Examining the farming/language dispersal hypothesis, ed. by Peter Bellwood and Colin Renfrew (McDonald Institute Monographs). Cambridge: McDonald Institute for Archaeological Research (Distributed by Oxbow Books, Oxford, UK). 2002. xiv + 505 pp. ISBN: 1-902937-20-1, ISSN: 1363-1349.

This volume contains contributions presented at a symposium dedicated to the topic described in its title, held in Cambridge in August of 2001. The papers examine aspects of the interesting hypothesis that the spread of agriculture correlates with the dispersal of linguistic groups.

The papers are arranged as chapters under three headings: "Part I, Introduction" with two chapters by the editors (3–28); "Part II: Setting the scene for the farming/language dispersal hypothesis" with seven chapters (by David A. Harris, Mark Nathan Cohen, Lyle Campbell, Peter A. Underhill, Luca Cavalli-Sforza, Peter Forster and Colin Renfrew, and Hans-Ju¨rgen Bandelt, Vincent Macaulay and Martin Richards) (31–107); and "Part III: Regional studies", the largest part, with chapters on four major regions, Western Asia and North Africa (six chapters by Ofer Bar-Yosef, Fekri A. Hassan, Alexander Militarev, Graeme Barker, Christopher Ehret, David Phillipson) (113–187), Asia and Oceania (nine chapters by Dorian Fuller, a team of ten authors headed by Toomas Kivisild, Charles Higham, George van Driem, Andrew Pawley, Victor Paz, Stephen Oppenheimer and Martin Richards, Matthew Hurles, Mark Hudson) (191–318), Mesoamerica and the Southwestern United States (four chapters by Søren Wichmann, Jane H. Hill, R. G. Mason, Steven LeBlanc) (321–365), and Europe (eight chapters by Martin Jones, Marek Zvelebil, Chris Scarre, Bernard Comrie, Guido Barbujani and Isabelle Dupanloup, Loune`s Chikhi) (369–466). The volume opens with a "Foreword" written jointly by the two editors (xiii–xiv) and closes with their separate "Concluding observations" (467–475). There are endnotes and references after each paper and a subject index at the end of the volume (477–505).

One cannot read the editors' "Concluding observations" (467–475) without sensing some degree of disappointment. Bellwood recognizes that critics of the hypothesis "will always be able to rub their hands in glee as yet another non-matching situation is … paraded before an awed audience of non-believers" and acknowledges (468) that the farming–language correlation may not be universally valid, but may still have been common in prehistory, or at least relevant at certain times and places, non-randomly. Renfrew concludes that "little was definitively agreed" (469) at the conference, and the "farming/language hypothesis is in its infancy" (470). He is "convinced that the nub of many of the arguments … relates to issues of time depth and … assumptions which many scholars still find it easy to make about ages and periods of development where languages and language families are concerned" (470). But the scholars he refers to level precisely this criticism against assumptions implicit in Renfrew's hypothesis. In Europe, farming originates in the Golden Crescent ca. 10,000 BP whereas the Indo-European break-up (if you believe there was such a thing) may date from as late as 6,000 BP (see below).

One major difficulty with the farming–language hypothesis is its implicit assumptions that in any one area (i) there was one spread of farming and (ii) one spread of the respective language (family), say, Indo-European. In this strong form, it is borne out, for instance, by the European colonization of those parts of the Americas where there was no agriculture in pre-Columbian times, and farming was introduced by Indo-

Europeans (as the editors are pleased to note, 467, 471). But surely this massive modern movement of people had no parallels in prehistory.

Several of the papers demonstrate how tenuous are the arguments for correlations between the geographical distribution of genetic markers and the spread of agriculture. From the side of genetics, Cavalli-Sforza acknowledges that "the low numbers tested in genetics, the poor representiveness of the samples, the uncertainties of the methods available and the rush to publish make the majority of current statements rather unsatisfactory" (84). Bandelt et al. add that "[o]ne of the main problems with genetics is that the geneticist is expected to get a grant to do something stupendous, and then quickly solve it and move on to something else" (103). But quite apart from this practical side of the investigative endeavor, there likely were numerous population movements in the past that may or may not have had anything to do with the spread of agriculture (cf. Richards et al., 459). Furthermore, what did spread during the millennial transition from mesolithic to neolithic and afterwards probably was not agriculture in the forms that we know now. More likely it was individual (clusters of) elements of agriculture—new domesticated animal and plant species and novel techniques. The earlier of these dispersals may have gradually transformed hunting and gathering into full-time farming, with different chronologies in different areas depending on a host of factors. The most obvious of these must have been the compatibility of new cultivars and techniques with climate and soil types, and the varying local availability of game and fish. Later dispersals may have changed the means and manners of production, incrementally improving the farmers' way of life. Any one of these agricultural elements may have been propagated across the land with or without an accompanying language dispersal. And when a population movement did lead to a language shift, the new language may in some instances have been unrelated, in some, more or less closely related, in some, merely a different dialect (cf. Bandelt et al., 104). This is the way improvements in farming and language shifts have occurred in historical times. It is, I think, what one would have to suppose for prehistory on a uniformitarian basis.

The linguistics contributions address, to different extents, the difficulty of identifying either genetic or archaeological evidence, but especially the latter, with the geographical spread of languages. I limit myself to mentioning the chapters that are directly relevant to the spread of Indo-European.

Campbell's chapter "What drives linguistic diversification and language spread? (49–63) is the only one by a linguist in "Part II: Setting the scene for the farming/language dispersal hypothesis". Campbell considers the Renfrew–Bellwood hypothesis in the strong form mentioned above and argues that in this form it is not plausible. There are enough language dispersals on record, both among foragers and among farmers, and enough dispersals of farming across areas maintaining their linguistic diversity to justify a single conclusion: joint dispersal of farming and language in prehistory may have occurred, but farming is at best one factor among several in the spread of a language. Among the numerous relevant factors in language spread, the chief one undoubtedly is always social. Campbell considers two more theories of linguistic prehistory which have been thought relevant to the hypothetical farming/language correlation. The first is Dixon's theory of punctuated equilibrium. Campbell finds that in linguistic divergence as in convergence, this theory has no revealing role to play. The second is Nichols's theory deriving distant genetic relationships from the contemporary

geographical distribution of structural features. In Campbell's view this theory's central distinction of accretion vs. spread zones is neither useful nor reliable, indeed the notion of spread zone should be abandoned.

In "Part III: Regional studies", the section on Europe contains just one contribution by a linguist, Bernard Comrie's "Farming dispersal in Europe and the spread of the Indo-European language family" (409–419). Comrie introduces a distinction between primary and secondary spread of farming. This enables him to propose a reconciliation of the early date of the spread of agriculture with the glottochronological age of the Indo-European family (6,000 BP). Supposing that Indo-Europeans were implicated in a secondary spread of agriculture also fits the lexical facts that indicate they were farmers before the supposed break-up of Proto-Indo-European. Comrie here reviews some of the terminology from animal husbandry and arable farming.[1] He also considers possible language dispersals based on elite dominance (cf. Campbell's social factors) and concludes that if such was the motivation for the spread of Indo-European in Europe, it could have occurred "without too great a level of population replacement and without any major shift in the agricultural basis of subsistence" (419). In other words, this account practically does not need any secondary spread of agriculture.

One other paper in this section gives extensive consideration to the dispersal of languages in Europe, the rich chapter by Zvelebil, "Demography and early farming populations at the Mesolithic–Neolithic transition: linguistic and genetic implications" (379–394). Here too a compromise account is developed, one that accepts demic diffusion of agriculture for southern and central Europe, but posits cultural diffusion for the west, the north, and the east. In the former areas Zvelebil sees a relatively clear cultural transition between Neolithic and Mesolithic, in the peripheral areas, greater continuity. Correspondingly, language shift is thought to have been brought about by Indo-European-speaking farmers colonizing the south and center, but by the local forager communities changing to Indo-European speech through intermediary lingua francas in the west (Celtic), the north (Germanic), and the east (Baltic, Slavic). Zvelebil dates the stages in these developments thus: origin of agriculture—10,000 BP, beginning of spread from Anatolia into Europe—8,500 BP, main advance—8,000–4,000 BP, final stages on the peripheries—Iron Age. For the linguistic developments Zvelebil proposes such dates as the following: Italo–Celtic–Germanic—6,000–4,000 BP; Creolization: Celtic in Western Europe—5,500–4,000 BP; Eastern Celtic in Central Europe—4,000–3,000 BP; Creolization: Germanic—5,500–4,500 BP; Creolization: Proto-Balto-Slavic—6,000–5,000 BP. No evidence is cited for the latter set of dates.

The section on "Asia and Oceania" contains two chapters that touch on the spread of Indo-European. Fuller's "An agricultural perspective on Dravidian historical linguistics: archaeological crop packages, livestock and Dravidian crop vocabulary" (191–213) examines agricultural terminology in Dravidian with sidelights on Munda and brief mentions of Indo-European. In northwestern India, agriculture was well-established and widespread during the period of Harappan city states; some crops spread to the east of the Indus Valley before 5,000 BP and into the Ganges Plain during the Harappan phase, i.e. 4,500–4,000 BP, diffusing into central India after 4,500 BP. Other dometicates developed in the northeast (8,000?–5,000 BP) and spread west and south from there. And there may have been autochthonous domestications in the south of the peninsula, which spread north (5,000–4,000 BP). This general picture suggests several regional types of

farming were in place prior to the immigration of Indo-European speakers. In addition, "[l]inguistic evidence congruent with an early North Indian (Gangetic) agricultural complex comes from a range of agricultural terms found in Sanskrit, and sometimes in Dravidian languages, which appear to derive from extinct languages of unknown affiliation" (204).

Writing on a different language family, van Driem, in "Tibeto-Burman phylogeny and prehistory: languages, material culture and genes" (233–249), emphasizes and illustrates the relative independence of the transmission of these three bodies of cultural and biological inheritance. His review of the Renfrew–Bellwood hypothesis includes visits to the theories of punctuated equilibrium and spread zones (cf. Campbell above). But it is especially useful for reminding the reader of historical facts that make the application of the farming–language hypothesis to Indo-European complicated: "the Fertile Crescent attests to the fact that agriculture spread effortlessly across linguistic boundaries … Sumerian, Elamite, Akkadian, Hurrian, Hattic, and other languages" (238); "an Indo-European demic wave of advance emanating from Anatolia does not fit well with what is known about the complex ethnolinguistic composition of Anatolia at the time" (238); "the Neolithic and Bronze Age of Asia Minor and Mesopotamia … are characterized by a long period of incursive population movements, driven or lured, it seems, by the relative affluence of urban centers … not just Hittites and Mitanni … Gutaeans, Amoties, Kassites" (238), etc.

Keeping in mind Cavalli-Sforza's cautionary words and the even more severe strictures of Bandelt et al. mentioned above, the volume remains interesting for its discussions of archaeogenetic (Renfrew's term) and archaeological evidence here brought to bear on the spread of farming. The chapters on Indo-European languages show no support for the Renfrew–Bellwood hypothesis in its strong form. Whereas it is up to archaeologists to develop a more detailed account of the dispersal of forms of agriculture, the historical linguists should take the advice of Zvelebil (105): "to develop more complex models for the origin and spread of … [the Indo-European] language family and to investigate ancient *Sprachbund* and other contact phenomena that could point to language meshes … [in distant prehistory]". In this regard it is notable that none of the papers on Indo-European mention the notion of a "staggered migration of Indo-European groups out of the core territory …" (Polomé 1990:274; cf. Meid 1975, Gamkrelidze and Ivanov 1984), which finds unexpected support in the irregular correspondences in some Indo-European languages (cf. Andersen 2003) as well as in the Indo-European lexical elements of varying age in Finnic (cf. Koivulehto 2000).

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[1] One of the items Comrie mentions is the etymologically difficult word for 'milk', apparently assuming that PIE *$h_2melǵ$- designated milk as an agricultural product, to the exclusion of human milk. If this assumption is correct, it may be relevant to note that recent DNA analysis (Pelttonen 2004) dates the development of lactose resistance to 4,800–6,600 years ago and identifies its place of origin as the Ural–Volga area. Pelttonen supposes that this genetic innovation spread to Europe, the Middle East, and the Indian subcontinent from there and notes that this interpretation implies support for the Kurgan theory. She reports that Luca Cavalli-Sforza sees this discovery as an indication there were two waves of Indo-European farming dispersal in Europe.