

Chagha Sefid. Two important appendices supplement the excavation data: Michael Kirkby's geomorphological analysis of land and water resources in Deh Luran and Colin Renfrew's analysis of the Chagha Sefid obsidian artifacts and late prehistoric obsidian trade in the region. Accounts of the retrieved faunal and botanical remains, entrusted to others for analysis, remain to be published.

Hole's new data reveal a set of marked changes in material culture for the pre-Sabz phase, labeled the "Choga Mami Transitional" after the occupation at Choga Mami with a similar ceramic assemblage. Do these changes signify the intrusion of irrigation-practicing peoples from the Choga Mami area into the Deh Luran plain? Choga Mami Transitional ceramics are now known from recent excavations on the Susiana plain and from new surface collections in southern Iraq. Does this distribution indicate that the early Susiana and Ubaid cultures are similarly derived from the irrigation culture of the Choga Mami area?

Too little has been published from Choga Mami and the Susiana plain and too little research has been conducted in southern Iraq to permit definitive answers to these questions. Hole extracts enough from the available data, however, to present a strong argument for a migration from the Choga Mami area into the Deh Luran plain. He suggests that the population growth encouraged by yields from irrigation agriculture in the original areas of Choga Mami Transitional settlement may explain this migration. Some may bridle at the association of "pots and peoples," but the association is more convincing when it is tied to changes in subsistence technology and population sizes in different ecological settings.

Hypotheses aside, the meaning of some fundamental data for early irrigation farming in southern Iraq and southwestern Iran remains to be clarified. Here it may be useful to note that irrigation agriculture in Deh Luran during the Sabz phase is still not a certainty. Pending the analysis of the botanical remains for the Choga Mami Transitional phase at Chagha Sefid, the evidence for Sabz-phase irrigation consists of two Sabz-phase linseed lengths, which Hans Helbaek argues could have been achieved only by irrigation agriculture (3). Although linseeds were reported for subsequent phases, only two carbonized specimens from the Mehme phase were measured. These samples, presumably also the products of irrigation agriculture, do not, when their lengths are "corrected" by van Zeist's shrinkage factor,

reach the lengths of the supposedly "irrigated" Sabz-phase specimens. Precisely the same situation obtains with the few samples from Choga Mami. With prehistoric linseed lengths now more fully documented from a variety of ecological contexts, the data from the Sabz phase need reevaluation.

Linseed lengths might not permit discrimination between canal irrigation, basin-flow irrigation, and the products of a high water table, regardless of annual precipitation. Kirkby's geomorphological appendix, which reconstructs the environmental history of the Deh Luran plain, concludes that "reliance on a high water table, rather than . . . specific water control techniques" could account for the Sabz-phase crops. A similar interpretation could be attached to the pollen data retrieved from the Deh Luran sites (4).

Prehistoric agriculture in Deh Luran has been understood against the climatic background inferred from the analyses of pollen cores retrieved from the western Zagros. Yet no modern analogue of the cores' zone B vegetation (around 8000 to 4000 B.C.) is certain, and these cores have been taken to suggest both climatic conditions warmer and drier than those that prevail today and conditions close to the modern ones (5). New data, publicized after this volume was in press, suggest yet another climatic background. Sediment cores from the Persian Gulf show alterations in the quantity and quality of river-borne terrigenous sediments from the Zagros drainages and suggest that increased precipitation facilitated changes in settlement and subsistence in this period. A relatively sudden increase in the Zagros drainage discharge began about 5500 B.C. and continued to about 3000 B.C. During this period annual precipitation may have been 30 to 40 percent greater than today in the Zagros, and two to four times greater in the Mesopotamian lowlands (6). The onset of these conditions is roughly contemporaneous with both the earliest documented settlements of southern Iraq and the movement of Choga Mami Transitional ceramics to the Deh Luran and Susiana plains. Irrigation agriculture may not have been necessary in these regions, and in the absence of certain data its origins there still elude us. In the meantime, Frank Hole's research and publications continually redefine long-standing archeological problems.

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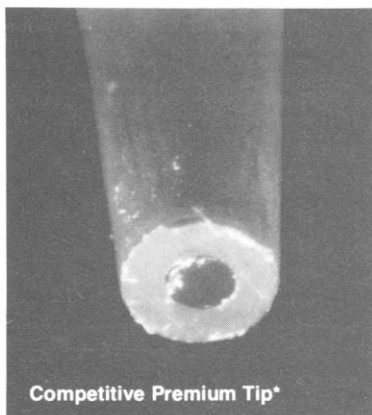
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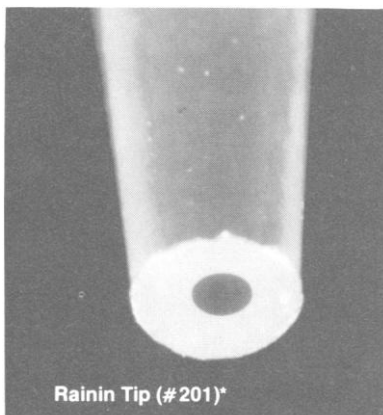
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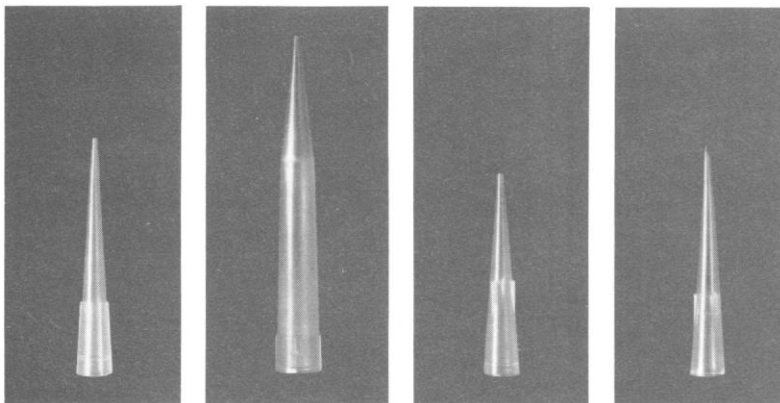


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