'On the Tasmanians as representatives of Palaeolithic man', *Journal of the Royal Anthropological Institute*, 23, 1893, pp. 141-52.

ago they abruptly disappear from the food refuse of archaeological sites, with no dire repercussions evident on the well-being of the society.

It is in the light of evidence such as this that archaeologists must frame their thinking. As Lewis says, 'instead of viewing agriculture as an imminent goal of human evolution we should rather ask the question: why should hunters and gatherers become agriculturists?'<sup>34</sup> Or in the words of the !Kung Bushmen to Richard Lee: 'Why should we plant, when there are so many mongomongo nuts in the world?'<sup>35</sup> We may emphasize the point by reference to the *locus classicus* of the origins of farming, the Near East.<sup>36</sup> It is logical to think that domestication of the cereal grasses of Near Eastern agriculture took place in the zone where their wild ancestors are at home. In a startling paper as recently as 1966 Harlan and Zohary revealed that 'over many thousands of hectares' in this zone 'it would be possible to harvest wild wheat today from natural stands almost as dense as a cultivated wheat field'. The next year Harlan published the results of such a wild wheat harvest, carried out with a flint-bladed sickle. He collected enough in one hour to produce one kilo of clean grain, twice as rich in protein as domestic wheat. This suggested that a family, working over the three-week period when the wild wheat becomes ripe, 'and not even working very hard', could gather 'more grain than [they] could possibly consume in a year'. Why should anyone wish to cultivate when natural stands are so dense?

Sahlins has suggested that anthropological misconception of hunter-gatherer subsistence is due, amongst other things, to the failure to appreciate that where needs are simple, means may be more than sufficient to meet them.<sup>37</sup> The material simplicity of hunter-gatherer societies is well attested. Possessions are few and within the capacity of every person to make for himself, predominantly out of local materials. Poverty of possessions is enjoined by the mobility, more or less frequent, for greater or shorter distances, according to circumstance, which is required by the strategies of subsistence. What is true of material possessions is also true of population, such members of which as cannot move themselves must be carried. Various practices, including infanticide and sexual taboos, hold the levels of population below that of depletion of food supply in any area, thus reducing the necessity for greater mobility than is essential. Population densities in Aboriginal Australia, as elsewhere, varied in harmony with the richness, reliability and concentration of food supplies and were highest along the coasts, especially those of the tropics, and

<sup>34</sup> H. T. Lewis, 'The role of fire in the domestication of plants and animals in southwest Asia: a hypothesis', *Man*, 7, 1972, p. 217.

<sup>35</sup> Quoted by Sahlins, *Stone Age Economics*, p. 27.

<sup>36</sup> The following is from K. V. Flannery, 'Origins and ecological effects of early domestication in Iran and the Near East' in *The Domestication and Exploitation of Plants and Animals*, P. J. Ucko and G. W. Dimbleby (eds), Duckworth, London 1969, p. 80.

<sup>37</sup> Sahlins, *Stone Age Economics*, pp. 3-5, 33-4, 37.

along the major river systems.<sup>38</sup> Where richness, reliability and concentration of resources were present in exceptional degree, as along the American Northwest Coast, population densities, size of settlement units and elaboration of dwellings, material possessions and social institutions reached a level normally associated with established agricultural communities,<sup>39</sup> showing that it is not the form of the economy but its productivity that is the essential factor.<sup>40</sup> For the generality of hunter-gatherer societies, however, resources were dispersed, so that production and the population that it maintained were *objectively* limited by the need to move and the potential of the poorest environments and/or seasons of the economic cycle.

One explanation for the shift to a neolithic economy, much canvassed of late, appeals to adverse changes in the ratio of population to available resources amongst hunter-gatherer groups.<sup>41</sup> Such changes are possible because the complex of factors, cultural and physiological, conscious and unconscious, that tend to maintain population below *carrying capacity*, does *not in the short run* always operate as a self-regulating mechanism. In certain circumstances, it is proposed, these temporary imbalances may be so frequent as to be continuous over a period. As a result the inhabitants of marginal environments may find themselves under pressure from immigrant communities living off from larger, more advantaged populations in optimum habitats at the height of population stress there, and be forced into a planting economy through competition.

There is, however, another factor relevant to the discussion, which, like the discovery of hunter-gatherer affluence, has only clearly emerged with the new orientations in ethnographic enquiry that have been described, and the reassessment of old evidence that they have prompted. In the process another widespread belief about hunter-gatherer economies, that they are passive, parasitic and totally dependent on nature, has been demolished. There is now an appreciation of the fact that hunter-gatherer groups *managed* their environment, particularly through the controlled and systematic use of fire. Fire is employed widely as a weapon in the hunt. At the right season it encourages new growth as an attraction to food animals and can be used to concentrate them, and other desirable resources, in particular localities, especially in ecotonal situations, the transitions or 'edges' between ecological zones where the density and variety of plant and animal life are greatest. Studies by Lewis in California, Jones in Tasmania and Hallam in Western Australia have shown how hunter-gatherers

<sup>38</sup> S. Bowdler, 'The coastal colonisation of Australia' in *Sunda and Sahul . . .*, Allen, Golson and Jones (eds), pp. 208-10 and references cited.

<sup>39</sup> C. S. Coon, *The Hunting Peoples*, Adantic-Little, Brown, Boston and Toronto 1971, *passim*.

<sup>40</sup> Maurice Godelier, *Rationality and Irrationality in Economics* (trans. from the French by Brian Pearce), New Left Books, London 1972, p. 315.

<sup>41</sup> L. R. Binford, 'Post-Pleistocene adaptations' in *New Perspectives in Archaeology*, S. R. and L. R. Binford (eds), Aldine, Chicago 1968, pp. 313-41.

in these areas used fire to expand natural ecotones, create new ones within single vegetation zones and maintain and renew complex associations and dynamic successions of grasses, shrubs and trees.<sup>42</sup> Jones has called this, aptly, 'fire-stick farming'.<sup>43</sup>

What the simplest agriculture represents, or horticulture as it is often called, is an extension of this environmental modification by the deliberate creation of niches in the bush for a selected suite of plants. For this purpose it is not necessary to grub out roots or prepare the soil, only to clear the standing growth and burn the accumulated rubbish, thus providing ash for fertilization of the crops. The garden plot is only cultivated for a season or so, after which new gardens are made elsewhere. The old plot is abandoned to a long period of fallow during which bush regenerates and restores the fertility of the soil. Such slash and burn or shifting cultivation which, in various forms of development and adaptation, is the predominant mode of traditional cultivation throughout the tropics today, was known in historic times in Europe and seems to have been the original neolithic practice in the prehistoric past.<sup>44</sup>

A number of studies allow us to see the general character of the economic systems supported on this base.<sup>45</sup> The required levels of production are achieved with marked under-use of available labour power and irregular inputs of work from the effective section of the community. Extended effort is indeed often called for seasonally. Even so Audrey Richard's figures for the African Bemba, as summarized by Boserup, show that

Even in the busy season the average working day was . . . only four hours for men and six hours for women. For a less busy season the average for men was 2½ hours and for women six hours, of which only two were devoted to agricultural work while four were spent on domestic activities. Since a great number of days are spent without any agricultural work it is safe to conclude that in the Bemba community the annual average of the performance of work in agriculture (including the clearing of land) amounts to something between one and two hours a day.<sup>46</sup>

This situation is in marked contrast to that reported for systems of intensive agriculture associated with irrigation and multi-cropping.<sup>47</sup> On the other hand it bears a striking resemblance to that we have described for hunter-gatherer economies where under-use of labour, the intermittent nature of work and the abundance of leisure are all in evidence. Add to the comparison that a

<sup>42</sup> Lewis, *Patterns of Indian Burning in California* . . . , Jones, 'Man and land in the Antipodes', pp. 25-8; S. J. Hallam, *Fire and Hearth: a study of Aboriginal usage and European usurpation in south-western Australia*, Australian Institute of Aboriginal Studies, Canberra 1975.

<sup>43</sup> R. Jones, 'Fire-stick farming', *Australian Natural History*, 16, 1969, pp. 224-8.

<sup>44</sup> J. G. D. Clark, *Prehistoric Europe: the economic basis*, Methuen, London 1952, pp. 92-4.

<sup>45</sup> Reviewed in Sahlins, *Stone Age Economics*, Ch. 2. See also Ester Boserup, *The Conditions of Agricultural Growth: the economics of agrarian change under population pressure*, Allen and Unwin, London and Aldine, Chicago 1965, *passim*.

<sup>46</sup> Boserup, *The Conditions of Agricultural Growth* . . . , p. 46.

<sup>47</sup> *Ibid.*, p. 51-3.

similar division of labour is also maintained: the woman with her digging stick, responsible for the plant foods, is as representative of hunter-gatherer as she is of horticultural society, her labour steadier and more predictable of results than that of the men;<sup>48</sup> the man still undertakes the tasks requiring concentrated periods of increased effort, in hunting and now in forest clearing with axe and fire.

Given all this, it is possible to imagine how reasonably sedentary hunter-gatherers with a firm plant base to their economy, possibly concentrating on a small range of suitable species—none of these being extraordinary conditions, particularly for the tropics—might slip into the horticultural mode without a tremor on the surface or the substance of their lives. In these circumstances it is legitimate to ask how useful is our blanket application the terms hunter-gatherer and horticulturalist, if they substitute, as such terms often do, for the detailed characterization of the phenomena we wish to study.<sup>49</sup>

Certainly a transition of the type we have been discussing would escape the archaeologist's trowel. The fact that it had taken place would only be known by its effects. This is why Childe describes the neolithic revolution as the climax of a long progress,<sup>50</sup> its first visible results a scatter of small peasant communities across the landscape, living in impermanent settlements manifesting no great degree of external contact and no internal differentiation. American scholars have introduced the concept of Incipient Agriculture to cover the period between the time crops were first planted to supplement the yields of hunting and gathering and that when cultivated plants with or without domesticated animals allowed the support of permanent settlements.<sup>51</sup> For both Childe and the Americans the closely associated development of permanent settlement, of the division of labour through craft specialism especially in pottery manufacture and metallurgy, and of some type of socio-political differentiation, often in the form of religious leaders, is a reflection of the potential of the new economy, which in certain circumstances is fully achieved in civilization itself. That potential, as we have already seen, was considered to lie in the ability the new economy had to guarantee enough for the support of large and stable populations and a surplus beyond subsistence requirements to maintain non-producers.

There was no guarantee, however, that the potential would be realized. Childe could see no reason for the neolithic farmer to produce more than was needed for the support of himself and his family. 'If each household does that,

<sup>48</sup> Betty Hiatt, 'Woman the gatherer' in *Woman's Role in Aboriginal Society*, Australian Institute of Aboriginal Studies, Canberra 1970, pp. 2-8; also C. H. Berndt, 'Digging sticks and spears, or the two-sex model', *ibid.*, pp. 39-48.

<sup>49</sup> D. R. Harris, 'Subsistence strategies across Torres Strait' in *Sunda and Sahul . . .*, Allen, Golson and Jones (eds), pp. 421-63.

<sup>50</sup> Childe, *Man Makes Himself*, Thinker's Library edn, p. 105.

<sup>51</sup> See Steward, *Theory of Culture Change . . .*, pp. 186, 191.

the community can survive without a surplus.<sup>52</sup> This limitation was transcended 'when farmers were persuaded or compelled to wring from the soil a surplus above their own domestic requirements and when this surplus was made available to support new economic classes not directly engaged in producing their own food'.<sup>53</sup> For Childe this was achieved in the stoneless, rainless plains of Lower Mesopotamia when the ready adoption of metallurgy broke down neolithic self-sufficiency by way of craft specialization and trade, while the development of irrigation works fostered interdependence of social units and gave opportunities for their political control.<sup>54</sup> Braidwood sees 'broadening social relations and a new and less folk-like sense of moral order' as important and ultimately crucial in the further development to civilization.<sup>55</sup>

The issues involved are well documented in ethnographic studies of a number of societies practising varieties of shifting cultivation in the tropics,<sup>56</sup> which at least in part would be representative, in social evolutionary terms, of Childe's Neolithic Barbarism and American scholars' Incipient Agriculture. The constant message is that such economies are underproductive, with the level of production often *well* below the potential capacity to produce. We have already commented on the marked under-use of labour power in these economies, through both the virtual disengagement of whole segments of the population from production and the modest labour inputs of those who do produce. The degree of under-use of resources in such societies has also been measured by the calculation of ratios of actual to potential population. The exercises concerned are subject to general and individual qualifications, but are revealing nonetheless, showing a wide scatter of values almost without exception below the maximum. For twelve groups of Naregu Chimbu, intensive gardeners in an area of the Papua New Guinea Highlands noted for its high population densities, Brown and Brookfield give a mean density of 288 people per square mile and calculate that this is only sixty-four per cent of prevailing capacity.<sup>57</sup>

The fact is that in these societies, as in hunter-gatherer societies too, the actual level of production is limited by demand, not by labour. Salisbury describes how the replacement of stone by steel axes among the Siane, close neighbours of the Chimbu in the Papua New Guinea Highlands, reduced the proportion of men's labour time spent in certain activities from eighty per cent to fifty per cent. The time gained was put not into increasing material subsistence but into non-economic activities like festivals, fighting and travel.<sup>58</sup> In a paper

<sup>52</sup> Childe, *What Happened in History*, p. 54.

<sup>53</sup> *Ibid.*, p. 61-2.

<sup>54</sup> *Ibid.*, Ch. 4; also *Man Makes Himself*, Ch. 6.

<sup>55</sup> Braidwood, *The Near East and the Foundations for Civilization . . .*, pp. 6, 42.

<sup>56</sup> Sahlins, *Stone Age Economics*, Chs 2 and 3.

<sup>57</sup> A number of exercises are summarized in Sahlins, *Stone Age Economics*, pp. 42-8.

<sup>58</sup> R. F. Salisbury, *From Stone to Steel: economic consequences of a technological change in New Guinea*, Melbourne University Press for The Australian National University, Melbourne 1962, discussed by Godelier, *Rationality and Irrationality in Economics*, p. 273.

on economic planning for primitive economies in Papua New Guinea which uses the Siane evidence as an example, Fisk points out that, where it is labour which is the surplus resource, the problem facing development economists is how to harness it.<sup>59</sup> This is precisely the problem which Childe saw was faced and solved in the evolution of human society to civilization. Historically it meant control of the domestic economy passing from the kinship to the political structure. In terms of the particular ethnographic societies with which he is dealing, Sahlins sees this as bound up with the role of the chief, though chieftainship is not so much the result of the production of economic surplus as it is its cause.<sup>60</sup> We can do no better than quote Raymond Firth on the mechanisms involved:

The prestige of a chief was bound up with his free use of wealth, particularly food. This in turn tended to secure for him a larger revenue from which to display his hospitality, since his followers and relatives brought him choice gifts. . . . Apart from lavish entertainment of strangers and visitors, the chief also disbursed wealth freely as presents among his followers. By this means their allegiance was secured and he repaid them for the gifts and personal services rendered to him. . . . There was thus a continual reciprocity between chief and people. . . . It was by his accumulation of wealth, and his subsequent lavish distribution of it, that such a man was able to give the spur to . . . important tribal enterprises. He was a kind of channel through which wealth flowed, concentrating it only to pour it out freely again.<sup>61</sup>

Leadership on these principles exhibits a great variety of forms and degrees in the Pacific area, from the purely local authority achieved through personal effort by the Melanesian big-man at one end of the scale to the hereditary chieftainship in large hierarchically organized polities in parts of Polynesia at the other.

It would be a mistake to look upon this range as constituting any sort of evolutionary sequence of political development in the Pacific area. The strong likelihood is that the principles underlying Polynesian socio-political organization came into the area, already formed, with the immigrant communities responsible for the settlement of Oceania beginning about 4,000 years ago. With those descendants of the immigrants who pushed on further than anyone else and became Polynesians, subsequent development of the basic social organization took different lines according to the historical circumstances of the settlement of the various island groups and the character of the various island settled. The basic facts of these individual histories have not yet been collected in sufficient quantity for any clear general principles to have emerged, but there is a great future for archaeological work in the region directed to a comparative view of the evolution of Polynesian societies.

<sup>59</sup> E. K. Fisk, 'Planning in a primitive economy: special problems of Papua New Guinea', *The Economic Record*, 38, 1963, pp. 467-8.

<sup>60</sup> Sahlins, *Stone Age Economics*, pp. 130-48.

<sup>61</sup> Raymond Firth, *Economics of the New Zealand Maori*, 2nd edn, Government Printer, Wellington 1959, p. 133, quoted by Sahlins, *Stone Age Economics*, pp. 139-40.

In contrast, we do have a history of sorts for a part of the Papua New Guinea Highlands, recovered by work of colleagues and myself at the Kuk swamp at 5,000 ft in the upper Wahgi Valley near Mount Hagen.<sup>63</sup> The history is an agricultural one. The first chapter is the arrival of a simple agricultural economy from lower altitudes at 9,000 years ago, an early date for agriculture by world standards and the earliest date at which domesticated plants could have been established in the region, given that the colder climate of the late Pleistocene had only just ended. The final chapter concerns the technologically complex agriculture of sweet potato farmers living in moderate population densities in the grassland environment of the Mount Hagen region today. The intervening chapters tell how and why this complex agriculture came about. Essentially the story is of periodic innovations in agricultural technology in response to crises in the practice of shifting cultivation brought on, it might seem, by its very success as measured by the growing populations it could sustain. At its most basic, as we have seen, shifting agriculture depends on forest regeneration under prolonged fallow to restore the fertility of abandoned gardens. Where fresh land is in short supply, population increase can threaten the maintenance of the cycle by shortening the length of fallow periods between episodes of cultivation. When other factors, like infertile soils, low rainfall or altitude, are present to inhibit vegetation regrowth, more frequent cultivation of the same land more quickly deflects the cycle of forest regeneration to secondary bush and finally to grassland. The lowered fertility of such degraded environments demands special measures to keep up agricultural productivity and maintain population levels. By 4,000 years ago, as the result of millennia of shifting cultivation, vast inroads had been made into primary forest in the upper Wahgi and secondary vegetation had taken its place. At this juncture there was reclamation of swampland in the district, and the provision of new land for agriculture which this effected allowed some degree of forest regeneration. At about 2,500 years ago an important innovation took place in dry land agriculture which allowed the abandonment of the reclaimed swamp with its requirements of continual labour inputs for maintenance, rather in the way that the arrival of steel axes this century afforded Siane men the opportunity to reduce their labour inputs in subsistence. The innovation in question was that of tillage of the soil, a technique required in the cultivation of grassland, where the normal operations of shifting agriculture, adapted to forest conditions, are ineffective. There follows in the Wahgi an alternation of periods of swamp reclamation and periods of abandonment whenever some further innovation in agricultural technology took place. The agricultural system is thus seen to be in continuous adjustment to the effects of the transformation of the environment for which its operations are responsible.

The Wahgi story is important because the agricultural practices that were

<sup>63</sup> J. Golson, 'No room at the top: agricultural intensification in the New Guinea Highlands' in *Sunda and Sahul . . .*, Allen, Golson and Jones (eds), pp. 601-38.



developed to cope with the environmental change from forest to regrowth and grassland have close parallels amongst farming societies in similar circumstances of environmental degradation throughout the tropics, suggesting broadly similar agricultural histories for them all. The Wahgi evidence is deficient, however, in that, because the settlements of the cultivators have not been found, we have no idea of the relationship of developments in agriculture to developments in society, except in the very latest phase. There is nevertheless no reason to believe that at any stage in the past more complexly organized societies existed than do at present. For support we may take the example of the Dani of the Grand Baliem Valley in the highlands of Irian Jaya, who operate the most advanced of New Guinea agricultural technologies, more complex than the Wahgi at any period, in the context of the normal type of New Guinea big-man system. The Dani combine large-scale drainage works on the swampy valley bottom, which carry the outflow of whole districts to control points on the river, with dry stone walling on the steep, rocky hillslopes supporting extensive terrace agriculture.<sup>63</sup> The whole system maintains densities of population around 500 to the square mile, abundantly demonstrating the capacities of agricultural societies without institutionalized leadership.

In half the time that an agricultural economy has been practised in New Guinea, societies in other parts of the world developed such leadership, and some passed beyond to the creation of the type of society we call civilization. It is possible that, given time and if left to themselves, some New Guinea societies would tread at least part way along this path. It may well be, however, that the path they have so far trodden is a real evolutionary alternative.

I wish to conclude by remarking on the promising contribution archaeology in this part of the world could make to the study of the issues I have been discussing. The region offers three large and diversified areas where historically significant types of human experience have been separately lived close to or into the present: the hunter-gatherer economy in Australia, the primitive agricultural economy in New Guinea and the chiefly society in the Pacific Islands. These circumstances provide a wealth of historical, ethnographic and ecological evidence, actual or potential, for the guidance of archaeological objectives and interpretations. It is also a vision which as archaeologists we need to sustain us as we delve for the scrappy evidence of bones, flints, potsherds and postholes through which the grand purposes of the universe reveal themselves to the trowel.

<sup>63</sup> H. C. Brookfield with Doreen Hart, *Melanesia: a geographical interpretation of an island world*, Methuen, London 1971, pp. 104, 114-15 and references cited.