

Wright

MUSEUM OF ANTHROPOLOGY, UNIVERSITY OF MICHIGAN

NO. 46

SOCIAL EXCHANGE AND INTERACTION

Edited by

EDWIN N. WILMSEN

Contributions by

ARAM A. YENGOYAN

GEORGE C. FRISON

RICHARD I. FORD

STUART STRUEVER and GAIL L. HOUART

PETER BENEDICT

HENRY T. WRIGHT

CONRAD P. KOTTAK

KENT V. FLANNERY

ANN ARBOR

THE UNIVERSITY OF MICHIGAN, 1972

A CONSIDERATION OF INTERREGIONAL EXCHANGE IN GREATER MESOPOTAMIA: 4000-3000 B.C.

Henry T. Wright

INTRODUCTION

ARCHAEOLOGISTS have long attempted to understand extinct interregional economies by studying the distribution of distinctive artifacts in areas removed from their locus of production. More often than not, these attempts have involved defining the period during which a product was repeatedly transported and mapping the region within which it was distributed. Such studies only demonstrate the existence and spread of trade networks; they provide neither elucidation of the mechanics of interregional exchange nor tests for the explanation of various cultural developments in terms of changing exchange networks.

To achieve these two purposes, it is useful to estimate the values of different commodities at different points in the network and the volume of transport between such points. Changes in both the value of different commodities (cf. Winters, 1968) and the volume transported (cf. Renfrew, Dixon, and Cann, 1969) can indicate the social context and regulatory controls of exchange. In addition, correlations between changing volumes of transported commodities and other variables can lead to the rejection or acceptance of possible explanations of cultural development. In this paper I shall attempt to use such estimates to test whether or not state development and population growth are explained by increased exchange.¹

Two categories of network studies are definable. One involves the consideration of transport through a single node in a network for a period of time. The other involves consideration of transport through two or more nodes in a network. In either case, the archaeological data used are observations on discarded artifacts at a site. Moreover, the artifact samples must be

¹This is a total revision of a paper presented at the 1969 Annual meeting of the American Anthropological Association in New Orleans. The changes result in part from the constructive comments of my friends, whom I thank, and in part from a complete reexamination of the body of data from Farukhabad.

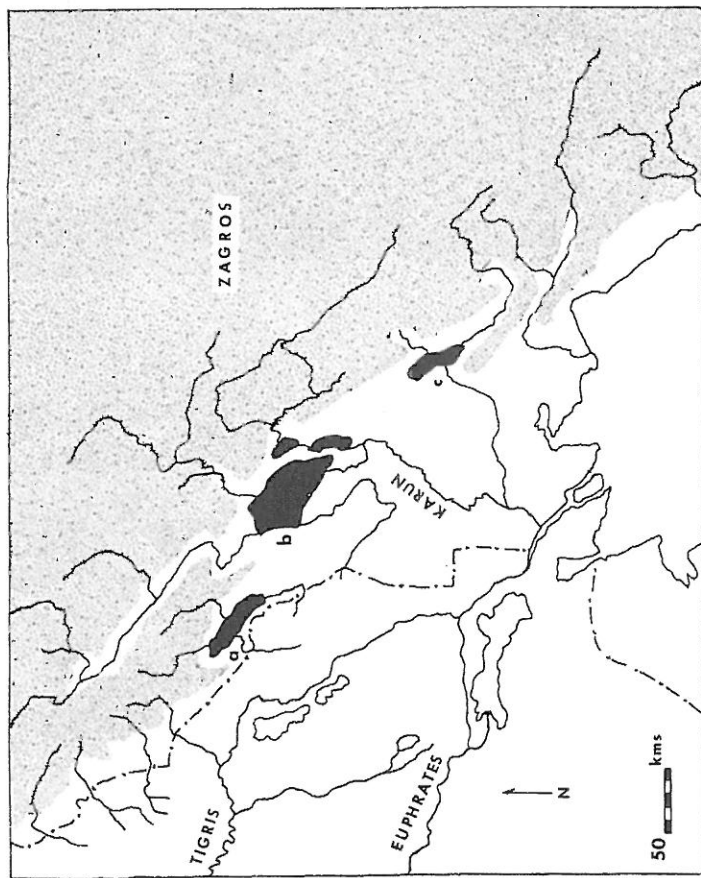


Fig. 1. The Central Zagros. The stippled area is rugged land above 800 m. The black areas are the major settled plains of southwestern Iran:

- a The Deh Luran Plain and Tepe Farukhabad
- b The Susiana Plain
- c The Ram Hormuz Plain

representative of those in the site or sites, and the assumptions which one makes in order to derive measures of exchange variables from the data must be explicit. Clearly, in order to study two or more sites one must have comparable samples from these sites. Such comparability is rare. It is therefore seldom possible even to test such simple hypotheses as "the value of a commodity is a function of transport distance from the source" or "volume of a commodity moving through a point is a function of the population served by that part of the network beyond this point." In this paper, only one node will be considered.

AN EXCHANGE NETWORK

To exemplify an approach using data from a single node, let us consider a small, fourth millennium B.C. center in Greater

Mesopotamia. Given the technology of the period, Greater Mesopotamia can be divided into three major material resource zones (Fig. 1). In the center is the Tigris-Euphrates alluvium. This was an area of high subsistence potential lacking stones, metals, large timber, and many other resources. North of this are the folded and eroded Zagros Mountains, rich in cherts for stone cutting tools, gypsum and limestone for stone containers, and timber. Seepages of bitumen, useful as an adhesive and waterproofing, occur along the juncture of these two zones. North and east of the Zagros are the Anatolian Plateau, Iranian Plateau, and the basins and ranges of Baluchistan and Afghanistan. In these occur metals, cherts, igneous rocks for durable ground stone artifacts, and gems for ornaments. As one moves from the alluvium through the rugged mountains to the poorly watered plateau, both settlement size and the size of inhabited enclaves drop. There were a limited number of routes and methods for moving resources from the thinly populated and relatively material-rich plateau to the densely populated and relatively material-poor alluvium. The mountains had to be crossed by one of a number of tracks, carrying goods on human backs or perhaps pack animals. Upon reaching the foot of the mountains, lateral movement by river boats or gulf sailing crafts was possible.

The center to be considered is Tepe Farukhabad on the Deh Luran Plain of Southwest Iran. Limited excavations were conducted here in 1968 by a team from the University of Michigan Museum of Anthropology and the Iran Archaeological Service.² The Deh Luran Plain was one of the small, settled enclaves south of the higher ridges of the Zagros but within the first low folds of the ranges. It is about one hundred kilometers west-northwest of the similar but much larger Susiana Plain and about one hundred kilometers north of the heartland of Tigris-Euphrates alluvium. Several of the possible routes between these two densely populated areas passed through the Deh Luran Plain. In addition to its location, the plain had the advantage of a number of useful resources. On the northeast edge of the plain is a large bitumen seepage. Immediately to the north of the plain, the ridges rise above one thousand meters in altitude, and even today oak is relatively plentiful. On the southeast end of the plain is an extensive granular chert source. Throughout the area, gypsum and calcite boulders occur. All of these materials

²These excavations were supported by National Science Foundation Grant GS-1936.

were collected and brought to the settlement at Farukhabad near the southwest edge of the plain.

The history of Farukhabad is now well documented. This settlement was founded before 5000 B.C. By the late 'Ubaid Period, about 4000 B.C., it was a small center with both simple and elaborate buildings, probably very similar to a number of other settlements on the plain. After an abandonment of several centuries, the site was reoccupied near the end of the Early Uruk Period. By the Late Uruk Period it had once again grown into a small center with both simple and elaborate buildings. It was probably the only such center on the thinly occupied plain. During the Jemdet Nasr Period, about 3000 B.C., this small center was subsidiary to a large town in the center of the plain. Farukhabad was abandoned during the later Early Dynastic Period, but it was periodically reoccupied until the first millennium A.D.

Farukhabad has been cut in half by the nearby Memeh River. Given the time and resources at our disposal, I decided to sample along this convenient transect through the site. Two five-by-five-meter blocks were arbitrarily selected along this face. In retrospect, it is likely that this method will result in a bias for the smaller central area of the site which probably had larger, more elaborate buildings. For this reason, we cannot estimate absolute consumption of either imports or local products. As the blocks were excavated down the face, all occupational refuse was screened with a standard 5mm mesh.

EXPORTS AND IMPORTS

To be useful in a quantitative study, an export from an archaeologically documented settlement must be relatively common. It must also leave both some evidence of production independent of the discarded finished artifact and the discarded artifacts themselves. An increase in export can only be measured by comparing increase in production with increase in consumption. Several examples illustrate this point. Utilization of oak is indicated by rare occurrences of charcoal which could be either burned discarded artifacts or burned waste. Thus it is not useful. Since utilization of calcite and gypsum is indicated almost exclusively by discarded finished grinding stones and stone bowls, they are not useful. In the case of chert utilization, both core-trimming flakes, cores, and finished tools are present, but there is no evidence that the various types of chert from Deh Luran were exported. However, in the case of bitumen there

are several distinctive by-products of manufacture and there are distinctive artifacts. Bitumen preserves well at the site. It proves to be a useful measure of export.

The bitumen seepage near Farukhabad has laid down layer upon layer of rock asphalt mixed with sediment and fragments of plants. This material is much easier to mine than the tenacious semiliquid fresh bitumen. Blocks of rock asphalt were returned to Tepe Farukhabad, and many fragments were discarded without any further treatment. These blocks can be heated until the foreign matter floats or sinks from the bitumen. The cleaned bitumen can be either packaged in a container for export or used locally. There were a very limited number of local uses. Cracked ceramic vessels were patched. Chert sickle blades were mounted in wooden handles. Reed and pole matting probably used in houses was sometimes coated with bitumen. At various times small bitumen spheres, perforated ovoids, and other items were made and discarded. The two major uses for bitumen in alluvial Mesopotamia, as architectural water-proofing and as boat caulking, are not attested in Deh Luran. Given the small and seasonal character of the local rivers, boats would have had little utility. The large amount of waste bitumen, both rock asphalt and melted pieces, relative to artifacts must reflect the differential demand and consequent high, though varying, export production.³

To be useful in a quantitative study of exchange, an import into a settlement must be common, and there must be some way to measure variation in import independent of variation resulting from use for different purposes. Many of the imports to Farukhabad are too rare for use in a quantitative study. Among these are obsidian, copper, basalt, marine shell, carnelian, and lapis lazuli. A common import is high quality chert. This is frequently used along with local chert for all blade tools except sickle blades. A local coarse gray chert is preferred for these. Variability resulting from different uses can be controlled by considering only one tool category. In this study, retouched and utilized blades and blade segments which were probably used for a variety of cutting activities are considered. The relative value of the import chert can be calculated on the assumption that local chert, being obtained and worked in the same manner through time, has a constant value. Given constant exports, a

³ A chemical study of bitumen samples from Farukhabad and other sites is now being conducted by Dr. Robert Marschner with the support of the American Oil Company. The study is hampered by our inability to obtain samples from the many seepages in Iraq and Syria.

decrease in the proportion of import chert to some constant amount of local chert indicates increase in the exchange value of the imports, and vice versa.

We have considered both some general problems of imported and exported commodities in archaeological contexts and some characteristics of the specific materials found at Farukhabad. Now let us examine the participation of a single node in greater Mesopotamian exchange networks during the fourth millennium.

FOURTH MILLENNIUM EXCHANGE DEVELOPMENTS

Data on objects of different materials are presented in the accompanying tables.⁴ We will examine each phase in turn.

The Farukh Phase, a stylistically distinct Deh Luran manifestation of the Late Ubaid Period, is our base point. Table 1 shows that in the total amount of screened Farukh Phase refuse, there were 35 grams of bitumen waste per cubic meter and 5 grams of bitumen spheres, bitumen-covered mat fragments, lashings, etc. Table 2 shows that major bitumen production could occur in either simple or elaborate buildings. There was no monopoly on production. On the other hand, stone for chipped tools was the only common class of import. For every 10 blades of local chert, there were 7 of exotic chert. In addition, small quantities of obsidian were being introduced. There were few other imports.

In the succeeding Early Uruk to Early Jemdet Nasr Periods, bitumen production, as indicated by waste density, fluctuated at a low level, while the utilized bitumen artifacts consistently declined. Note however that there are so few artifacts that even if the manufacture of each artifact left twice its weight in waste, the trends in bitumen waste density would hardly be affected by this apparent decrease in use. On the other hand, for every ten blades of local chert, we found only one or two blades of imported chert. The value of these stones had more than tripled relative to their Farukh Phase value. Thus there was relatively constant local production, but the value of previously easily-obtained commodities rose, since so few of them reached Deh Luran. The Late Ubaid exchange network was no longer effectively supplying Deh Luran.

During the Early Uruk to Early Jemdet Nasr Phases there is evidence that the exchange network was undergoing a trans-

⁴These figures are subject to minor revisions before final publication of the Farukhabad Report.

Table 1
LOCAL AND NONLOCAL MATERIALS AT TEPE FARUKHABAD

Period	Total Cubic Meters Screened	Grams Waste Bitumen/ M ³	Number Bitumen Tools	Grams Bitumen Tools/ M ³	Local Chert Blades	Non- Local Chert Blades	Local Ratio	Import Ratio	Obsidian	Copper	Basalt	Marine Shell	Carnelian	Lapis Lazuli
Late Jemdet Nasr	27	252	8	15.8	41	17	10:4		1		9	11		4
Early Jemdet Nasr	44	31	3	.4	95	14	10:2		1		2	5	2	
Late Uruk	26	60	5	2.2	127	16	10:1			1		5	1	
Early- Middle Uruk	37	20	5	3.2	74	15	10:2		2					
Farukh	63				144	109	10:7		2	2		1		

Table 2

BITUMEN DENSITY IN SIMPLE (S) AND ELABORATE (E) BUILDINGS AT FARUKHABAD

Period	No.	Type	Excavation	Feature	Layer	M ³ Screened	Grams Bitumen Waste	Grams Bitumen/M ³
Late Jemdet Nasr	1	S	B	10AB	21-19	7.8	402	51
	2	E	A	1DC	10-6	8.3	2589	312
	3	E	B	10CB	23-22	10.0	4084	408
Early Jemdet Nasr	4	S	A	12B	17-14	8.2	231	28
	5	S	A	12A	13 L-M	3.6	25	7
	6	S	A	15	18	3.3	30	9
	7	E	A	1E	12-11	5.4	98	18
	8	E	A	1F	13 U	2.3	66	28
	9	E	B	10DC	26-24	13.8	806	58
Late Uruk	10	S	A	16	19	2.7	5	2
	11	S	A	20-22	21	4.8	71	15
	12	E	B	22-23	31U-30	6.7	491	73
Middle Uruk	13	S	B	26	33U	3.9	44	11
Early Uruk	14	S	B	37	36	6.4	318	50
Farukh	15	S	B	40	41	6.5	223	34
	16	S	B	41	44	4.1	15	4
	17	E	A	25	30-31	1.5	48	32
	18	E	A	28-29	27-24	14.5	231	16
	19	E	A	30	23-22	2.7	103	38

formation. Obsidian was no longer transported, but such technically useful materials as copper and vesicular basalt and such socially useful materials as marine shell and carnelian appear, even in our small sample. These shifts in minor commodities suggest decreased exchange with northern Iraq and increased exchange with central Iran and the Gulf area. Until the sources of copper, basalt, and carnelian can be identified, this possible change in territorial orientation cannot be verified. Whatever the explanation of these shifts, these and other evidences suggest that

a new exchange network was growing up around the large Uruk Period towns of alluvial Mesopotamia and the Susiana Plain. However, the Deh Luran Plain does not appear to have participated significantly in this new network.

Examination of Table 2 suggests that from Late Uruk times onward there was more bitumen waste in elaborate buildings than in small buildings. This may indicate that production for export was concentrated in these structures. Such a conclusion cannot be accepted unless it is shown that this larger amount of waste cannot be explained by an increased bitumen tool use in these buildings. This is not now possible given the small samples of bitumen tools.

In the Late Jemdet Nasr Period, there were major changes. There was an overall eight-fold increase in bitumen density to 250 grams per cubic meter, resulting from a three-fold increase in waste density for simple buildings and a ten-fold increase in waste density in elaborate buildings. There were 16 grams of bitumen tools per cubic meter. Unfortunately the proportional increase in export production cannot be estimated because we do not have large enough tool samples to accurately estimate changes in local consumption. On the other hand, for every ten blades of local chert there were four of exotic chert or an approximate doubling in their relative use. In addition, there was marked increase in other, less common import commodities such as basalt, marine shell, and semiprecious stone. Since local bitumen production increased so radically, this increase in imports need not be explained as a result of decreases in their relative value. The increase in imports could be more reasonably explained as a result of an increase in exports. If so, by Late Jemdet Nasr times the Deh Luran area had considerably increased its participation in the transformed exchange network that developed during the Uruk Period.

In summary, this consideration of the occurrence of various types of materials at Farukhabad indicated a simple Late 'Ubaid exchange network in which few commodities were transported in any quantity. During the succeeding Uruk period this simple network did not adequately supply the Deh Luran Plain with high quality chert. Also, during this period there are indications of a change in the organization of local production of bitumen and indications of a change in the kinds of commodities transported. During the Late Jemdet Nasr Period, Deh Luran was apparently integrated into a transformed network in which large quantities of many commodities were transported.

INTERREGIONAL EXCHANGE, THE STATE, AND POPULATION GROWTH

For the purposes of this paper, a state is defined as a socio-cultural system with a specialized administrative subsystem. In Mesopotamia its existence is indicated by an administrative technology including official seals, numbered systems, and special buildings. At Farukhabad, a numbered and sealed *bullia* was found in later Middle Uruk layers. Since only the small center of Farukhabad and a few villages occupied the plain at this time, it is likely that the Deh Luran Plain was a marginal part of a larger state centered somewhere else, probably on the Susiana Plain. If so, the Deh Luran area was drawn into a state long before it participated significantly in the transformed exchange network. The latter cannot explain the former.

Population increase and population nucleation are indicated by growth in the number and size of settlements. On the Deh Luran Plain, settlement reached a nadir during the Middle and Late Uruk periods. During the Jemdet Nasr period however most centers, large and small, were reoccupied. By Late Jemdet Nasr times all were occupied and population was perhaps double its Farukh Phase level. It seems that the major population growth preceded major participation in the new exchange network. If so, the latter cannot explain the former.

Thus there is one likely case against the hypothesis that interregional exchange alone causes either state development or what is commonly called urbanism. Furthermore, it seems as fruitful to pursue some contrary ideas: that state development implies both changed demand for goods and changed political geography which require changes in the pattern of interregional exchange and that population growth stimulates increased volume of exchange.

CONCLUSION

I hope that this example demonstrates the utility of quantitative archaeological studies of exchange. Let me recapitulate some of the pitfalls. First, one should have equivalent recovery procedures in each area sampled. Screened samples of a waste product from here and hand-picked samples from there would be misleading. Second, one should have samples representative of the sites being studied. If samples are biased, then some attempt must be made to account for this in analysis. Third, one

has to devise some means of measuring import and export independent of local use. The means will differ in various research situations. In the above example, local consumption of the export commodity was minor and the density of the waste product could have been used as an indicator of export for the immediate objective. However, even with small samples of bitumen tools, a rough assessment of the contribution of increased local consumption was possible. However, exact correction would require not only larger samples but also knowledge of the absolute amount of waste created in the manufacture of each bitumen tool type. On the other hand, import cherts had to be estimated relative to local inferior substitutes in the above example. The absolute amount of import chert could have been estimated if we had a representative sample from the site, since all the import material would sooner or later have been discarded.

I originally set out to consider the relation between interregional exchange and both state development and demographic growth in a portion of Greater Mesopotamia. The major increase in participation in interregional exchange occurred during the Jemdet Nasr Period. This is in keeping with the evidence from other nearby areas. Though the evidence is slim, and can perhaps be interpreted in ways other than that presented above, it seems that the state as a political form developed prior to this increased participation in exchange. In addition, major demographic changes seem to have begun before increased participation in exchange. These results suggest that the explanation of the rise of the state and the growth of great population centers is to be sought in variables other than increasing volume of interregional exchange.