Letters

Modern Human Origins

The recent article by C. Stringer and P. Andrews on the origins of modern humans (11 Mar., p. 1263) confounds rather than clarifies the issues. The article is not an undogmatic review, so described by Roger Lewin in his accompanying article (Research News, 11 Mar., p. 1240). Rather, it contains contradictions, misrepresentations, and omissions and is a step backward from the progress made during what has been anything but "a period of relative neglect."

The authors present a comparison of two models—the "multiregional" and the "single [African] origin" models. They then choose the single origin option. The two models represent the extremes of a number of possible hypotheses. For instance, regional continuity might have characterized east Asia but not western Europe during the late Pleistocene. Moreover, the value of their dichotomy, even as a heuristic device, is undermined when they then assume the hypothesis they set out to test, through their initial contentions that the origin of modern humans is "an event" and that modern humans are a new species distinct from earlier "archaic" populations of *Homo sapiens*. We find no compelling support for the notion that modern humans are a biological species distinct from archaic *H. sapiens*. In fact, this and other (*1*) attempts to define the characteristics of this supposedly distinct new species are unsuccessful because they do not include large segments of some recent populations.

Stringer and Andrews incorrectly characterize the multiregional hypothesis and make improper attributions to it. These invariably provide the "predictions" then said to be disproved. For instance, one disproof is supposed to be the inability to account for the loss of "Indonesian-derived characters" in late Pleistocene Australians, when in fact the multiregional model proposes that late Pleistocene Australians differed from middle Pleistocene Indonesians because they evolved from them. The multiregional hypothesis makes no claims about whether or not transitional specimens should be widespread or "common" (this is surely a matter of taphonomy, funding, and plain luck). The hypothesis does not predict an "earlier establishment of combinations of *Homo sapiens* characters" at the center because of gene flow. "Center and edge" theory predicts peripheral homogeneity and central heterogeneity at the time of the initial habitation of Eurasia, but not a million years later, as Stringer and Andrews interpret it in their table 1.

We do not agree that "under the multiregional model, the marked morphological and metrical similarities of . . . geographically distinct crania are explained as the result of parallel evolution." To the contrary, the discredited "parallel evolution" interpretation of Carlton Coon is rejected in every publication on the topic, as well as in the summary of the hypothesis the authors themselves present. Stringer and Andrews criticize the multiregional model for requiring an "extraordinary [and quite unrealistic] level of gene flow." Yet, in its place are offered worldwide population movements and *complete* genetic replacement in what must have been a Pleistocene "holocaust." Other misinterpretations of how gene flow is used in this model lead to incorrect "predictions," such as that modern peripheral populations should be more divergent than central ones and that there are "no universal patterns of *Homo sapiens* origins."

The multiregional model does not suggest that recent variation is solely the product of middle Pleistocene ancestry. This would ignore the fundamental role of local environmental selection in accounting for human variation accepted by all models and deny the possibility that the spread of culture may provide selection for common evolutionary directions without gene flow. Interpopulation variation in features that characterize regions by commonly or uniquely appearing together in high frequencies is not the same as the intrapopulational variation of all features. The interpretation that there were morphological clines across Eurasia in the middle Pleistocene does not imply that European Neanderthal characteristics should be expected in the Far East, just as the clinal explanation or races does not predict Europeans in the Far East. Moreover, there is a contradiction between the description of middle Pleistocene Asian hominids as lacking "evidence of Neanderthal-derived characters" and the description of these hominids as showing "a greater resemblance to European . . . hominids" than to their own direct ancestors. We have difficulty reconciling the latter contention, of middle Pleistocene regional convergences, with the assertion that widespread populations only first came to resemble each other in the late Pleistocene.

Instead of presenting comparative photographs of crania oriented in the universally accepted Frankfurt Horizontal, the authors use a novel orientation that denies the possibility of comparing their photos with other published ones, and even with each other. They state that, "although Europe and southwest Asia have the most complete fossil record for this period, there is an absence of Neanderthal–modern *Homo sapiens* transitional fossils in either area." Whether or not the authors agree with those who have worked on the specimens from the region, we wonder why they did not mention the detailed formal descriptions of the Mount Carmel remains from Israel and the Vindija remains from Yugoslavia, both of which conclude that the samples are reasonably interpreted as transitional. We question the use of the term "homoplasy" to describe character states in races of a single species. However persuasive the use of the cladisic approach, it is misapplied when samples below the species level are compared.

While it is said that Chinese fossils from sites such as Jinniu Shan (Yingkou) and Dali exhibit a greater resemblance to their European contemporaries and a greater contrast with their "supposed local ancestors," this is contradicted by Chinese publications (*2*) on the specimens [including those quoted (*3*)]. WLH 50, a late Pleistocene Australian specimen, is described as "the only credible morphological intermediary between middle Pleistocene Indonesian hominids and late Pleistocene Australians" in a statement that does not conform with our knowledge of the multitudinous Australian fossil record. It also ignores decades-old publications (*4*) which assert that middle Pleistocene Indonesian features are exhibited in late Pleistocene Australians. Similar misinterpretations of the Australasian sequence are evident in the statement that there was "a basic east-west division of middle Pleistocene hominids." This ignores the marked contrasts in east and southeast Asia between the Sangiran sample and the Zhoukoudian and Hexian samples and takes no account of the significance of Narmada (*5*).

Finally, we do not agree with the description of any Australian Aborigines or their immediate ancestors as cases of "apparent evolutionary reversals," and such statements and their implications are unfortunate.

Multiregional evolution was initially proposed 50 years ago as the polycentric theory of Franz Weidenreich, the first paleoanthropologist to study extensively human fossils from three geographic regions. Stringer and Andrews do not appear to have examined the Asian and Australasian fossils that are so critical to their interpretations. It is laudable to test models, but to trump up predictions for one model so as to disprove it is counterproductive. It is appropriate to conclude that paleoanthropologists who ignore the increasing wealth of paleontological data will do so at their peril.

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Response: We explained the rationale behind our approach in the first paragraph of our article (*1*). Far from assuming the hypothesis before we started out, we feel that treating the emergence of modern *Homo sapiens* as an evolutionary event enables proper consideration of that event. Multiregional models can (and for some authors do) account for the evolution of "modern" features in geographically separate populations by parallel evolution, and it seems essential to diagnose what we mean by "modern humans" in an article which discusses the origin of modern humans. Too often other workers (including some authors of the above letter) have not made clear and scientific presentations of what they mean by "modern human," thereby preventing tests of their preferred evolutionary models. Thus they do not provide consistency of approach or genuine testability for their ideas. Without a clear conception of what they mean by "modern human," they are unable to provide appropriate data on ranges of variation in "modern humans," to recognize the earliest appearance of "modern humans" in any given area, or to establish the existence of evolutionary intermediates or hybrids, which should be essential components of multiregional–gene flow models.

Inextricably linked with these discussions are different or confused conceptions of what is meant by the term "species." One must have a conception of what is meant by the term "modern human," as well as an awareness of the limitations of the biological species concept as applied to fossils. It is evident from recent studies that neospecies may have very high or very low levels of morphological variation. In the case of extant primates, it seems that the use of skeletal variation alone would lead to a serious underestimate of species numbers (*2*).

By choosing to limit the use of *Homo sapiens* to anatomically modern humans as