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Evidence for a Long Term Process Scale for Social Change in Modern Man Settled in Place via Agriculture and Engaged in Trade and War

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Introduction

We have initiated a model of human social systems by the following near standard physical strategy. Observing a typical human unit through time, as in any thermodynamic system, there comes a point where initial distinctive features are lost, dispersed, and (ignoring new features that arise in the meantime) it comes to resemble its neighbors. This is the relaxation time at which locally distinctive features decay, whether through collision with neighbors or by an internal decay process. Over many observations, the effective average distance travelled by such groups in this time is their mean free path. In any continuum-like physical field the mean free path and relaxation time are fundamental scale measures.

We have suggested that the mean free path – relaxational time scaling for modern *biological* man, homo sapiens sapiens, bound into hunter-gatherer social groups, was about 40 km (a daily roaming range) and 25 yr (a generation time) – (1). After diffusing in time at a scale measured by these parameters, man filled the earth's habitat available to him fairly uniformly in density (all land surfaces except the arctic regions and the most extreme arid areas) by perhaps 15,000 years before present (15 Kyp – Kyp will be used to denote thousands of years before present) – (1,2), almost certainly by 10 Kyp [1]. Subsequent growth in population and population density, for a long time effectively unchanged in rate (5), had to take place by some sort of process other than by freely diffusing hunter-gatherer band life. This required some sort of transition, in physical concepts a stability transition, a bifurcation among a very limited range of new possibilities which even included the possibility of extinction (see (5,6) for discussion of stability transitions). Clearly, one can surmise that the processes elected were condensation in place via horticulture (or fishing), transforming into agricultural cultivation, active trade, and/or pastoralist or nomadic association, e.g., via transhumance, the latter perhaps only as a temporary but long time alternative [2].

A new size for larger social groupings (e.g., settled organization), we estimated, had a space scale on the order of perhaps 300 km involving a dozen or so significant fixed centers engaged in convecting goods by trade ((1,8) – the physical process of developing macroscale ensemble flow patterns is known as convection), and an organized time scale on the order of 500 to 1000 years (5).

The purpose of this fourth paper is to demonstrate experimentally that this long time scale of perhaps 500 years is compatible with cultural-political-economic organization (known mostly from archaeological evidence, but also extending up to modern times) in the post-condensational period after 10–15 Kyp. That is, we claim that significant reformations or reorganizations (as fluid-plastic-like changes in social patterns) have taken place and continue to take place from the earliest condensations in population onward (e.g., the earliest Mesolithic cultures), *and* that these changes are to be found (a) either in settlement patterns, (b) political boundaries, (c) culture (belief structure or heritage), (d) ethnic groupings, or (e) economic modes (tool traditions, modes of production).

Some introductory comments that may furnish a background to the goals of this paper, and the nature of its findings are in order.

Clearly, a study of this sort owes its inspiration to Tylor's creation of modern cultural-anthropological study, to Spencer's positive achievement in calling for and starting up an extensive systematic ethnographic inventory of cultures, and to Murdock's furthering attempt (9) to make it as exhaustive and systematic as possible. However the problems at hand are both an attempt to provide a physical theoretic for their results, which we have begun in (1,2,5), to test those theoretical predictions and to comprehend what they mean experimentally, and to offer some appreciation of the magnitude of the real task requiring study. In this paper, as very amateurish historians, we barely scratch the surface of the problem.

Our theoretical studies have suggested that, beyond a hunter-gatherer stage in human existence, there was a transition to condensation in settlement or part settlement at increasing density to a state of culture and civilization involving social coherence and cooperativity at the 500–1000 year and perhaps 300 km scale. We found this very encouraging in its compatibility with Murdock's conclusion (9) that appropriate scales for effective independence in cultures are separations of 1000 years or 300 or so km.

But then the necessary conservatism of the Ethnographic Atlas' inventory (it only purports to include well documented

social units) of about 800 cultures perhaps can be appreciated, for a scaling of about 500 years and 300 km suggests that the number of possible units that might require study in the potentially available earth habitat of about 120 million sqkm for about 12,000 years is more like 30,000 study units. This becomes of more astronomical measure, like studying star maps rather than taking inventory in a small storeroom. One might therefore surmise that our amateur archaeological study of a cultural-civilizational inventory might at best only succeed in giving a little of the flavour and some of the character of the problem.

It has to be understood that we started this study with little else but the hypothesis that our theoretical space-time scaling might have some societal significance. The purpose of performing an experimental investigation was to seek possible verification of the thesis, to determine what might be the actual variance associated with our theoretical estimate, and to determine what sort of actual causes were responsible for the space-time scaling. As the data will show and we hope convince the reader, our scalings seem verified, but the variances are considerable, namely a time scale of 200 to 1200 years, and a space scale of perhaps 50 to 800 km. With such a scaling range, the magnitude of a cultural inventory of social condensations might have to consist of more like a few hundred thousand units of study. Thus we now tend to believe, as a result of our study, that perhaps between fifty and a few hundred thousand culture units is a better second order estimate of the cultural inventory that needs to be studied. Such a goal, either a priori or posteriori, was or is of course impractical for a very modest introductory paper. Besides the data base doesn't exist to support such a study yet. So what we did, and now appear to have justified in retrospect, was to comb through secondary regional source studies and extract whatever quantitative empirical results we could find. We have let that body of data speak to us by itself. As we discovered, our proposed scaling was on the right track, and in fact now justifies even more detailed study. We ask no one to accept our hasty run through, only to get a first kalaidoscopic sense of the space-time rush of social dynamic history and its processes. Perhaps this endeavor will inspire other more thorough, more leisurely, more scholarly summary studies.

We also have to indicate that in our search for these condensed state (effectively liquid-gel elastic-like) cultural-civilizational units, we found that there existed more than one condensed state of human social organization. That is, the variance range we have managed to derive includes both a liquid-like state of tribes, chiefdoms, even small kingdoms, involving a scale not so markedly different from hunter-gatherers (e.g., areas of a few thousand square km and times of a few hundred years) as the more common local cultural scaling over most of the Holocene era. And, at the upper end, we found a near solid, plastic-elastic state that represents more nearly the modern idea of political and economic state civilizational organization. That is, the condensed phase of man's history, while perhaps averaging on the order of 500 years and 300 km with a wide time range like 200 to 1200 years and space range of perhaps 50 to 800 km, covers two kinds of social organization, and – as we have suggested – that with such a scaling range, the magnitude of a condensed cultural inventory really might have to consist of more like a few hundred thousand units. In such a case, anthropologists have perhaps only sampled close to 1% of all cultures, and may have a primitive sense of a 10% sample. Thus as a modification (and tribute) to Murdock's conclusions, we might say in introducing our primitive beginning of the task of physically reviewing an inventory of cultural phenomena: Interesting changes in human organization are to be found beginning at the culturally interacting scale of perhaps 50 km and 200 years.

The sources of the fluctuating process relaxations that begin at these scales include of course buffetings derived from nature, and from other groups wherein invasion, destruction, replacement, absorption, or even elastic rebound can take place.

The very fact that we have proposed and found a 500–1000 year fluctuational process scaling suggests that after a period is reached (15 Kyp) when the field (the earth's habitat as both the location of and a social physical process itself) becomes unstable (in supporting or permitting a particular kind of biosocial process – see (2,8)), we could not and should not know 'precisely' – to a number of such fluctuating times – where or when transitions to the required new emergent process patterns (other than hunting-gathering) might arise. Thus it is no surprise, in fact a pleasing observation, that the late Magdalenian period of culture in Europe (nominally 15.5-11.5 Kyp) doesn't produce anything of great novelty as a social movement (regardless of its artistic novelty). Rather we have to await the appearance of what is often regarded as a rather 'sharp' Mesolithic transition epoch in the Near East (10), but one that is just as likely elsewhere – [3]. Modern societal man's 'history' (as a nonrecorded prehistory, dependent on paleontological artifacts for the story) begins at (or near) that phase in time and at a number of such points in space.

Earliest Known Mesolithic Cultures: Levant – Mesolithic I, 20-12 Kyp; Far East, 13-12 Kyp; Levant – Mesolithic II, 12-10.5 Kyp

The Levant

Movement toward a dawn for civilization has typically been identified by Mesolithic cultures existing in a brief transitional period at the end of the Paleolithic (see, for example (10)). More recently, in both the Levant and in the Far East (Japan, central China, possibly SE Asia), that time frame of transition has been considerably extended. For an updating of the Near East, we take our cue from Moore (10a).

A Mesolithic I period is identified that follows a final Aurignacian phase in the Levant from about 20 Kyp very probably down to 12 Kyp. It is based on almost 70 sites of the Kebaran tradition extending in lowlands along the Mediterranean, in a strip 200 km wide (E-W), as far N as Aleppo, and as far S as the Negev. It is marked by chipped stone tools and small group habitation of rock shelters and open stations. From our point of view, as small groups constantly on the move in search of food, the life style was hardly different from that of the earlier Aurignacian hunter-gatherers. Nevertheless, in their advance in tool style, and beginning of seasonal occupancy using constructed shelters, such peoples begin to be viewed as Mesolithic.

More conventional is Moore's (10a) Mesolithic II, largely the so-called Natufian tradition. This resembles much more the common identification of the Mesolithic horizon. However, it developed directly from the Mesolithic I style. It lasted from 12 Kyp to about 10.5 Kyp. It is also identified by about 60-odd sites in the same region but extended to Helwan in the S, and to various highland sites that were not too wooded. Tool traditions were more advanced. They included ground as well as chipped stone. Dwellings were of greater stylistic diversity, and the peoples possessed some heavy stone tool artifacts – pestles, mortars, querns, indicating a much lesser mobility than before. Wild cereals, in a state prior to or on the verge of cultivation, were significantly used. Transhumance, involving both hunting

and herding of animals, was also practised. Most sites were small, a few hundred sqm., a few km to a few tens of km apart. A few larger sized sites were fractional acre in size.

We can make the very crude estimate that the population density by Mesolithic II times was on the order of 0.2 persons per sqkm. The free roaming range of the hunter-gatherer had begun to shrink considerably. Contact was more frequent. The Natufian was beginning to move toward the more uniform life style of tribal existence. ". . . the new Mesolithic II adaption gives the impression of having reached an equilibrium which perhaps lasted a millenium or more."

The Far East

Recent findings suggest an earlier startup in the Far East than previously known. On the other hand, while the archeological findings are very extensive, they are not yet so fully systematic as the Near East findings, so that any numerical estimates we make might still be fuzzy.

We note as an initial observation that the early history of man in Eurasia was hunting-fishing and hunting-gathering. The very earliest evidences for a beginning Mesolithic age in the Far East seems to lie in the 14-13 Kyp millenium, with nominal starting dates of perhaps 13 Kyp in Japan (Fukui, Kamikuroiwa; pottery, for example, beginning at perhaps 12.75 Kyp), 12 Kyp in SE Asia (Spirit Cave, Thailand), and pre-11.5 in central China (Szechwan and Hupei (11)). The hydrological resources in the Far East, both SE Asia and the more N coast (e.g., Japan), were much more extensive than those of the Near East, in which the fertile crescent was favorable for human habitation only during moist periods. Much of the Far East, e.g., SE Asia comprising a large land mass involving land bridges from SE Asia to Malaya to the Philippines that submerged in the Holocene, was tropical and semitropical, with numerous waterways. Many of the inhabitants of that SE Asian area lived on estuaries and low terraces and depended in part on fishing, with a settled and essentially stable life. Skin boats and rafts had been used, even with lowered water levels, in the peopling of the Australia-New Guinea land mass. Crude canoes are dated to the Hoabinhian, Guha Lawa and lake and blade industries in Indonesia, dating back at least to 14 Kyp, and boats are inferred for Upper Paleolithic Japan. A focus on Japan (i.e., coastal Far East), where thousands of sites (of an estimated 75,000) have been studied, can provide a type case for the dynamics of a stable but intense regime of food collection.

In Japan, on a peninsular fringe of the Asian hydrological triangle and what was then an inland sea, indigenous simple slab pottery, perhaps the oldest in the world (the earliest datings at 12.75-12.3 Kyp) but not much earlier than that of China, comes not from coastal but from inland mountainous cave sites near the S coast, associated with a Mesolithic technology of microblades (dating from 13.5 Kyp) that has widespread parallels in N Eurasia and North America (Clark (12), Sherratt (13), Aikins, Higuchi (11)). The use of boats in Japan apparently dates from the Paleolithic (11).

Final Near Eastern Mesolithic Cultures: 12-10.5 Kyp

As a final Near Eastern transition towards civilization, Mellaart (10) shows the results of ethnic groups moving into Near East regions in the Black Sea-Caspian Sea-Mediterranean-Persian Gulf land rectangle and condensing within settlements in about four locales. These regions (and modern names of some of the settlements) are:

the Caspian Caves (Hotu Cave, Belt Cave);
the Zarzian culture of the Zagros Mtns. (Zawi Chemi, Shanidar, Gird Chai, M'Lefaat, Zarzi, Karim Shahir, Tell Asiab, Bus Mordeh);
Kebaran (and Nebekian) in Palestine and Jordan (Ksarakil, Yabrud, Eynam, Fallah, Kebara, Jericho, Ummes-Zuwaitina, W. Rimon, El Arish, Beidha, W. Natuf, El Wadi);
Belbasi (Kara'in, Okuzlu'in, Cark'in, Beldibi, Belbasi);
Egyptian (Helwan);

These settlement regions exhibit intensive foot gathering, larger group sizes than earlier, the use of microlith tools (representing a large diversification of tool types with its implied large diversification in division of types of labor).

These Mesolithic epochs would have to be identified as ones in which culture and ethnicity were essentially identical (or at least very closely mixed). Thus to whatever degree 'political' command-control existed among each of the regional settlements, it too was as yet indistinguishable from culture and ethnicity. One would have to assign some such interpretation to 'pristine' encounters between ethnic groups ingathering toward early settlements and tribal existence.

The reader interested in more detail and further updating of the final (Mesolithic II) Mesolithic transition in the Near East and the subsequent Neolithic may consult (10a).

First Far Eastern (Coastal) Proto-Neolithic Cultures: 12–10 Kyp

Changes in a thousand years are found in the dating of slab pottery (incipient Jomon) to this period, now far into central Japan in riverine ecology. Decorative technique shift from linear relief to nail stamping. Changes in lithic industries include abandonment of microblades, with substitution of chert axes and adzes and obsidian arrowheads. By 10 Kyp pottery was in use over all three southern islands.

First Near Eastern Proto-Neolithic Cultures: 11-10 Kyp

A thousand years wrought considerable change, not only in the original four Near Eastern locales named, but in additional areas in that Near Eastern rectangle. Continuing in tabular form:

Zagros Mnts., post Zarzian (Shanidar, Zawi Chemi-Shanidar, Karim Shahir, Tepe Asiab, Ali Kosh, Gird Chai, M'Lefaat);
Nutufian in Palestine and Jordan (Carmel caves of El Wadi, Wadi Fallah, Kebarah, Eynan, Jericho, Beidha, Ain Sakhri).

These proto-Neolithic sites indicated the beginning domestication of animals, tools for dealing with grain, permanent settlements, use of luxury goods, trade, the beginning of towns, funerary rites.

Coastal Far East: Earliest Neolithic Cultures: 10-9 Kyp

Initial Jomon pottery, hand coiled with cord impression, is found at sites such as Natushima on Tokyo Bay (Chard (14)). Demographic pressure on limited food resources appear associated with a foraging scale that utilized marine resources to complement land resources, and in which the boiling of plant foods and molluscs alike may have provided the incentives for pottery (12). Only cooking vessels are ceramic in this phase, often decorated with shell imprints. Open settlements in the

interior, and in riverine and coastal shell-mounds, provide a semi-sedentary seasonal round, adapted to temperate forests and coasts.

Some basic elements of Jomon adaptions are set at this time, and remain relatively unchanged for millenia. "The close juxtaposition of mountains, rivers, and coasts throughout most of the long, narrow . . . archipelago meant that economic resources needed to sustain local groups could usually be obtained within just a few kilometers, making it possible to maintain a predominantly [semi-]sedentary pattern of residence on the basis of a hunting-gathering-fishing-shellfishing economy" (11). Seasonal fish runs may also have been the basis of semi-permanent village life (as developed much later in the lower Amur further N, perhaps by 5 Kyp, and even later on the NE coast). Small but cohesive groups are suggested by clusters of up to 15 substantial dwellings, with sunken floors and thatched roofs with upright posts or gables. Particular favorable sites were occupied, at least intermittently, for hundreds and sometimes thousands of years.

Thus, even though this was an early, very possibly one of the earliest of Neolithic forms, one notes that it very possibly regressed back to or never got very far from the transition between a gathering and a settled form of life. In (2), we indicated that isolated sized regions might either die out at small size or regress at medium size. As we see here, there is little need to progress further – if population or outside pressures do not get out of hand.

Near East: First Pre-Pottery Neolithic A, 10.3–9.7 Kyp

Natufian (Jericho, Wadi Fallah, Mount Carmel, Eynan, Beidha)

These further developed Natufian sites show town growth, appearance of cultivation techniques, fortifications, stone use in building. Perhaps the earliest evidence of remote materials – obsidian from Citlik in Anatolia – is found.

Near East: Pre-Pottery Neolithic B: 9–8 Kyp

This period is also Moore's (10a) Neolithic 2 period.

'Tahunian' (Jericho, Tell Sheikh Ali 1, Tell Munhatta, Tell Far'ah, Wadi Shu'aib, Beidha, Ras Shamra, Tell Ramad, Yabrud, Kara'un, Mukhtara, Adlun);
Anatolian (Hacilar, Kizilkaya, Catal Huyuk);
Euphrates (Bouqras);
Khiroktia (Cyprus);
Zagros (Jarmo, T. Guran, Ali Kosh).

In addition to these aceramic cultures in this epoch, there may have been the beginning of the Hassuna pottery tradition in Iranian sites such as T. Sarab and Jarmo.

There are sites up to 12 ha in size. There was a marked increase in population, and almost all year round occupancy. Cereals and legumes were cultivated; cattle, sheep and goats were kept. Life was basically tribal, but egalitarian, with no chiefs or any with preferred access to settlement resources. There was a considerable cultural unity. Life was also sedentary, tied to close by agriculture. The time effort was not much greater than among hunter-gatherers, except for intense work periods alternating with extensive leisure.

There was an increasing demand for exotic materials. Traffic in such materials took place over considerable distances – hundreds of km. But the trading was not particularly convective, via traders and transport mechanisms. Rather it was largely exchange between individuals, but of considerable complexity not just down the line exchange. For example obsidian came from as many as six places.

Coastal Far East: Semisedentary Neolithic Cultures: 9-7.5 Kyp

The Jomon period in its entirety (lasting 8,000 years) can profitably be seen in terms of contemporaneously linked traditions (co-traditions), with E (N temperate mixed deciduous forest) and W (semitropical broadleaved forest) variants, neither predominating as 'central' Jomon, but the former perhaps more elaborated. Approximately seven major rediffusions of ceramic styles are established for E Jomon (the W styles are less well analyzed), likely reflecting socio-economic changes or religious cult influences (14). Thus, in spite of a common cultural base in which some features are relatively constant, changes are evident on a millenium scale. In addition, particular features are added such as the acquisition of domesticated dogs, the use of grinding stones for plant foods, and the introduction of stone net sinkers at or shortly after about 9 Kyp.

From this period forward, Jomon fishing shows an increasing extent of use of maritime resources, with a variety of hooks, barbed and tanged arrows, and harpoons for catching large marine fish whose remains are found in middens. A variety of boat types are in evidence (e.g., birch bark canoes in Hokkaido) or hypothesized (rafts or bundles of bamboos). Analysis of remains show that many species were caught on relatively distant fishing grounds, implying seasonal absences of active men (12).

Near East: First Ceramic Neolithic: 8-7 Kyp

Byblos early Neolithic (Amuq, Ras Shamra, Byblos, Sidon, Tell Abu Zureiq, Hazorea, T. Kibri, T. Sheikh Ali 2, T. Batashi, Hacilar);
Anatolian (Catal Huyuk, Kizilkaya, Mersin, Tarsus);
Zagros (Jarmo, Tepe Sarab, T. Guran, Ali Kosh, Hassuna, Hatarrah, Ali Agha, T. Shimshara, T. Sukas, T. Ramad);
Yarmukian:
Hassuna, Sammara, early Halafian (Hassuna, Halaf, Baghuz, Samarra, Susiana 1, Eridu).

Coastal Far East:
Proto-Agricultural Neolithic Cultures: 7.5-5 Kyp

Sea level transgressions reached a maximum at this time, reducing the area of available human habitat, and increasing pressures on inland food collection or shellfishing (increases in shallow water areas reduced deep sea fishing). Larger settlements are in evidence. Traditions diffuse and additional local traditions develop (e.g., six regional style zones), but nothing suggests the migration of peoples. Trade develops in stone ornaments, possibly stimulates the infusion of a ceramic style from Korea. In the middle of the period, more organized horseshoe style midden sites appear – dwellings and clear ground, also refuse outside. In S Hokkaido, dating to 7.5-5 Kyp, buckwheat and wild grains are found at Hamansuno. At the very end of this period (starting with Middle Jomon, at about 5.5 Kyp), the processing of wild vegetal foods (indicated by metates, large storage vessels, fertility figurines, remnants of starchy food cakes) develops to a level perhaps comparable to aboriginal California.

The earliest pottery in Korea becomes a co-tradition in this epoch. In 5 Kyp, possibly due to an accidental trans-Pacific voyage, we also find Jomon pottery in Peru. Long-range transports and exchanges begin to play a role in Japanese life – by 4.7 Kyp we find polished axes for dugout boat carpentry, and evidence for sewn boats in form somewhat between dugouts and sampans.

China and SE Asian Path to Settlement: 11.5-7 Kyp

The earliest (preagricultural) pottery in China (Chang (15)) dates to 11.5 Kyp from caves in the Central region, Szechwan and Hupei. Shortly after, there emerges, in numerous caves of South China dated to 11.5 to 7.5 Kyp, a very different style of Tseng-p'i-yen early cord-marked slab ceramics, now dated reliably at least from 10.4 Kyp in a number of sites. The S China caves show hearths, storage pits, stone choppers, scrapers, awls, chisels, grinding stones, and possible digging stick rings, suggesting gardening, occasional elongated pebbles that suggest pestles, and convincing evidence of domesticated pigs. The caves appear to be permanent dwellings or home bases, with burials in the kitchen midden. The variegated subtropical ecology consists of woodlands, slopes, rivers and lakes, evidencing a great variety of subtropical faunal remains at the settlement sites. Besides the caves, similar remains and dates are also found in open-air river terrace and shell-midden river sites.

Spirit Cave in NW Thailand represents the same ecosystem as in the S China cave sites of the same period. While plant remains are not reported for the Chinese sites, the Thai remains (dated to 9 Kyp) include almond, betel, bean, pea, bottle-gourd, trapa, pepper tree, butternut, Chinese olive, candle nut, water chestnuts, and cucumber.

Recent published analyses (summarized by Chang) are still difficult to compile in terms of temporal phasing, but suggest numerous local cultures and ethnicities over a rather vast area in S China down into N Indo-China or SE Asia.

Two millenia after the S China Tseng-p'i-yen pottery we find P'ei-li-kang and a variety of related ceramic remains (from about 8.4 to 7 Kyp) in scores of N China sites, in the Kwang Ho basin and that of its upper Wei River tributary. They divide into four regional clusters: Tz'u-shan in Hopei, P'ei-li-kang in Honan, Wei-shui River in E Shensi and Kansu, and Li-chia-ts'un in S Shensi. (Contemporaneous are the earliest phases of the Central China farming cultures of Ta-wen-k'ou in Shantung, and the Ta-hsi of Szechwan and Hupei). These early farming sites are often 2 ha. in extent, with considerable density (e.g., 8 sites in 32 sq km); they involve plastered houses with sunken floors, grain storage pits (millet), axes, stone sickles, mortars and pestles, domesticated dogs and pigs (15). [4]

Some Initial Commentary

We may pause a moment for some comments about this first 8,000 year or so epoch. This period indicates the development of individual cultures, moving in as ethnic groups and beginning to precipitate into local areas which possess or develop fixed or semisedentary populations or population centers among which they – the mixed group – become 'tribal' and then 'stratified' as their interactive intensity increases. These groups move in perhaps as hunter-gatherer groups, perhaps as 'tribes' – see for example the extensive discussion of Fried (18) who by his very contrary discussion 'proves' the need or existence of social organization, e.g., tribes, as a conglomerate social network of networks, moving toward stratified societies with differential rights of access to basic resources. In our opinion, such change was an immediate consequence of an aggregation forced by increased densification of population which drives the populace to some weaker form of aggregation than hunter-gatherer groups of bands or families.

In the *Near East,* as Mellaart and Moore characterize them, they start up throughout the Near East from shadowy beginnings (Kebaran) of about 18 Kyp merging into the Natufian tradition of about 12–10.5 Kyp, and then to the beginning of the Halaf culture, likely in the 7.5-7 Kyp time frame, certainly exhibiting populous towns by 6 Kyp. That 6,000 period showed many changes in the indications of how economic life was conducted, in the corollary 'tool' usages, in the transition from intensive gathering to horticulture to agriculture, from sophisticated stone tools to ceramic usage to metallurgy, from symbiosis with to domestication of animals to stock raising, in the growth of extensive trade as symbiosis, and of change in the style of housing. Each thousand year epoch, in every region discussed by Mellaart, shows perhaps 2–4 salient changes in cultural styles per millenium. This is even more prominent in the layering in various major settlement excavations, e.g., Jericho (see for example (7) for a story of the many layers of Jericho, *or* see (17)), Catal Huyuk, Hacilar, Eridu, Susa. Movements of peoples and patterns of living sweep over these centers, each with specific epochs of settlement style.

Central and South China, with a variegated subtropical ecology markedly contrasting to the fertile crescent, nonetheless shows a series of developments of pottery, domesticated plants and animals, and semisedentary village life that produces population scalings comparable to the Near East. Neither direct evidence of violence nor walled settlements appear during this period (not until about 4.5 Kyp, unlike, for example, the fortifications of Jericho 9.5 Kyp).

There is no theory why any particular area should be the first to begin a stability transition except that of a general field instability (wherein the very first startup is almost a matter of accident). Thus, we can simply note an initial Mesolithic in *Japan,* not really appreciably different from the other two regions of China and the Near East. Even though some technologies befitting its marine ecology may have emerged somewhat earlier in Japan (elaborate fishing, boats, pottery for dealing with non-hunted resources such as cooking plants and shellfish), the striking difference is a longer initial pristine period of general 'ethnic' stability (the Jomon period extends from about 10 to 2.5 Kyp), contrasted with earlier development of agriculture, towns, trade, and a succession of ethnicities in the Near East. By 8 Kyp Jericho had a town size of about 3,000, contrasted with 200–300 at most for large Jomon sites. The use of wild grains and their domestication lags by thousands of years, and only then does monumental architecture appear (after 4 Kyp), of a monolith variety. Evidence of hierarchy and social differentiation are conspicuously absent. Ethnicity is evidently the highest level of polity, perhaps culminating in tribal networks of networks with a growth of settled populations and local trade. But then with a heterogenous local ecology capable of supplying a variety of needs, and a long term continuity of ethnicity, a high scale of convective trade does not represent an important transition range flux. There is little need to force population density in such relatively isolated ecologies.

We would tend to surmise that the significant ecological difference is that social evolution does not depend simply on populational density, but also on ecological scale. Confinement to a relatively narrow river valley (with surrounding deserts and mountains) can tend to increase the interacting pressures a great deal more than the much more extended ecological scale of social evolution in China. That is, we note the need to begin to

confront a very real socioecological hydrodynamics within the various earth's habitats.

For Japan, we can surmise that it is the variegated local rich ecology within close packed mountains and nearby coasts, with little challenge from outside and a resultant long time delay in encouraging population growth that results in no need to precipitate an ascent to civilization with the rapidity of the more distributed faunal and hydrological resources of either the Near Eastern fertile crescent or the riverine forests of S China. What results is a relatively isolated culture area that is not overrun by an influx of ethnicities or challenge from the outside. What appears to result is an extremely long life scale for such a culture, but one which can easily tend to become 'archaic' [5]. Nevertheless, a long, perhaps 200–1200 year, span for local cultural turnover seems to be observed in a succession of indigenous developments in linked co-traditions. Japan may represent simultaneously a lesser known, fluid-like, yet early illustration of condensation of ethnicities toward culture-civilizations.

Near East Trade and Polities: 7.5-4.5 Kyp

In a following period, say 4.5–7.5 Kyp, see (10), Fig 1,4, the Mediterranean coastline including the Nile and the entire Tigris-Euphrates region, and the Zagros Mountain area (except the Syrian Desert) has filled in with settlements. The 'average' life of a culture (as found in a number of settlements) is about 500 years (a +/−1 standard deviation range is about 200–1,200 years as estimated from (10), Fig 1).

A dramatic way to see the proto-Neolithic, Aceramic to Ceramic Neolithic process (presented by Fig 2, 26 in (10)) is to be found in (7) in which the intercity trading constellations (largely) obsidian being used as the test material in trade for farm produce – "As early as [10.5 Kyp], a primitive sort of trade had arisen in the Near East [as barter] . . . and by [9 Kyp] Jericho was engaged in it") are shown: in Anatolia (the region bordering the Mediterranean) and Armenia (the swath from the Black Sea to the Persian Gulf) for the period 7.5–10 Kyp, and then for a more inclusive territory from 4.5–7.5 Kyp. These four named regions demonstrate a number of points: (a) these 'first' trading constellations extended over regions of a few hundred km in spatial measure; (b) they linked perhaps a dozen or so 'major' settlements (we do not know how many 'minor' settlements may have been involved); (c) the trading regions were fluid, certainly at the millenial time scale (see for example Fig 16.2, (13)).

To discuss the nature of the 'political' systems in that rather enormous period, e.g. 10 to 5 Kyp, is of course really out of the question. It is a period of prehistory. It takes the most subtle of paleontological clues to piece together any modest conclusions. Thus, at best, one can only surmise styles of life from the remnant tools, structures, and other artifacts and arrangements. Nevertheless we still can surmise that 200 to 1200 year cultural-economic-political scalings had some significance. In any case by 6.5 Kyp, the entire Near East was sprinkled with settlements, sufficient generally for this date to be commonly offered as the 'beginning' of an active urban civilization. However it is really the 'end' of a 5000 year startup of somewhat urbanized trading and warring settlements whose history we simply do not know, of the beginning of a life based on indigenous crops and herd animals; on a technology based on very skilled use of stone, transforming to unbaked and then baked clay, on to copper and lead metals. "The most crucial innovation came in the Samarran phase (about [8 Kyp]) with the growth in central Mesopotamia of villages of greater size (4–5 ha [10–12 acres]) and complexity, with an economy based on the simple irrigation technology that was to make possible the extensive agricultural settlement of Sumer . . ."

And similarly, but with (still) lesser evidence, we sense related stories continuing and starting in other civilizational regions: –

Spreading E beyond Susa and Chogha Mish (in Khizastan) lay Sialk, Malyan, Tepe Yahya, Tal-i Iblis, Shahdad, Shahr-i Sokhta (1000 km beyond). We have passed beyond the Sumerian complex (to illustrate: Tepe Yahya was only a small village in 6.5 Kyp. By 5.5 Kyp it was an important city in its area and by 5 Kyp it was of 'international' importance in urban Mesopotamia).

Having reached 5.5 Kyp, after the emergence of the major proto 'civilizational' (or'precivilizational') trading loops in 10-7.5 Kyp of Anatolia (e.g., involving such centers as Hacilar – Catal Huyuk – Asikli Huyuk – Mersin – Ras Shamrah – Khirokitia – Byblos – Jericho – Beldibi – Beidha), and Armenia (Ali Kosh – Tepe Guran – Matarrah – Jarmo – Tell Shemsharah – Tepe Gawra – Nemrat Dag – Cayonu – Bouqras), and the second, definitely civilizational trading loop of Anatolia, 7.5-4.5 Kyp (Hacilar – Knossos – Ras Shamrah – Byblos – Trebizond – Mersin – Kultepe – Tepe Gawra) and of Armenia (Yanik Tepe – Eridu – Ali Kosh – Arpachiyah – Chagar Bazar – Ras Shamrah – Byblos – Susa – Tal-i Bakun – Bahrein), we have even passed the beginning of the first significant sized 'towns'. The 13 ha (32 acre) Catal Huyuk (8 Kyp – gone after 7.6 Kyp) can be compared with Jericho (10 Kyp) of 4 ha (10 acres), or other 1.6 ha (4 acre) settlements back to 12 Kyp. The earlier Anatolian cultures reached out as far as to touch Thessaly by about 9.5 Kyp. Similarly the Armenian cultures reached out to the Elamite related area, certainly as far as Tepe Yahya, by 7.5 Kyp.

The Ubaid culture (in Iraq) 8.5-7.5 Kyp laid the foundation for the Sumerian civilization. From that time on, 7.5 Kyp, Mesopotamia became the center of the civilized Near East.

Uruk (the Ubaid culture) begins about 6.3 Kyp. Examine the picture of a Ubaid temple of about 6 Kyp at Tepe Gawra (10), p. 131) to grasp how fully we are dealing already with a civilization, an urban one at that. In the same period, Eridu's cemetary had more than a thousand graves. The first written records are found to begin about 5.5 Kyp. With these new settlers moving up the Tigris and Euphrates from the S, the first long lived civilization, the Sumerian, begins about 5.5 Kyp from a first center at Uruk (village life at Eridu begins about 7.3 Kyp).

Uruk (5.5 Kyp) becomes the first city-state (i.e., with differential access to potentials). It reached its height in abut 4.8 Kyp, with a population of about 40,000–50,000. (Catal Huyuk, 3000 years earlier, had a population of about 6000). In the vicinity of Uruk, alone, in 5 Kyp, there were at least 146 outlying villages, each with a temple, irrigated agriculture, and a family-clan social pattern. Beyond lived nomads. Between 5 and 4.7 Kyp the 146 villages had dwindled to 76; from 4.7 to 4.4 Kyp from 76 to 24. At the same time, the number of cities (greater than 40 ha (100 acres)) grew from 2 to 4 to 8.

Over that 1000 years, the society changed from one dominated by elders and priests (e.g., as heads of leading families), to wealthy landowners and merchants.

The Ubaidian culture ingathered for about 500 years (6.3-5.8 Kyp) before Uruk grew up to begin to found a civilization. It reached its peak in about 4.8 Kyp, 1000 years later. The next 500 years (to 4.4 Kyp) is the time scale of the early Bronze Age Sumerian civilization. Thus we find such start up numbers – 400, 500, 1000 years (the latter Early Dynastic times of Sumer in which political power passes among the cities – Ur, Umma, Lagash, Uruk, and Kish. Other cities were Eridu, Badtibira,

Nina, Girsu, Nippur, Sippar, Akshok). It was clear that by 4.6 Kyp, there existed a kingdom-state, Elam, to the E of Sumer. This included Susa on the W and likely Tepe Yahya on the E, a formidable distance in range. Elam remains in history at least until 2.7 Kyp, although that 2000 year history is made up of a considerable number of segments (300–500 years are suitable measures of those segments).

Chinese Trade and Polities: 7-4.5 Kyp

By 7 Kyp, eight or nine major Neolithic culture areas of China (15) had vastly expanded their realms to the point of filling most of the available agricultural niches in S China (the cord marked cultures of Ta-p'en-k'eng on the coast, Ta-lung't'an on the Yungshi and Yu Rivers N of Vietnam), Central (Ta-hsi on the upper, Ma-chia-pang on the lower Yangtze, and the early rice-growing Ho-mu-tu in Chekiang) and N China (Ta-wen-k'ou on the lower Hwang Ho and Yang-shao and on the upper Hwang Ho/Wei/Yellow River basin, Hsin-lo on the Liao N of Korea). One of these areas – Yang-shao – represents a cultural fusion, with many local phases, in the area occupied by the four earlier Neolithic clusters – Tz'u-shan, P'ei-li-kang, Wei-shui River, and Li-chia-ts'un. By 5 Kyp interaction intensifies between these areas, joined by a new center in Shan-pei (Central China), and with regional differentiation both in the N (Liao into Hung-shan and T'u-chu) and the now all rice-growing S (Ta-p'en-k'eng into Shih-hsia, Feng-pi-t'ou and T'an-shih-shan), resulting in a sphere of interaction – the Lung-shan horizon – that anticipates historical Chinese civilization. Interactions between regions that have been in place for several millenia now intensify to show a tangible and sustained archaeological record of diffusion and trade.

The Yang-shao horizon shows domesticated pigs, cattle, sheep, goats, dogs, millet, rice. Stone implements were used; silk-worms cultivated. Settlements were dense but still semi-sedentary. Cast bronze knives are found on the upper Yellow River but, unlike Thailand at the time, lack significance as a major industry. Ceramic *Ting* tripods, judging from later uses, appear as symbols of shamanistic leadership. The later Lung-shan culture, beginning about 5 Kyp, in addition used wheat, the horse, and fully sedentary settlements, and practised fire-cracked bone divining.

In the Lung-shan horizon, there are literally hundreds of pre-state linked settlement clusters, each with multiple settlement condensations, on the scale of Renfrew's Early State Modules (ESMs – (20), or see our physically derived scaling). Each might consist of multiple autonomous polities (communities), closely linked. In the Shantung area, for example, we find 10 major sites at nearest distances of 40–80 km, occupying a total area of perhaps 80,000 sqkm (discounting hilly terrain in the center), or about 8,000 sqkm each, suggesting separations of about 35 km. One of these sites (from 4.5 Kyp), is the 18 ha (45 acre) Ch'eng-tzu-yai walled town, in which social stratification (e.g., four classes of burial) and lineage organization are attested. It is from this horizon that walled cities and direct evidence of violence first appear in the archaeological record. The threshold of civilization has clearly been reached (15). Chinese society, moreover, is already hierarchically organized at seven distinct levels: the individual human organism, families, lineages, communities (based on short range exchange interactions), ESMs (based on middle range exchange interactions), cultures or ethnicities (the diffusive units we are examining), and interactive spheres (based on long range exchange interactions).

Developing out of Lung-shan, the 380 ha (940 acre) Erh-li-t'ou site dated from 4.1-3.8 Kyp, with a population on the order of 40,000, and probably associated with the first (Hsia) Dynasty, is roughly comparable to Uruk, in roughly the same time frame (4.8 Kyp). And with the dynastic period (see below), we are up to scale of the Near Eastern city-kingdom of Uruk.

Near East Beginnings of Empire: 4.5-3 Kyp

The first great empire, under Sargon of Akkad (the first Semitic – Akkadian – invasion of the Sumerians) begins about 4.4 Kyp. The initial point to be drawn from this instance is that organization did not remain perfectly fixed (and confined to trade and/or local skirmish) among a group of a handful of population settlements in agricultural fields. Instead higher ordered associations began to form fluidly at the hundred km – few hundred year scalings. It is clear that they were not limited in size (at such small limits). 'Kingdoms', 'city-states', 'nation-states' even 'empires' (of such states) can emerge also, but these too are fluid.

So we see an 'empire', Akkad and Sumer (as Sargon conquered its city-states), reaching to Mari and Assur (to what became Assyria) and on to the Mediterranean; to the E Elam, in all a region of about 2000 km in extent (and perhaps 500 km in width). But within 300 years, the empire was gone. It was followed by the Gutians (a hundred years), the Assyrians (a hundred years), the Hurrians (a hundred years), the Hittites (a few hundred years), the Mitanni (a few hundred years), the Babylonians (a few hundred years), the Aramaeans (a few hundred years). We have thus jumped another millenium to perhaps 3 Kyp.

The main story that one senses in this region, from 12 to 3 Kyp, was wave upon wave of condensation of outside ethnic groups – bands, often tribes – ingathering into this fertile hospitable ecology, hospitable for water supply, for domestication of a variety of plants and animals. What was life fashioned around? – Sunlight, water, reeds, fish, obsidian, sheep, goats, barley, wheat, stone, copper, lead, bitumin, salt, well irrigated soil. From groups of hundreds, to thousands, to tens of thousands, the population densities within the region could be increased.

Egypt

The red and black lands of the desert and the Nile Valley were a long time in condensing population toward civilization. The earliest Neolithic (Fayum Depression) began about 6.5-7 Kyp. The first millenium exhibited at most flimsy huts and little villages. (Farming had been attempted in an earlier age and given up). The first half of the next millenium (6-5.5 Kyp), the Early Predynastic period, slowly showed a growth of more substantial villages. Living became more ambitious in the next Middle Predynastic period 5.6-5.4 Kyp. Beyond simple cultivation, animal husbandry, hunting and fishing, now land reclamation from the marshes for the growth of grain was undertaken. Political life, while still tribal and centered on the large village or market town, became more complex. By 5.4 Kyp, civilization – *probably because of contact with the Levant* – was about to begin. By 5.4 Kyp, kingdoms had been formed and united. Thus, predynastic Egypt showed ingathering and developing scalings in the 200–500 year range. An Early Dynastic period of about 500 years existed (5.2-4.7 Kyp), then the old Kingdom of about 600 years (4.7-4.1 Kyp), all in all

about 6 periods down to 2.5 Kyp, averaging about 450 years, with a (one) mean deviation range of 300–600 years.

The Tigris-Euphrates to Indus Valley Gap

Continuing to the E of the Tigris-Euphrates Valley, we find the Elamite Kingdom (from Susa halfway to the foothills of the Zagros Mts, across the Zagros Mts. to Tepe Yahya), to Bahrein (Dilmun) in the Persian Gulf to the (as yet still uncertain) Arabian Sea ports of Makan and Meluhha; this area exhibited a sparser set of settlements which clearly had trading contact with the Mesopotamian civilizations in the 7.5–4.2 Kyp time slot, and also trading contact over part of that time scale with the Indus Valley civilization. It is not difficult to demonstrate extensive connection in the 5–4.2 Kyp slot (which becomes one time scale), and perhaps in the 5.5-5 Kyp slot. Thus we make the connection lightly as the outlying area to the Sumerian civilization, a convenient area (one of the major routes) for ingathering of new populations. Even if only lightly shaded in, this region exhibited significant changes at the less than millenium scale.

Chinese Beginnings of Empire: 4.5 Kyp on

5 Kyp marked the beginning of a transformation of the Chinese culture areas that led to another emergent level – that of empire-nation, in which the total proto-Chinese sphere of interaction between culture areas formed a spatial core that became historical-imperial China, united by the three dynasties: Shang (Honan) and Hsia (Shensi) of the lower and upper Hwang Ho River, and Chou on its Wei tributary.

Dynastic history begins with writing, and writing relates to the role of the priest-ruler in religious integration of the state via the ritual use of inscribed bronzes: the bronze Nine Ting Tripods of Dynastic China, modeled on the ancient symbol of state and legitimacy:

". . . the bronze vessels enabled man to unite Heaven and Earth, and he who possessed the bronzes was the legitimate ruler. The fierce contention among the many states of early China . . . came to be symbolized as a fierce contention for each other's art treasures. The Nine *Ting* tripods of course symbolize all art objects, but because of the scarcity of the metal and the trouble it must have taken to smelt the ores and to cast the vessels the bronzes were given a paramount place among symbols. One measure of the central importance of bronze in the early Chinese scheme of things is the hypothesis that the frequent moves of the capital cities of the Three Dynasties . . . were necessitated by the frequent exhaustion of the copper and tin mines in N China and the consequent incessant chase after new sources of the metal. The capital cities are seen in this hypothesis as the leaders of the chase. . ." (15)

The distribution of shifting dynastic capital sites indeed coincides with the distribution of copper and tin mines in ancient China. Within these contending centers of cultural achievement, from ca. 4.2 Kyp forward, hegemony shifts from Erh-li-t'ou (Hsia dynasty) to Shang, and Shang to Chou – not a dynastic sequence but a system of parallel development and shifting centers of power. And within these centers, cultural and ethnic subgroups contended for political dominance. The number of independent states, according to traditional history, declines as hegemony and political hierarchy are established:

"It is traditionally stated that when Yu [of the Hsia dynasty] assembled the lords at T'ushan there were ten thousand states [areas comprising towns and contrysides] that came carrying jades and silks. At the time when Ch'eng T'ang [of the Shang dynasty] received the mandate, more than three thousand states remained. When Wu Wang [of the Chou Dynasty] viewed the troops, there were 1500 states. During the 242 years to . . ., the lords further engaged in subjugating one another, and only more than 100 states are seen . . ." (Chang citing Ku Tsu-yu, early 1600s).

The 'historic' epoch begins with the Shang Dynasty of about 3.5 Kyp (e.g., 1384 BC). Chang suggests that if Ehr-li-t'ou was a Hsia and not the early Shang capitol, as once supposed, such a capitol city, on the basis of historical records, remains to be discovered in E Honan. Middle Shang sites such as Cheng-chou are vaster in scale, with warfare organized by horse chariots, and town walls characteristic of the earlier Lung-shan horizon.

The Bronze Age late Shang (An-Yang) capital of Yin, likely dated between 3.2 and 3 Kyp, was ". . . a city of immense proportions, the seat of a civilization characterized by writing, flowering bronze and jade arts, monumental architecture, a powerful kingship, a ritual calendar, human sacrifice, and a great war machine headed by the horse-drawn chariot . . . Shang remains . . . in the An-yang region . . . covering an area of approximately 24 sqkm. . . .

"The Shang sites of the An-Yang region were apparently articulated into a complex network of specialized parts . . . palaces . . . habitation clusters, workshops, tombs . . . the royal cemetery . . . of noblemen and many thousand sacrificial burials . . . on its outskirts were settlements of varying sizes . . . the area of the distribution of settlements became greater as groups moved away from the center . . . in the neighborhoods were . . . large bronze foundry sites . . . bone workshops . . . [suggesting that] handicrafts were carried out under the direct control of the [upper classes] . . . not necessarily concentrated in [special industrial] quarters." (Chang, translation of *K'ao'ku).*

The people of the Three-dynastiy (Hsia, Shang, and later Chou) civilization: ". . . were all farmers of the millets, . . . foxtail . . . and panic. . . . They used stone, bone, and shell hoes and sickles, and mortars and pestles . . . planted soybeans, wheat, and some rice . . . kept dogs, pigs, cattle, and sheep, and they hunted and fished . . . bronze was used for [vessels], weapons and for a small number of tools . . .; cowry shells, perhaps used as a media of exchange; . . . fabrics, often of silk . . . there was only a single system of language [used for religious, ritual, and political purposes] . . ."

"Compared with their precedent, Lung-shan . . ., Erh-li-t'ou, Shang, and Chou showed qualitatively intensified differentiation of society and qualitatively higher degrees of achivement in the arts, . . . [however] no significantly new technological invention has been . . . documented from the Neolithic into the Bronze Age . . . the emergence of Bronze Age civilizations in China was not accompanied . . . by a significant use of metal farming implements, irrigation networks, . . . draft animals, or . . . plow . . . the factors are primarily in the political realm . . . uneven distribution of resources, . . . achieved by the emergence of an all-powerful kinship associated here above all with the bronzes . . . the instruments of 'the two major affairs of the State, the ritual and the warfare' . . . [Chang, quoting *Tso Chuan* 577 BC]

". . . ritual objects [metal, jade, ivory, lacquerware, wood, pottery] were the paraphernalia of ancient shamans in their tasks of communication with the departed ancestors and other deities. The oracle bones were used for the same purpose . . . shamanistic figures are evidenced as far back as Yang-Shao Culture, and the Three Dynasties shamans were later versions . . . [who] either acquired political powers themselves or were monopolistically employed by the kings . . . their art was in fact

shamanistic paraphenalia . . . the very instruments of political power."

Thus, Chang is clear that the cultural reformations of early China are organizational, matters of populations, social pressures, and responsive flow fields, including the symbols of exchange and hierarchical coordination and transmission, rather than the outcomes of simple material or technological processes.

So, in summary, in China, the 'historic' epoch begins with the Shang Dynasty of about 3.5 Kyp. Before the Shang period, the story has unfolded of the two cultural phases of Yang-shao and Lung-shan, possibly 1000 years earlier, with no known contacts with the west. The earlier Yang-shao, possibly 1500 years earlier – with reputed stone age origins a thousand years earlier (e.g. Panpo Village) – indicated domesticated pigs, cattle, sheep, goats, dogs, millet, rice. Stone implements were used; silk-worms were cultivated. The later Lung-shan culture, in addition, used wheat and the horse. They practised fire-cracked bone divining. Clearly with these two segments and the various culture and political segments that followed even up to recent times (e.g. postulated Hsia dynasty 21–16 Century BC, Bronze Age Shang 1500–1027 BC, Chou 1027–475 BC, the warring states 475–221 BC, Ch'in 221–207 BC, Han 207 BC –220 A.D., independent states 220–265 AD, Tsin 265–420, Siu 581–618, T'ang 618–907, regional states 907–960, Sung 960–1279, Yuan 1271–1368, Ming 1368–1644, Ching (Manchu) 1644–1911), all ranging from 100 to 500 years, suggest an average of about 300 year segments in Chinese history. In fact, Mencius, in about 1.7 Kyp, already had recognized this sort of 500 year epoch in political organization.

The Indus Valley Civilization

While the Indus Valley villages started autonomously from local populations, the first cities began in about 4.5 Kyp and they were soon involved in some trade with Sumerian and Elamite civilizations. Wheat and barley agriculture in these Indian villages likely began by about 5.5 Kyp, diffusing from Mesopotamia. These first thousand years likely were the first shadowy precivilizational period. That Indus Valley area extended as far N as Harappa, as far W as Sutkagen-dor in Makran (possibly ancient Makan), and the Gulf of Cambay in the S.

Shukrabati ((13), Chapter 22, references) summarizes 'current' incomplete knowledge of the early development of agriculture (including rice, already in use in the earlier Mesolithic), domestication, towns in India possibly from beginnings between 9 and 8 Kyp involving excavations in at least 45 sites – (250 settlements have been noted) on the Indian subcontinent (a region as extensive as 2000 km E-W×2000 km N-S). Small villages, e.g. of perhaps 0.8 ha (2 acre) size, date back to that time. Evidence from 8-7 Kyp suggest beginning argiculture and cultivation (e.g. rice), and domestication of cattle, sheep, and goats. Ceramic development dates back to 6 Kyp.

It is very difficult, at present, to underline how many segments of change were involved in the 9-5 Kyp prehistory. Certainly such segments were less than 1000 years, i.e. the very spotty data do indicate a richness of more than four changes through a Mesolithic and Neolithic beginning. (For example, domesticated horses, possibly semi-nomadic herdsmen on horseback, are found in NW India in 5.5 Kyp). One can attribute a great deal of early achivement to 'pre-' or 'early' Harappan culture, say as early possibly as 6.5 Kyp (or 6 Kyp) to 5 Kyp as the technological, economic, and possibly ideological base of the Indus civilization. This involved a plough-based agriculture, metallurgy, craft specialization, pottery, walled settlements, possibly using a planned urban layout, trade (in pottery, stone objects, turquoise from Iran, lapis lazuli, terracotta figurines). Thus a precivilizational segment (post Mesolithic?) of perhaps a thousand years is found.

The following Indus civilization appears almost 'explosively'. Its grid-planned cities, copper-bronze metallurgy, monumental architecture, sculpture, wide trade network, and an art of writing seem to have emerged 'independent' of that prior base. That Indus Valley – Harappan – culture, centered on Mohenjo-daro and Harappa (populations perhaps 40,000) extended as far as the Makran coast and the Gulf of Cambay (e.g., Lothal, population perhaps 2000). A flavor of life in that slot can be obtained for Mohenjo-daro (read (7)), or for life at the settlement of Kulli (read Hawkes (21)).

Whithin a few hundred years, the level of trade began to decline, and by 3.6 Kyp the cities had crumbled into dust. Not for more than 800 years did this civilizational excursion in NW India exist in an area much larger than the Mesopotamian states. ". . . no theory has yet been offered to account for the end of the Indus civilization as a whole over its entire distribution area" (13).

(Note this general problem with civilizational studies. Civilizations ingather without a genetic code – except the past geographic historical experience transmitted by peoples' minds, and what becomes a standard repertoire of human actions; they come apart in time because of some general failings that seem to arise, typically, again and again. Hopefully studies like this may in time isolate the essential factors).

Some other non-Indus cultures known are: around Burzaham in the N, a N Neolithic culture with Chinese affinities emerged within the 5–3.6 Kyp frame; adjacent to Swat in the NW, a Goudhara Grave culture in about 3.5 Kyp; to the E of the Indus Valley (Rajosthan and Moharashtra – between the Indus and Upper Ganges), there is the Ahar culture (about 4.4 Kyp), a Kayatha sequence (4.4-4.1 Kyp), a Malwa culture at Kagatha (4-3.6 Kyp), a 'late Harappan' culture at Daimabad (after 3.6 Kyp). The Ahar settlement was about 6.5 ha (16 acres). Loosely speaking, we see 300–1200 year segments.

A long Neolithic sequence, 5-3 Kyp is found in S India with such sites as Brahmagiri, Piklihal, Utnar, Hallur. Documentation would reveal sparse information, perhaps indicating two known phases (e.g., a first phase of pastoralism at Hallur).

To the E (the Andhra section), both Neolithic and Chalcolithic sites existed, again, segments perhaps less than 1000 years. In Bengal a metal-free phase existed before 3.6 Kyp. A melange of other observations on individual sites suggest various Neolithic and Chalcolithic settlements in that 5-3 Kyp frame. They indicate various pieces of cultures, but no civilizations. At most one might say that generally Neolithic and Chalcolithic cultures have been found in India in that period, e.g., possibly on the order of a thousand years apiece.

Iron is found beginning about 3 Kyp (Hallur; Eran 2A; Upper Ganges valley in the 800-400 BC slot, in E India dated to about 800 BC). "All over India the Iron Age was beginning to merge into the early history period [e.g., the Mauryan Empire beginning about the fourth century BC]".

Thus Indian history, 9-2 Kyp, exhibited one urban civilization (4.4-3.6 Kyp), but basically no other; nevertheless it likely exhibited various regional cultures with a fluctuating time scale in the 300–1200 year range. No strong reason is yet known either for the birth or death of that one civilization. Yet the fluctuating time scale for settlement configurations of a town-village nature presists.

Long Range Interaction; Marine and Inland

In China and the Near East, 6-5 Kyp, we see long range exchange interactions between culture areas, a significant amount of which is conducted via riverine and maritime routes. 6 Kyp is also the likely time of sail dispersal of the Austronesians from Indo-Chinese origins into the Pacific and Indian Oceans (see Goodenough in White (22) for discussion of the China-SE Asia connection) – related coastal peoples push inland to the Koryat Plateau; it is also the time of the first sail-propelled boats in Egypt. With the rise of the first city-states in Sumer (5.5 Kyp), we have cylinder seals associated with maritime trade in the Persian Gulf and Arabian Sea. 5.3-5.1 Kyp witnesses, in closs succession, the formation of Egyptian riverine market towns, merchant trading ships, and the first Egyptian kingdoms. By 4.5 Kyp the Indus civilization is flourishing with boats, maritime links to Mesopotamia, writing, coinage, cylinder seals, and a entire co-ordination of long-distance trade networks and elite stratification. The Japanese by this time have deep-sea going boats and a boatmaking tradition, and an ancient seagoing boat-making tradition is also known (but not dated) from SE Asia. The entire S maritime-riverine zone of the Old World is thus ringed by this earth flux, if not the widespread use, of maritime trade, and is soon filled in, similarly, across expanses of desert and steppe by camel and horse caravans. Everywhere (including China, where long distance trade was nominally 'despised' but practised, and tributary payment was an important long-range means of transfer), trade involved ethnic diasporas, or full-time ethnic specialists in trade. Clearly mixing as policy, not simply as ethnic dispersion whether for trade or war, had begun (Curtin (23)). In all of the early civilizations, the traders were not the rulers themselves (and usually not of the ruling ethnicity), and long-distance trade was tightly administered by the polity as the polities themselves were the chief and only clients for strategic goods, expecially metals. In the Near East, the strategic goods brought by such trade were essential to rule (coinage, warfare, patronage); in China the civilization centers were directly linked to the strategic sources of such goods. In both cases elite ware were manufactured and exported via hierarchical redistribution as a means of binding secondary elites as well as the traders themselves (who were often allowed to be 'wealthy' but often restricted to separate quarters in the city, as in Sumer).

In conjunction with urbanization and trade, Dynastic Egypt begins 5.2 Kyp, Dynastic Mesopotamia 4.9 Kyp, Dynastic China possibly by 4.4 Kyp, certainly by 4.1 Kyp, and the Indus civilization of trading cities begins by 4.4 Kyp, perhaps by 4.5 Kyp. All have a maritime component. The dependence of civilization on long distance trade is everywhere evident. Although never seriously accepted as a causal theory, the facts are that the Indus decline of trade with Mesopotamia directly followed invasion and conquest of the latter by mobile pastoralists, and the Indus civilization went into its decline ("collapse" for the elites and their urban sites) and reformation (for the peasant agricultural bases) in the immediate ensuing centuries.

For the Old World after 5 Kyp, the existence of long-range civilizational-maritime trade connections – extending into the Aegean and Mediterannean, linking the Near East, India, and East Africa, extending into the Pacific, linking China to Indochina, and both to India, around the coast of India, and to the West, and finally, out into the Atlantic seaboard and beyond – and their overland counterparts (through Arabia and North Africa, and through the steppes from the Near East and India, to China) – constitute a higher hierarchical "world system" context for further and future political and economic development.

West Central Asia – the Steppes

Central Asia (beyond the Scandinavian Peninsula – Caspian Sea – Persian Gulf crescent, E to the Chinese-Tibetan borders) enters with conscious impact upon W European written history in about 2.8 Kyp. But its cultures have threads and themes for something of the order of 3000–4000 years prior. These cultures, originating from N hunters (Finno-Ugrian), a mid Aryan complex of nomads and pastoralists, and S Indo-European nomadic pastoralists, impinged on what became the settled civilizations to the W and to the E. More southerly they also impacted on the Dravidian civilization of the Indus Valley. The most publicized gateways were the regions N and S of the Caspian Sea, the steppes and mountains. We would go so far as to say that this nomadic pressure, coming off the central plains of Asia, in our opinion, is what helped create the forms of both W *and* E civilization (in its settled agricultural-urbanized form). Trade and war, we could submit were created by that kind of 'outside' ethnic pressure.

So to the W, from 2-1 Kyp, there appeared the Huns, Avars, various Turkish tribes, among them the Khazars. Certainly these waves occurred with less then 500 year timings. The subsequent 500 year period, from 0.5-1 Kyp was certainly challenged by conquering Asian civilizations, e.g., Mongols, down to 1453 A.D.

In the preceding millenium 3-2 Kyp, successive groups of nomads, Sythians, Sarmatians, Parthians, pressed on the fringes of the steppe and further into Europe and the Near East. These waves occurred with less than 500 year intervals. "This tendency, inherent in the nomadic system and the geographical setting of central Asia, was fostered by advances in technology that favored nomadic warfare [e.g., mastery of the horse, and of the bow and arrow. Horses are of significance, possibly as horse riding, back to 5 Kyp; certainly its mastery by 2.8-3 Kyp]." (13)

The nomads of central Asia likely underwent their initial formative stage from about 4 Kyp, possibly as a result of overgrazing by unmounted pastoralists and, more southerly, early or abortive irrigation farming. Milk animals and wheeled transport formed another life style that fit the steppes. That transition likely took place in the 4-3.5 Kyp time slot N of the Caspian along the Volga River, in the Ural, Altal and Sayan Mountains. Two wheeled carts and four wheeled wagons came into use on the Pontic Steppes at about 4.5 Kyp. Settlement evidence suggests that independent pastoral economies existed on the steppe between the Dnieper and the Ural Rivers from about that time and radiated past the Ural by about 4 Kyp. Settlements are found in the river-valleys that cut across the steppe, and along the forest steppe margin. Thus again, we can sense more than one kind of major social change (e.g., 500 year or smaller segmentation) in that 3-2 Kyp millenium.

Retreating back one more millenium, 4-3 Kyp, Neolithic cultures are found, including small villages and even settlements up to 32 acres engaged in irrigation farming. (Note that nomadism requires a rather careful matching of social pattern to resources and conditions. The same is true about agriculture. Irrigation with associated stock keeping very likely became too demanding by 4 Kyp in the S-regions. Thus these solutions sought on the steppes were not long term). One senses from these beginnings (and even an earlier animal husbandry) that in the election of a style of life, e.g. particularly a technological mode of production, and corollary (in the Marxian spirit, but not necessarily tightly linked) cultural complex, plus what one finds as earth processes (meteorological, hydrological, geological), there has to emerge a fairly careful match between the social style (both internal and external) and the physical processes to succeed. (We have characterized the problem by the

statement that social pressures emerge from complex atomistic interiors to equilibrate external field stresses. But we now learn that the match has to be close, and is difficult to maintain). But/ so we find that the match cannot last indefinitely. Because of one 'random' factor or another (the systems have too many degrees of freedom), in characteristic times (characteristic of each such complex system, e.g., biological, social, meteorological, geophysical, hydrological, mental) the organized system aspect comes apart. Here we find this, with a variety of causalities, over the large central Asian territory.

We find the scaling to continue to be what we have found in the otherwise socially organized 'civilizational' areas built around settlement and agriculture, the period seems seldom to be less than a few hundred years and may be as extended as 1-1 ½ millenia. The solutions, after experimenting with settlement and agriculture, have had to light on animal transport around which meat products, dairy products (food), clothing, and shelter could be organized by spatial transhumance. Thus from domestications as early as 9 Kyp, with Neolithic forms being found after 6 Kyp, ultimately the emergence of nomadic life could be more or less successful.

Not invariably successful. Because another way of looking at the central Asian picture of that extensive 7000 km E-W stretch, is that it was not a region hospitable to extended civilizational solutions. Thus after its population density achieved transition levels (e.g., 0.03 persons per sqkm, or so), higher density solutions were explored (e.g., up to settlements and agricultural life, and/or intensive hunting-gathering). There was no satisfactory near-homogeneous solution, and so persistent fluctuations continued to be thrown up from that area. Those 'outward' fluctuations, not exceeding the order of 500 years, then developed *a* if not *the* dominant pressure on the regions that were to become great civilization centers – the Near East, the Indus Valley, and China.

"Trade is as old as the beginning of settled urban life" (4). But then, more narrowly: "In the fourth and fifth centuries AD the irruption of nomadic peoples from central Asia threw the whole civilized world into disarray. The invading nomads were under no form of central control though their movements radiated from a common center. They were mostly Mongoloid . . . All the established centers of civilization were affected by them: China, Gupta empire [India] . . ., Sassanian Persia, . . . Roman empire, . . . [into] Britain. The setbacks were lasting . . .". However there were waves effectively every millenium irrupting or radiating from perhaps 8-10 Kyp on. A first expansion phase outward took place from 40 to 10 Kyp. The next phase began a backward remixing. The subsequent fluctuations were not coherent, did not take place in one continuous epoch, and were not of one ethnic group. But – to us – they contain the names and the mysteries associated with almost every Eurasian ethnic movement that appears *at* the civilizationist's horizons.

Just like the problem of blowing up any large flaccid ballon, until the pressure becomes appreciable, there is no great efflux at various leaky portals. Thus the social efflux, at various early phases, is not appreciably different from a simple diffusion. The efflux backward out to regions surrounding the Central Asian steppes was not extensive in the formative 7-4 Kyp time frame. It requires expert study to try to trace those movements. That is why the pressure these peoples began to exert on civilizations does not become so noticeable until the 3-2 Kyp era. [6]

East Central and Northern Asia

We shall recall the borders: To the N and far to the W (Northern European Plain), nearer to the W (Siberian Plain) and N (Siberian Plateau), we have the hunter-fishers who adapted, in time, even to a sub-Neolithic life (e.g. they appropriated Neolithic crafts such as pottery, and traded, without practising a Neolithic economy. That circumpolar region simply did not and could not encourage high density settlement, Clark, Piggott (24)). In due course they acquired bronze, but for a long time were dependent on flint, stone, particularly slate, and organic materials for tools and weapons. They went through a Mesolithic period, e.g. of fishing using bone forms for fishhooks. With their mastery of snow movement, they had mobility, could trade in raw materials. Yet in spite of seasonal mobility, there was a considerable stability in social life, e.g. numerous graveyards are found, with clothing, ornamentation, art, possessions, and ceremony found or indicated.

It seems clear that such Northern Eurasian, intrinsically Mesolithic traditions, could be maintained for centuries, possibly even some millenia (basically, again, because of their particular kind or isolation), at the fringes of long-established peasant cultures, without or only latterly and sporadically, modifying their economy. Thus with no ability to provide any more detailing without a great deal of perusal of specialist literature, we can surmise such bridging and even slow northerly diffusion, with considerably faster E-W diffusion, for some period of perhaps 12-2 Kyp. (Note: Neanderthal man, by 60 Kyp, arced say from Spain, down below the Black and Caspian Seas, the Himalayas, up to Choukoutian in China. Diffusion slowly pushed that border N, with homo sapiens sapiens, into the Scandinavian ice sheet. We are talking about that species, modern man, left in the N regions after the end of the ice age retreat). We have no notion of the scale of change in that period. It has always remained marginal to civilization. (Yet we can imagine change to have occurred perhaps as rapidly as a 2000 years epoch or even faster, but this is only a conjecture based on the number of changes of culture found, and the much more rapid E-W movements).

We may take Zungaria (e.g. a region bordered by the Altai Mts, Lake Balkash, the Tien Shan Mts.) as the 'center' of Asia; the region to the N and S representing North and South Asia; the region to the E and W representing East and West Asia. The northern steppes, from Hungary to Manchuria, including NW Asia are like the prairies of North America, suited to agriculture or to pasturage. N-E Asia contains both the fertile crescent and desert. E Asia contains a great deal of desert as well as steppe. E of Zungaria, the dominant type of man have been of mongoloid type, originating in the Gobi Desert perhaps 20–35 Kyp. In the N forests, man spread westward to the Baltic. However mongoloids did not appear in the W steppes until perhaps 2.5 Kyp.

As we have stated, the early history of man in Euroasia was hunting-fishing and hunting-gathering. A Mesolithic Age may have been late in coming to W and central Asia, diffusing from the Near East and from long-established peasant cultures at the periphery. Pottery making begins not much before 4 Kyp. With agricultural economies appearing in the W, there was an E diffusion with perhaps a millenium or more delay (i.e. movements of perhaps 1.5 km per year or somewhat less). This was not accompanied yet by nomadism. Bronze appears by about 4 Kyp also.

In the next 1000 years, nomadism was developed into a successful style of life and it made its appearance, via 'barbaric' invasions, to the E and W civilizations.

Southeast Asia

With regard to SE Asia, we have touched on the tropical Neolithic there (the early use of boats and fishing to supplement

rather stable land-based subsistence on estuaries and low terraces; domesticable plant remains in Spirit Cave in about 9 Kyp). Many of the early domesticated plants in SE Asia were probably used to provide containers (bamboo trunks and bottle gourds), or were used for cordage in fishing and net-making. Along with evidence of simple settled village life that may have been in place for some time (22), pottery occurs by 7.4 Kyp (late by Chinese-Japanese standards, but at the same time horizon as the earliest Near Eastern ceramics), and plank boats by 7.5 Kyp, linked to fibre industries and cord-impressed pottery. The domestication of cattle, pigs, and chickens occurs well before 4 Kyp but is not well dated. By 5.9 Kyp population pressures push village settlements (typically houses on wooden piles) inland to areas such as the Koryat plateau, bringing with them a full complex of domestic plants and animals (22). Dry rice is found from 5.5 Kyp. In the period from 10-5 Kyp we sense temporal scalings at 500–1000 years.

Tin and copper mines are found together in the Thai plateaus, as in China. Some of the earliest of the world's bronze manufactures (the dating at 6.4 Kyp is possibly anomalous) may be those found in cave deposits (12) – [7]. Bronze is introduced to the Koryat plateau (e.g., Ban Chiang) by 4.9 Kyp, and a peaceful (nonurban, nonmilitary) Bronze Age runs from 4.3-3.7 Kyp, with bronze smelted at the mining site used for personal ornaments, fishhooks, tools, axes, and spears. While this dating of independent metallurgy is comparable to that of Anatolia and Early Dynastic Sumer, the used of bronze are entirely different. Metal was not a major symbol of wealth monopolized by an elite group. With these and subsequent phasings from 5-1.8 Kyp we can again sense 500–1000 year scalings, as evidenced by Ban Chiang – 3.7-3 Kyp, a period of emergent specialized occupations and the beginnings of wet rice; 3-2.3 Kyp a period of coalescence of wet rice cultivation with water buffalo traction, the utilitarian use of iron, ramie yarn weaving with spindle whorls; 2.3-1.8 Kyp a period of specialized textile manufacture and printing coordinating with Chinese penetration in Tonkin and external tribute (with meagre Chinese trade goods), contact with Indian merchants and SE Asian traders; 1.8 Kyp, formation of the Hindu Kingdoms. The site size at Ban Chiang, however, remains that of a village (5 ha), and the probable population may not exceed 1,000: The 'pathway', although a stable and indigenous Bronze Age, leads only to proto-, not fully condensed civilization.

Tracing the different pathways above – the Near East and China to early civilization, SE Asia to proto-civilization, and the Japanese to long-term Neolithic stability – we can identify differences in the play of medium and long range trade flows that are involved in the transition to civilization. In the first three, there are long-range flows and pressures (long distance trade and politics) at work, but organized quite differently.

What leads to civilization reformations is not the expansion of the flux of trade per se, or the technological base, but rather the *inter-systems pressure developed by elites with respect to middle and long range distance flow convections*. In the Near East, a trading system arose (starting from 10-7.5 Kyp 'trading loops') in which elites became involved in the regulation and defense of long distance trade. The use of cylinder seals, coinage, and writing for trading transactions throughout these extensive trading loops attested to intense elite commercial interests. By contrast, the exchange system in China (starting from a 10-7.5 Kyp maritime-riverine and, by 7 Kyp, an inland interregional 'trading loop') was less overtly concerned with the commercial aspects of trade than with the symbolization of power and hierarachy. While a Dynastic Bronze Age was slower to take form in China than the Near East (and Egypt), Imperial unification as a recurrent political form was quickly attained. The temporal phasings of turnovers in political culture, however remain at the 100–500 year scale, the lower end of our 200–1200 year range.

Differences in the long-range connections in the Near and Far East are also reflected in the spatial and temporal phasings of the circulation of capitol or dominant cities. In China, like Ban Chiang in Thailand, the Dynastic and Imperial capitols were located within the mining area for tin and copper, and probably rotated as nearby mines were exhausted (e.g., on a 40–90 year turnover), directly controlled by an elite for whom the manufacture and possession of the bronzes symbolizes rule. In the Near East, tin was scarce and at great distance from copper mines; and both are removed from the centers of civilization (e.g., Iranian tin was brought into Sumer, although one source was relatively close in the Zagros Mtns). Metallurgy became the basis of warfare (weaponry) and of the monetary (coinage) system of exchange by which goods were moved over vast distances by an elite for whom coinage and the control of exchange came to symbolize rule. The rotation of capitol cities (e.g., 100–200 year turnovers in Sumer) reflected competition for hegemony among elites, also paramount in China, but under differing political and economic constraints.

In SE Asian we have all the makings of civilization: domestication, settled village life, middle and long range transport, and metallurgy, but occurring at a much lower settlement size and population density, and in a rich subtropical environment. What did not emerge were extensive trade, a stratified elite, hierarchical political bondings, and warfare. This, as we shall see, is consistent with our more clearly evolving physical condensation view of the emergence of civilizations.

Europe

It seems clear that the European subcontinent represented an area in which the remixing of the human species occurred with a number of waves, diffusions, and rediffusions. We will not attempt to trace these during the last ice age, e.g., say from upper Paleolithic reindeer hunters in N Europe as of 20 Kyp. Instead we would prefer to consider the move toward settlements out of a late Paleolithic, toward Mesolithic-Neolithic transition with agricultural settlement and later civilization.

Thus we can begin that period as a population and technological diffusion from the Anatolian (eastern) coastline of the Mediterranean, beginning from the pre-pottery Neolithic epoch prior to 10 Kyp (e.g., the Natufian). In the 9-10 Kyp epoch, that pre-pottery Neolithic had expanded through most of Turkey; by 8 Kyp it had expanded as a Neolithic village agriculture throughout the Balkan; by 7 Kyp, it had expanded across all of mid-Europe; by 6 Kyp, it had expanded through W Europe; and by 5 Kyp (6-5 Kyp) it had expanded throughout the British Isles. However, the expansion was largely a rediffusive remixing of new peoples among sparser occupation by older peoples. (See, for example, Howell (26)). Essentially these expansions carried agriculture all through Europe, and were also accompanied by a variety of technological changes. Most notable among artifact markers was a series of evolving pottery usages, e.g., beginning extensively as the Bandkeramik of central Europe in the 8-7 Kyp epoch. Considerable differentiation existed within the coastal Mediterranean developments and the internal forest areas. The forest areas were not cleared and joined into the commonality of a European community until millenia later.

Milisauskas ((27), Fig 4.3) provides a sense of how rapid and active the cultural changes were in Europe from a period of about 8.5 to 3.7 Kyp. He covers cultures that are located within about twenty current polities, e.g., Greece, Yugoslavia, Bul-

garia, Romania, Hungary, Italy, France, Spain, Czechoslovakia, Poland, Austria, Germany, Belgium, Switzerland, Great Britain, Scandinavia, Russia. He lists about 125 cultures. They average about 600 years in lifetime, with a +/− standard deviation of 400−800 years.

McEvedy (28) in fact depicts much of the pace of cultural change in Europe, from Mesolithic cultures as of 10.5 Kyp, extensive Neolithic cultures as of 6.5 Kyp, Chalcolithic cultures as of 4.75 Kyp, and the extensiveness of a bronze culture by 3.6 Kyp. with a single European centered civilization in Greece.

But we have to make the transition to civilization's spread more specific. Metallurgy, for example, does not begin significantly until about 6 Kyp (iron about 3.2 Kyp). One may properly say that the Neolithic age begins to draw toward an end in Europe beginning about 6 Kyp. Yet one can very properly note that cultural changes (of assorted technological styles of conducting organized communal life) transform very significantly in all regions of Europe in the 300−1200 year scale, all through its Neolithic history, and Europe very significantly had become a relatively dense array of agricultural communities.

"In about [5 Kyp] a decisive change took place in the European way of life, . . . apparent from artifacts and settlement patterns as much as from direct evidence of subsistence. . . . important innovations were introduced from . . . the steppe region to the N of thhe Black Sea, though ultimately from the Near East. . . . most important were the use of animal traction to pull . . . but . . . this is only part of a wider complex of animal husbandry . . ." (13).

The indications of a new economy were the expansion of population in the steppe area, appearance of fortified settlements, use of the horse, sheep herding, change in pottery to utility forms, change in dietary patterns to more use of milk products, metallurgy; in the Mediterranean area, increased contacts by sea. All the changes in the Mediterranean area began to drive toward the appearance of an urban civilization in the Aegean.

The Bronze Age spread into many parts of Europe in the 5-4 Kyp epoch, intruding into the widespread Chalcolithic cultures.

We may use Troy, on the Aegean, as the westernmost outpost of the Anatolian Near East as a bellwether marker for the beginning of change towards civilization in the Mediterranean. In the period 4.5-3.1 Kyp, excavations at Troy (Blegen's dissection (29)) show populous settlements at a scale of about 300 years apart.

From early in the 3-2 Kyp era, new walled towns appeared at Troy, and on the neighboring islands of Lesbos and Lemnos. These towns had streets and long houses in rows, and worked metal. By late in that era (e.g. 300−600 years later), urbanization had advanced in scale, with considerable division of labor and social hierarchy. It appears quite clear that these towns were involved in trade with the Near East, e.g. in gold and tin.

By the mid 3-2 Kyp era, many proto-urban villages had been established all around the Aegean − to illustrate, by naming a few, Pefkakia in Thessaly; Eutresis, Lithares, Thebes in Boeotia; Askitaria in Attica; Asine, Lerna, Tiryns in the Argold; Akovitika in Messenia; Aghia Eirene on Kea; Kastri on Syros; Khania, Knossos, Lebena, Malia, Mochlos, Myrtos, Palaikastro, Phaistos, Vasilike on Crete; on Rhodes; on Samos; at Miletos. Actually from perhaps 8 Kyp, the Cyclades had been initially settled from Anatolia (e.g. Knossos, as a Neolithic village, started about 8 Kyp. Ten levels at that site, perhaps to 4.6 Kyp, the beginning of the Bronze Age in Crete, suggests scalings at periods averaging 300 or so years). Within the 3-2 Kyp era, toward its end, trade with Egypt and the Near East in raw materials and luxury imports existed: obsidian, silver, gold, copper, tin, semi-precious stones, seals. Between perhaps 4.5 Kyp and say 4.2 Kyp (about a 400 year period), one had an active circulating trade conducted by the Aegean Early Bronze Age villages. An early palace civilization was centered on Crete, with its many settlements by about 4.2-3.7 Kyp, followed by a Second Palace period 3.70-3.45 Kyp (with its center shifting to Mycenae on to 3.2 Kyp). Thus in perhaps two 500 year waves, the first European civilizations had come into being and passed away. The Minoan culture extended northward all through the Aegean, e.g. at Kythera, Kea, Melos, Naxos, Thera, Karpathos, Rhodes, and Iasos on the Anatolian Coast. Trade went to the mainland, in the Peloponnese, to Troy, Cypress, the Levant coast, and to Egypt (Cotterell (30)).

On the Greek mainland, the Minoan civilization likely acted as a remote magnet and basis for settlement and densification. With disruptions in about 4.2-4 Kyp, central Greece and the Peloponnese attracted and turned into the Mycenaean palace civilization by about 3.6 Kyp (under the Minoan), and superceded the Minoan after 3.45 Kyp.

The Mycenaean civilization collapsed by about 3.1 Kyp; its towns persisted afterward. At its height, it included such great citadels and centers as Mycenae, Tiryns, Gla, Troy.

Following the collapse of the Mycenaean civilization (for example, the classical fall of Troy is dated at near 3.2 Kyp), there was a Greek dark age, for the period of approximately 3.1-2.8 Kyp. Starting after 2.8 Kyp, under the Doric influence, the Greek mainland villages, stimulated by pressure from the E Phoenicians and emerging as an iron age, developed into the 'classic' (archaic and classic) Greek civilization in the period of 2.8-2.3 Kyp.

The Phoenicians − the Canaanites of the Patriarchical Age of the Levant, as they were known to the Greeks − represented a civilization that diffused and controlled much of the S Mediterranean coast of Africa and maintained quite a few N coast cities too. As a maritime civilization, they were significant in the period perhaps 3.4-2.2 Kyp, when the Romans took over the scene from both the Greeks and Phoenicians. The Romans, themselves, took over and expanded next to the neighboring Etruscans, an E people who established a small civilization in the period perhaps 2.7-2.4 Kyp. The Roman civilization was strong and unified from perhaps 2.2 to 1.5 Kyp; its earlier history 2.8-2.4 Kyp was that of a growing fluid culture whose status changed after its conquests of the Etruscans and the Phoenicians.

Of course there were other significant cultures and cultural periods in Europe. (Besides the earlier start of civilization in Europe in the Mediterranean region, N and middle Europe began to show significant growth of towns in the time frame 2.8-2.4 Kyp, as an age of iron began to become significant after a 3.2 Kyp start (Wells (31)). To illustrate its character, the La Tene period, 2.5-2.05 Kyp, represented a complex of settlements and hierarchies of settlements with proto- and fully urban communities; they extended from the Iberian Peninsula, through France, Germany, N Italy, and the Balkans. They included a Celtic component. One must also reckon the many waves of immigrants moving in from the E, both in N and S waves, as a great number of 'barbaric' invasions. These processes essentially all fall in the 200−1200 year scale. All of this brings us up at least to the barbaric invasions that mark the end of the W and Roman Empire, e.g. 1.5 Kyp.

Africa

In Africa, we have touched on, at the very N periphery, the Egyptians down to perhaps 4 Kyp. Now we have to bring other African changes into focus.

There is a very complex hunter-gatherer hominid story in Africa that extends over an enormous period of millions of years, a Middle Stone Age that has beginnings there perhaps 100 Kyp with a very early appearance of a microlithic Late Stone Age. For example in the Southern Cape Province, there is a Robberg microlithic industry that covers a range from about 29-11 Kyp; there is an 'independent' Albany industry that ranges from about 14.5-8 Kyp; similar ones in the Transvaal and Rhodesia. Other industries, their loci, and their temporal range (or their absence) have been traced down to 4-5 Kyp. Nothing is found particularly unique in the Holocene period of the past 10 Kyp to mark the activities of hunter-gatherers in Africa. All the elements of their material culture go back a much longer time (e.g. one should say that African peoples 'solved' human style existence early, as befits a rather moderate to hot climate, dominated much more by wet-dry, than warm-cold; with those solutions, at modest densities, little pressure existed for any further 'urban civilizational' development for a very long time). "The populations of the Holocene were entirely modern both physically and in terms of intellectual capacity. Their material culture was highly developed, and their lives were well organized to cope with the business of staying alive. Leisure time [existed for many such functions] . . . The old way of life did not pass quickly in Africa; after at least six thousand years of encroachment, the farmer has still not entirely ousted the hunter." – (13). (At least not until today when displacements are taking place with lightning speed).

After the collapse of the Old Kingdom in Egypt (perhaps 4.2 Kyp), that Empire split up, and was caught up in many regional fragmentations and incursions. For example there was a Northern Kingdom (4.16-4.04 Kyp) separate from a Southern Theban Kingdom (4.13-3.99 Kyp). A Middle – Theban – Kingdom then existed (3.99-3.63 Kyp) with the beginning of a considerable urban component in particular towns. Excursions and conflicts with Asian and Nubian groups are found through 3.5 Kyp (e.g. the so-called Hykos, foreign rulers of say 3.67 Kyp). For 500 years, Egypt then existed as the New Kingdom (1567-1085 BC) as a revitalized strong state kingdom. Thus from 7 to 3 Kyp, Egypt grew in a number of steps, again in the range 200–1000 years, from a series of tribal communities into a unified state with extensive external trade, and imperial power. Much of the distinctive culture was maintained.

After 3 Kyp Egypt lost its imperial role, and instead was increasingly caught up in larger international power struggles in which its role and complexion changed a number of times, e.g. in relations to Assyria, the Persian Empire, the Greek world, and later the Romans. In the Third Intermediate Period, 3.09-2.69 Kyp, political cohesion came apart, and massive foreign intervention occurred. Incursions from Libyan commanders, and strong interaction with Nubia and the Sudan, the Kush region, transformed the direction of influence from 2.9-2.7 Kyp to Kushite control 2.6-2.4 Kyp, retaining considerable influence from 2.4 Kyp to 1.6 Kyp. By 2 Kyp, Rome had taken over the entire N edge of Africa, the older Phoenician empire, including all of Egypt.

Agriculture spread into N Africa and the Nile Valley from SW Asia (wheat, barley, sheep and goats) in the 8-6 Kyp epoch; S of the Sahara it developed independently. A number of African grasses were also domesticated. Cattle spread through Africa over a period of about 6000 years, starting in about 7 Kyp. However climate was not favorable for the Near Eastern crops except in Ethopia. The Saharan area took on a pastoral life style, but the region dessicated badly by 5 Kyp. Climate and disease seems to have provided pressure against development much beyond a Late Stone Age as of 2-3 Kyp. A hunter-gatherer and nomadic style of life fit most of Africa until very recent times. While it has been regarded that an Iron Age began about 1 Kyp (with iron coming from the N), most recently evidence has emerged for ceramics, iron, domesticated animals, and a beginning grain agriculture in the period 1.5 to 1.2 Kyp in S Africa (Denbow, Wilmsen (32)).

Ghana is regarded as the earliest reported African state (outside of the very N coast and the Egyptian complex), described by Arab geographers about 1.1 Kyp. There are some occupation tells going back to 2.3 Kyp (Gao); some from the 4-3 Kyp era (Daima), but no urban or wide trading net civilization earlier then the past 1 Kyp. The small nets have been short lived, perhaps in a 100–200 to 500 year period. Examples are Ghana 800–1100 AD; Mali 1200–1700 AD; Meroe (2.9-1.6 Kyp); Nok (2.4-1.8 Kyp); Urewe (ca. 1.6 Kyp); another dozen large settlement areas in S Africa. Yet there may likely have been wide range pastoral trading nets in the S (but hardly organized civilization) as early as 1.2 Kyp. Then with the much later extensive Bantu language expansions in a more recent Iron Age, subsequent small trading regions and kingdoms appeared, and involved copper, gold, salt trade. Seventeen or so states or empires in the Sahel, savannahs, and tropical highlands arose in Africa's interior in the period from 900 to 1500 AD.

The Americas

While primates (e.g. New World monkeys) have existed in the Americas since continental drift separated the continents, hominids are not found in these continents till their recent adaptive radiation perhaps 12 Kyp, and only in the form of homo sapiens sapiens. One can surmise that it is only man's extreme habitat range, as part of his world diffusion, that brought man to the Americas essentially only near the end of the last ice age. That movement was made possible, it is assumed, by the Bering Strait land bridges and man's successful adaption in Siberia. It is also premised that man's diffusive movement in the New World was quite rapid, perhaps a few km per year, for on the order of only a few thousand years man had reached the tip of South America. It is presumed that, as a 'superb' hunter-gatherer, he had devastated most of the large land mammal as game in that expansion (3).

A record of group life patterns, loosely speaking, may be traced from perhaps 12-10 Kyp. In varied spotty arrays, one finds beginnings toward settlement and horticulture (not always both together) in the Americas in the period 8-4.5 Kyp. The appearance of movement toward civilizations, with extensive settlement, population concentrations, and trade, are not found before 4.5 Kyp. Thus there is little point in attempting to locate the various significant culture changes before 4.5 Kyp. Suffice it to say that all of these exhibited epochs that lasted less than 1000 years.

With regard to North America: with a Western Archaic tradition, beginning in perhaps 9 Kyp, and considerable shifting from hunting to seed resource gathering cultures, there arises at least one culture, the Windmiller culture in the Sacramento river valley, that exhibits high levels of cultural elaboration, dense population, sedentary village life and complex political-economic arrangement, although without horticulture.

The Plains Archaic is largely concerned with the hunting of bison and gathering for most of the past 10,000 years of the Holocene.

The Eastern Archaic finally yields up an Old Copper culture, and long distance trade in portable durables – copper ornaments, shell beads, and exotic lithic material; and growing population density supported by trade, along the tremendous distance from the lower Mississippi to Canada's Maritime pro-

vinces. Cultigens are found in the Woodlands areas in the 5-4 Kyp era. Agriculture itself may have diffused in from Mexico in the 4-3 Kyp era.

From perhaps 5-1 Kyp, various so-called Mound Builders cultures have sporadically created extensive cultures along the Mississippi and tributaries. For example the Adena culture (Ohio, Kentucky), without agriculture, dating perhaps back to 3 Kyp was quite possibly an early civilization. That culture was superceded and replaced by the Hopewell culture, at about 2 Kyp (Illinois, extending through Ohio into New York). That near 'civilization' with little or more likely no agriculture, maintained considerable population density and trade settlement for perhaps a thousand years (e.g. 2.3-1.3 Kyp). That culture was superceded by the Mississippian culture, based on agriculture likely imported from Mexico. They maintained a megapolis (Cohokia) which held up to 30,000 residents. This civilization lasted about 500 years, e.g. 1.3 to 0.8 Kyp, followed by a much reduced Natchez remnant.

An interesting Pueblo civilization existed in the Chaco Canyon from about 1000 to 1200–1300 AD. It could almost be considered a prototype for all such short civilizations (e.g. those nearer to 300 years). It covered a region of about 120,000 sqkm. It had something of the order of a dozen or so population centers. It had a fairly high culture, representing a rather elaborate distribution system and political system. In what appeared to have become a rather fragile ecology, a victim of ecological limitations and meteorology misfortune, it came apart, and dispersed rather quickly. Once again this history stresses how significantly emigration (ethnic diffusion) is a dominant complex human mode.

Lightly reviewing again (Coe, Snow, Benson (33)), past the Upper Lithic age (industries and complexes likely of Asian Upper Paleolithic origin) – e.g., after 9 Kyp – we approach the Archaic Period. In the prior period, the Paleo-Indian hunter-gatherer densities in the Americas may have been 0.015 persons per sqkm. In the long Archaic Period, they exploited plant and animal resources very extensively but without any full-scale plant cultivation. Having likely disposed of the Pleistocene big game, with increase of population density they required increasingly sophisticated application of tools in hunting and foraging more intensively for smaller species (or conversely, technology led population), and in more nearly settled regions. That Archaic period ended in some areas as early as 5 Kyp, and in others as late as 2.7 Kyp. Loosely speaking, in North America, the human culture regions – as ecosystems – can be associated with the major river basins.

As an illustration of the complexity reached in the Archaic age, one might examine:

Poverty Point – an Archaic village complex in the lower Mississippi valley – 3.5-2.7 Kyp.

One can then turn to illustrations of cultivating cultures in North America.

Adena culture (burial mound builders) – a cultivating complex ecosystem in the Ohio River valley – beginning perhaps 3.1-2.7 Kyp, and lasting perhaps to 1 Kyp as the Hopewell culture (Adena perhaps to 2.1 Kyp, gradually replaced by the Hopewell). These societies were in the early stages of social stratification, and practised long distance trade. They occupied a territory of about 1600 km long and perhaps 500 km wide. They were not yet fully modern agricultural cultivators of domesticated plants.

Mississippian cultures (temple mound sites) – these flourished at various periods in the 800–1500 AD time frame. To illustrate some of their scale, Cohokia was a center with a population as large as 20,000 (estimates vary from 10 to 30 thousand) in its peak period of 1000 to 1200 AD.

Northern Iroquoians – illustrating Indian tribe and nation life peripheral to the Mississippian. They drifted into the NE (around Lake Ontario) in the period perhaps 3.7-2.7 Kyp. They became subsistence cultivators until about 1000 AD. From then to about 1600 AD they had become advanced horticulturists (based on maize, beans, and squash), with condensation into small nation territories.

Eastern Plains Woodland cultures – post-Archaic peoples who moved into their areas as expert horticulturists and developed farming systems, first in the period 2.25 Kyp to 1.05 Kyp. They were perhaps inspired by and became derivative of the Hopewell cultures and participated in the Hopewell trade net.

Plains Village communities – 900–1850 AD. Permanent communities, advanced horticulturists and farmers, they never achieved chiefdom status. One notes that many such settled horticultural communities were abandoned with the appearance of European settlers, their importation of the horse which became wild, and which permitted many of these Plains Indians to become equestrian nomads as the historic period emerged.

In the Desert West there were Archaic cultures in two distinct regions – the Great Basin, and the Plateau, typically in the time frame 3-1.6 Kyp. These Archaic bands were replaced, in Utah, by the Fremont tradition (400–1400 AD). In the SW, the Prehistoric period is marked by five cultures. The major ones were the Hohokam, Mogollan, and Anasazi. The Hohokam began in the time frame, perhaps as early as 2.3-1.4 Kyp. They were perhaps replaced after 1300 AD. They were farmers who used irrigation to extract crops from the desert. Confined largely to Arizona, they were involved in trade and were influenced by Mexican traditions.

The Mogollan, in New Mexico and Mexico, existed in the time frame from about 300 to about 1350 AD.

The Anasazi began as a basketmaker tradition in perhaps 1.2 Kyp, and began a first 'Pueblo' period about 1.3 Kyp. These cliff dweller traditions were abandoned in the 1300's AD. All of these areas, because of drought and poor crops, were abandoned and the horticulturists became nomadic, or moved into the Rio Grande Valley and other historical Pueblo sites.

The Chaco Canyon culture, short lived from 950 to 1300 AD, possessed perhaps 125 planned towns (the major ones were much fewer in number). They were on the boundaries on the trade network within the Anasazi tradition.

California alone exhibited perhaps 500 specialized cultures (tribal organizations) based on specific artifacts in the time frame 500 to 1800 AD. These were considerably clustered in the N (Bay and River) area, and the S (coastal area).

The NW Coast region exhibited many cultures in the 5 Kyp to 1800 AD time frame involving a great deal of social stratification and wealth after 500 AD.

This presentation offers only a most fleeting impression of what amounts to a few thousand cultures that interacted in relatively complex fashion in North America.

As a brief pictoral synopsis of North America, one may examine a National Geographic map, "Indians of North America" (1974), connected with their book, *The World of the American Indian* ((34); also see (33) p. 44 for a comparison of culture areas as of 1500). What is clear from that map and the people pictured was that they were of Asiatic descent, their density N of Mexico (about 1–8 million people in about 15 million sqkm of territory at about 1500 AD) was under 0.3 persons per sqkm. Their social evolution for at least 2000 years was consistent with agriculture and settlement as in many other parts of the world with tribal and chiefdom life, and included a few regional civilizations.

In contrast, Mesoamarica, with an area of about 5 million sqkm and a population between 5 and 50 million at the time of

the Spanish conquest, suggesting a population density of perhaps 3 persons per sqkm, was capable consistently, of having exhibited a number or large and strong civilizations in its prior history.

Interim Discussion

In attempting to assess what there is to learn, say, from a comparison of prehistoric life in Asia, Europe, Africa, North America, Australia, even if you will the Arctic Regions, it appears that we might be best guided by anthropologists', ethologists', and ecologists' notions of life styles, but with some provisos and caveats. Life style, including the evolution of technology, seems to be considerably related to the region of development. Effectively the same human species has been able to move into almost all earth habitats, but each local style is not quite exactly the same. Loosely speaking there is a progression of styles from hunter-gatherer to horticulturest or pastoral nomad to farmer or pastoralist to urbanist, but the progression is not hard and they go through reversals. The notion of a 'hard' progression seems more related to the 'writing' of the victors, rather than the facts. Also success or failure in style seems more associated with local facts and local history.

In general, at some slow rate, population density seems to have grown, with critical changes (one or more) at the loose scale of perhaps 0.03 to 3 persons per sqkm. Thus we tend now to grasp our prototype example – a hunter-gatherer society of perhaps a hundred people in a region, e.g., river valley, of perhaps 1600 sqkm, diffusing among such regions at perhaps the generation time scale, and holding 'oral' social coherence for perhaps 25 generations, e.g., 500 years. Beyond that there does not seem to remain any real social memory, only social myth.

But if we examine life as it condenses on beyond that level (i.e. what we will call second phase condensation past the end of the glacial age, perhaps 10-12 Kyp), we find it takes on slightly different flavor in each local region. But it is precisely in that sense that we tend to find the transformation of loose band association as hunter-gatherers into a more uniform larger density ethnic (kinship directed) tribal organization quite prototypic of human organization at intermediate population density levels of perhaps up to 0.3 persons per sqkm.

It is in that regard that we find a considerable degree of similarity in human social organization in North America, Africa, Australia, Europe, Asia. As in Africa, man was quite comfortable with that life style at intermediate densities (perhaps as with many other species with widely dispersed taxon levels, man has found his 'niche'; savannahs, prairies, forests, river valleys, seasides were especially hospitable). We find humans in upper Paleolithic, in Mesolithic, in Neolithic, in Chalcolithic forms of technological organization. They are peoples, nascently or well on the way to being settled. They were capable of (in fact had to become capable of) creating surpluses in food and possessions. They had to begin to exhibit rational order, some beginning forms of complex political organization, e.g., elders and similar forms of group leadership. As we might see them in many areas of the world, they might exhibit group densities (as cultures) of perhaps 300 cultures per million sqkm of territory. That is, they still resemble one culture per 1600 or so sqkm, but their populations may be considerably larger than 100 people (with a dozen or two villages in such an area, prototypically each with a few hundred people, this might represent tribes and chiefdoms. Any higher transitions, e.g., towards statehood, would depend on how much pressure would emerge from outside from the density of such surrounding cultures).

One may get the impression – as we perhaps left it in North America – of cultural lives of a few thousand years (for cultures that were comfortable in an ecological niche and with low density in surrounding cultures, e.g., other river valleys). This is not precisely the case. Rather it is that the diffusive motion, while retaining an essential similar component of family and band movement, has settled down to a great deal of more remixing. The 'tribal' memory of a coherent group still remains basically only 500 years, but there is more coherence in the group's movement toward settlement. Its Mesolithic-like nature is measured more by the adaption of horticultural techniques, nomadic pastoralism, forest efficiencies, village-like life. There is more group attachment to the particular land. But on the other hand the life may be somewhat precarious in a longer run. Thus within a few thousand years, one can often expect significant failures, and the general apparent tranquility of a life will have become largely transformed. It is the nature of that apparently quiet prehistory – with very few relatively immediately obvious victors – that marked intermediate human tribal life (mainly tribes and chiefdoms) in most parts of the world over the period from perhaps 10 to 2 Kyp (in fact, until perhaps 1 Kyp, when higher density associations over many regions of the earth's surface were forced by density competition, e.g., at levels like 3 persons per sqkm or greater). The fact that a few regions went beyond that life style to the higher interactive density that we call civilization (one that we should perhaps now identify as a phase three life style) in no way contradicts the more prevalent lower density mixing style of tribal life. That tribal and chiefdom style is a loose network of networks. It is a life style that effectively no other land animal form possesses (although perhaps many plant forms do have, as well as oceanic animal forms). And it begins to involve many and considerable network chains of trade. The total ecumene begins to move toward closure. (See, again, (18), where denial of tribal organization affirms their existance. Fried's search for uniform stacking of nodes in such networks is what misleads him to deny their existence. Also see Polyanyi et al. (35) for the form that such trade networks might take).

It is very likely that what distinguishes the areas that were transformed into a third civilizational phase is that they were fortunate not to have undergone ecological failures (as exhibited by the Chaco Canyon culture, the Mississippi cultures, the Hopewell cultures, the South American cultures, a number of failures of early farming – in Egypt, in Asia), that their population densities increased easily or smoothly, that they were thrown into conflict with neighbors, that one or both of such conflict groups settled and were absorbed, and that they were able to develop a fairly long lived accommodating style both of trade *and* war. We are thus inclined to believe that the incorporation of trade and war in a sufficiently nonstressful form, e.g., by the adoption of a sufficiently flexible economic and political system, has become the hallmark of civilizations. But, of course, these too do not last forever. They too are marked by the same 500 year life. Thus it is that common kind of time scale that we have been encoutering in phase two and phase three style life and reporting on. The North American epoch, Archaic and post Archaic, e.g., 9 Kyp to 1600 AD has to be taken as one more of the larger prototypes of major life styles of man, rather than the more narrowly directed 'civilizational' successes of Mesopotamia, Egypt, the Indian, the Chinese, and the later European (Mediterranean). It is only in the past 2-4 Kyp epoch that we can begin to see in the Americas the same 500 year process beginning to be more narrowly related to a greater constancy in the regions of interaction. Thus it is more common that isolated civilizations come and go, in this phase two life style, rather than the appearence of a few chains of civilizations associated with a

few areas. It is only in the recent few millenia that the more 'continuous' twinkling of chained civilizations have become common. Yet one might say that there was as much fluctuation – although not precisely the same kind of political fluctuation – among these phase two cultures (Mesolithic, Neolithic, early Chalcolithic cultures) as there was among the nation-states of the past 500 years of European history.

A basic note is required to explain why a strong association of trade and war develops at increasing density, and why it leads to civilization. With increasing density, an increasingly long distance trade net is ready to develop. What becomes particularly notable about that trade net is that it develops not around bulk 'commonplace' goods, but around goods that elite members of the group require, e.g., tool materials, copper, iron, gold, luxury goods. That is, the chain of processes that develop are the appearance of elite members who are capable of dealing with the greater complexity of increased density, special needs that elite associate with their changing status, the increasing need for more certain long range trade, the use of the organized form of warfare to extract political (command-control) goals, and thus the regularly entwined complex form of politics and economics – hierarchies of people and institutions – that we identify as civilization.

As far as successes are concerned the best we can tell is that no particular economic or political system has been more successful than any other. As technology in interaction has progressed, the need for systems capable of handling greater interactive complexity has arisen, but no one of these has been particularly more successful than any other. By Aristotle's time, political systems had been identified as the rule of the one, the few, or the many, and that topological classification is still more valid than any classification that say Marx or modern economists have been able to draw. The *three* major characteristics that seem to have made for interactive survival were some sort of reasonable internally successful political-economic system capable of supplying people's needs within trade nets, sufficient people and technological power to provide external defense (and offense) against intruders, and luck in physical environment. When these conditions were satisfied, then these peoples could claim being 'gifted', with superior ideological-religous forms of belief. And for us to be able to speak confidently about any of them, we have had to await the development of a rich written symbolic language. That did not begin until perhaps 5.5 Kyp – and only in selected areas – even though we can surmise (from art forms) that definite understanding and appreciation of the individual goes back to perhaps 20 Kyp.

Meso- and South America

Returning in our study to the Americas: For further (and earlier) civilizations, we now turn S.

By perhaps 8 Kyp, the megafauna of the Americas were extinct, in part or all due to the hunter-gatherers. Completely or almost completely independent of Old World origins, man was able to bring a great number of plants into cultivation starting up in a first epoch as early perhaps as 11 to 7 Kyp. Domestication of a significant number of animals and plants begins – in highland Mesoamerica, and through the Peruvian Andes – in that epoch. Man made a slow transition from seminomad gathering to semisettled horticulturist and farmer up to a period of about 3.5 Kyp when maize farming became a way of life. A few major examples of the earliest developments were cultivation and domestication of maize, beans, chili peppers, pumpkin. Among animal species domesticated early was the dog, camelids (alpaca, llama), guinea pigs.

Incipient agriculture took off in the lead region of Mesoamerica in perhaps 9 Kyp. During a first identified phase (El Riego in the Tehuacan Valley) 9-7 Kyp, seminomadic bands moved seasonally, harvesting and planting a number of food and material crops – avocado, chili peppers, grain amaranth, walnut squash, cotton. In a second aceramic phase (Coxcatlan phase), beginning about 7 Kyp, maize began to be domesticated; by 5.5 Kyp stone containers were being manufactured which soon led to pottery (in a fourth phase, 4.3-3.5 Kyp). By 3.5 Kyp, the Tehuacan Valley clearly showed nomadism replaced by sedentism.

Thus, in some general context, we will have to consider a semisedentary Mesolithic epoch as being feasible in the S continental expanse of the Americas beginning perhaps as early as 7-6 to 4 Kyp. The final periods of transition are relatively narrow, perhaps a thousand years or so, driven by the effect of their new process technologies on further change in lifestyle. The regions that we have to consider are in Mesoamerica (Valley of Mexico, Valley of Oaxaca, Gulf Coastal Plain, Yucatan Peninsula, Guatemala Highlands), N and Central Andes, S Andes, Amazonia, the circum-Caribbean area.

In *Mesoamerica:* "Between [8 and 4.5 Kyp] a number of interrelated developments ultimately brought about the emergence of settled village life based on full-time farming; the population grew until it exceeded the figure that could be supported by hunting and gathering alone; under human selection [the much faster selection pressure of selective breeding], certain plants – notably maize – became larger and more productive until it became increasingly worth while to clear away the wild vegetation in order to plant crops; as crop plants made a greater contribution to the food supply, communities were able to remain in one place for longer periods, and the camp sites were larger and more permanent. . . .

". . . the most critical [factor] may be the increase in the size and productivity of the maize plant . . . in about [4 Kyp] a critical threshold was reached, with a yield of some 200 kilograms per hectare [2.5 acres], maize was now more productive than any wild plant and was capable of supporting settled life. It was at just this time that the first villages of pottery-making farmers appeared in highland Mexico". (13)

In the *Andes:* In the coastal plains of Peru and Ecuador and in the Peruvian Andes, villages of appreciable size (e.g.,at El Paraiso, a town of 50–60 ha [200–250 acres] with a population of 3000–4000) appeared 500 to 1500 years earlier (e.g., at sites like Real Alto and San Pablo, back to 4.4-6 Kyp).

"During this final preceramic period [5.3-4.2 Kyp] the pattern of future Peruvian coastal civilization began to emerge. All the major food crops were grown; the techniques of irrigation were understood; trade networks connected the different regions of the Andes, bringing highland obsidian and vicuna skins to the coastal towns, sea shells to sites high in the Andes, and motifs taken from Ecuadorian pottery to the gourd carvers of Huaca Prieta in Peru." (13).

Except for perhaps one controversial exception (the possible African origin of the bottle gourd), agriculture in the New World seems to have an origin independent of the Old. Recognizing the sparse statistics of only two independent cases (e.g., the Old World versus the New World) with differing biological speciation, or at most perhaps a handful of 'independent' cases (e.g., the Near East, Africa, China, Australia, the Americas), one is hard put to consider the American development of agriculture, ceramics, metallurgy, settlement, trade to be markedly different (overlooking perhaps 2000 years of differential fluctuations in phasing) from the Old World developments with their more prolonged occupancy by homo sapiens sapiens.

Thus we need confront 'startups' of civilization from a period starting perhaps at 5 Kyp in the Americas, with prior cultures of not more than 500–1000 years traced back perhaps to 10 Kyp in selected areas. Once again we have to take a unitary view of ceramic and cultivating cultures of the Amazon Basin, the Andes, the South American W coast, up through the North American plain, emerging with increasing population densities. (As one more illustration, various *Amazon* cultures have a life scale of about 500 years from 4 Kyp to the present; Fig 60.2, (13)).

For example, using ceramic indicators (and evidences of trade), there seems to be trading connection from an Early Tutishcainyo forest culture of about 4 Kyp to the Waira-Jirca complex at Kotosh, which connects with the nearby Chavin culture in coastal Peru, as well as to Valdivia and Mochalilla in coastal Ecucador.

In the *Andes,* "the first suggestion of new, larger-scale societies came about [3 Kyp] with the spread of the Chavin art style" (13). The extent and diversity of the Chavin tradition suggests that it was a 'first' or 'near-first' Andean civilization. By 2.1 Kyp, it was replaced. That is, its 'life' was less than 1000 years.

In *Mesoamerica,* prehistory is divided into a Formative era (4.5 to 1.7 Kyp), a Classic period (1.7-1.1 Kyp), and a Post-Classic period (900–1520 AD). The Mesoamerican cultures, exhibited by the lives of their centers, (13), Fig 58.2, lasted perhaps 550 years, with a standard deviation range of 400–800 years. The Formative period shows the beginning of a civilization in the *Olmec* culture at about 3.5 Kyp. It centered on the Gulf coastal plain of Mexico but with trading influence spreading much further NW and SE. Although a civilization (e.g., perhaps from 3.5-2.4 Kyp, but constituting two different horizons), with a handful of ceremonial centers of not more than a thousand people each, they did not constitute state polities. Yet they traded extensively. (Illustrating major centers are San Lorenzo, La Venta, Tres Zapotes).

A pre-Classic civilization began to appear in the Basin of Mexico after about 2.6 Kyp. A major settlement started at Cuicuilco (2.6 Kyp), another at Cholula (2.2 Kyp), and another at what clearly became the undisputed center of that Classic civilization when Cuicuilco was destroyed at about 2 Kyp, *Teotihuacan* (which started in about 2.1 Kyp). This civilization lasted about 900 years. Its center at Teotihuacan, at its height, between 1.6 and 1.25 Kyp covered an area of about 20 sqkm, and achieved a population of about 125,000 people (with an estimated range up to 250,000).

In the Basin of Oaxaca, a village site (San Jose Mogote) is found as of 3.1 Kyp, and the center of what later becomes the *Zapotec* cicilization is found at Monte Alban beginning about 2.5 Kyp. There is early affinity with the Olmecs.

The Classic period opens in Mesoamerica with *Teotihuacan* and its establishment of empire, one even mightier than the much later Aztec. Its large population was maintained by the fertility of the chinampas system (water, water lillies, fish). It was heavily engaged in trade (and war) with all the rest of Mesoamerica. Its period of dominance persisted from about 2 Kyp to 1.25 Kyp; its demise due perhaps to environmental degradation (it had long outlasted the Olmec civilization), certainly the city was destroyed by fire.

There are settlements in the State of *Veracruz* (on the Gulf Coast NW of the Olmec area) from the period 1.7 to 1.4 Kyp, indicating a Classic Totonac civilization there, with centers like Cerro de las Mesas and El Tajin. They too were engaged with trade with Teotihuacan.

The *Zapotec* civilization continued from the Formative through the Classic period (the latter beginning in Monte Alban perhaps about 1.6 Kyp). In the Formative period there were only a few centers in the Oaxaca basin; in the Classic period (up to 1.3 Kyp) the civilization was truly an urban civilization with a few hundred settlements. By using extensive irrigation, it was able to support a considerable population in a dry valley bottomland. While not the equal of Teotihuacan, it was more urbanized than the contemporary Classic Mayan, in spite of the preeminence of that civilization.

The *Mayan* civilization began from the growing connection of sites from Izapa on the Pacific plain of Chiapas, Kaminaljuyu in the Guatemalan highlands, from Late Formative period of perhaps 2.4 Kyp to perhaps 1.7 Kyp as the beginning of the Classic period. This civilization was then transmitted northwards across the Guatemalan highlands to sites such as Tikal and Uaxactun in the Peten lowlands of the Yucatan Peninsula which started up about the same time as Teotihuacan (2.1 Kyp) and became the center of the Classic Mayan civilization. NE, on the Yucatan coast, beyond the major site of Lamanai, there was a significant seaport town of Cerros (33).

The density of centers now known on the peninsula was represented by about one center per 250 sqkm. Tikal became a thriving city from about 1.7 to 1.1 Kyp. In about 1.2 Kyp it had a population perhaps as large as 100,000. It is now known to have a written history, e.g., a ruler in 1.4 Kyp, one who ruled until the age of 80, who was called a Lord of Lords. That is for a period on the order of 600 years, we confront the rise of a polity among a civilization of polities, with an elite and hierarchy and many centers, with extensive division of labor, an extremely long trading net, which even with poor soil had developed the very intensive type of chinampas horticulture that has been found extensively in Mesoamerica. One finds the progression in political-religious outlook that transforms from belief in gods to acceptance of rulers as divine in their own persons. The Yucatan trade net likely traversed the peninsula from the sea by river through Cerros through Tikal, then with land portage to Bonampak up the river with trade on to the coast and basin cities in Mexico, e.g., Teotihuacan. Warrior-merchants from Teotihuacan were in evidence by 1.5 Kyp in Kaminaljuyu, Tikal, and N Yucatan, and began to exert an overweening influence.

Major construction lapsed for a half century during the crisis of Teotihuacan's decline after 1.45 Kyp. By the time of its fall in 1.25 Kyp, the Maya underwent a Late Classic reflorescence. But by about 1.1 Kyp, the major Mayan cities were abandoned. The reason for the collapse is not known but it is conjectured that the civilization had reached a density that a marginal 'high' technology could no longer support. All that remained after was the village culture, and basically a slash and burn agriculture. There is a great deal of prototypic character in this 'isolate' or 'pristine' civilization that suggests striking parallels with the Aegean civilization.

We point to one additional only recently charted archaeological finding (Matheny (36)). Perhaps 70 km from Tikal, by recent report, an elaborate city-state El Mirador existed as one of the most elaborate Mayan polities (if not the largest metropolitan area) in the Preclassic era, having lasted from about 2.15 to about 1.85 Kyp. At that time, its population may have numbered in the tens of thousands in an area of about 16 sqkm. It was certainly engaged in a trade network reaching hundreds of km, quite possibly throughout the entire Mayan area. The finding is viewed as one of what must have been a number of other cities tied together in an extensive trading net that had to be a precursor to the high achievements of the following Classic Mayan period of 1.75 to 1.1 Kyp. Early Mayan population densities are given as possibly at the tens of people per sqkm (33).

Thus, also, with the destruction of Teotihuacan in 1.25 Kyp, the Classic civilization drew quickly to an end followed by competition among various centers for supremacy (e.g., Cholula, Tula). The *lowland Mayan* civilization centered on Tikal persisted until 1.1 Kyp. A first secular empire, of the *Toltecs,* then arose in Mesoamerica (e.g., Chichen Itza). By 1224 AD, the Toltecs were gone. An *Aztec* empire, drawing from the Toltec culture, persisted from 1345 AD until the Spaniards came.

Thus the Olmec, Teotithuacan, Mayan, Toltec, Aztec civilizations, very extensive cultures, dominated Mesoamerica in the period 3.2 Kyp to 1500 AD, averaging perhaps 700 years each (except for the Aztec who were cut short by unexpected foreign conquest). It is difficult to see much less complexity, yet with similar evolution suitable for dense forms of human society, albeit perhaps 3000 years later, than in the Asiatic Near East. One can expect this to gradually dawn on public consciousness as the history is pieced together with increasing detail.

Reviewing Mesoamerica for its highlights (33): Nine major cultural traditions have been identified. The first high culture were the Olmecs (playing a role similar to the Sumerians), about 3.5-2.4 Kyp. Many of their traits are found in later civilizations. Extensive trade networks, with specialized 'diaspora' traders of differing origins, linked the civilizations.

Tehuacan basin cultures – An Archaic or Incipient Agricultral Age begins about 9 Kyp. It lasted until the Formative period beginning about 4 Kyp with villages all through the area (similar to Europe). During the Archaic Age the transition from hunter-gatherer began in perhaps 7 Kyp with a primitive form of domestic maize. Bands moved with patterned seasonal migrations, with domesticated crops likely in humid river bottoms.

Archaic sites (e.g., preceramic) have also been found throughout the East-West Mexican-Guatemalan leg of Mesoamerica. Village life based on farming flourished in the Formative Age in the more humid areas – Pacific and Gulf Coasts, Mayan Lowlands, highland basins of Oaxaca and Mexico. Irrigation appeared in the Formative Age. Olmec Formative sites are spread through that East-West leg. During the Formative Age, simple villages coexisted with some very developed civilizations. The Early Formative existed from perhaps 4 to about 2.9 Kyp, the Middle from about 2.9 to about 2.3 Kyp, and the Late from about 2.3 to 2 Kyp in central Mexico and to 1.7 Kyp in the Mayan Lowlands.

The Olmec civilizations exhibited two horizons: one from about 3.5 to 2.9 Kyp, and the second from about 2.9 to 2.4 Kyp. Geographically, they extended E-W from about Mexico City to about Guatemala City, about 800 km E-W, by about 500 km N-S. The principle center was at La Venta. Perhaps 20 other significant population centers are known.

Another Basin civilization was the Zapotec from inception about 2.5 Kyp, to decline about 1.2 Kyp; its center was at Monte Alban.

Classic Teotihuacan and its empire began about 2 Kyp, based economically, it is presumed, on the chinampas horticulture, and involving a very large trade net. It lasted until about 1.3-1.4 Kyp. The city of Teotihuacan, at its peak, may have had a population of 125,000–250,000 people, larger than most Old World cities of its day.

Another classic civilization was the Totonak in Veracruz, linguistic relations of the Mayan. They were involved in the Teotihuacan long distance trade network.

It was the Mayan civilizations, which began their condensation in the Late Formative after about 2.2 Kyp and started a first flowering about 1.7 to perhaps 1.1 Kyp, that represented the greatest complexity in the New World (perhaps until today). To name a few of their centers: Izapan, Kaminaljuyu, the Peten area (e.g., Tikal), the city-state-like centers of the Mayan lowlands (e.g., Yaxchilan, Palenque, Copan). These Mayan civilizations were engaged in struggles with Teotihuacan. They outlasted Teotihuacan briefly, but then they too fell 'mysteriously'. We must presume that these mysterious endings are common phenomena wherein both phase two and phase three lifestyles become mismatched to the world of nature and man, and so collapse and diffuse away. This mismatch is not metaphoric but a real stability transition. It is not simply that a near continuous reduction in population density and extent will permit survivorship. Rather, the peoples flee in extensive numbers. What may be left is a much lesser number and type of existence.

A post-classic era, from 900 AD to 1500 AD, existed as the Toltec state. As nomads, they moved into the Basin of Mexico about 900 AD and established many population centers (e.g., Tula). From 900 to 1200 AD they also migrated to the Yucatan where they again established many centers (e.g., Chichen Itza).

The Mixtecs, in the mountainous W of the Zapotec area, e.g., the Oaxaca Basin, developed after 1200 AD, and began to take over the old Zapotec domain after 1400 AD. With the rise of the Aztecs, after 1300 AD, they were involved in wars with the Aztecs (that is, warring among the Toltecs, the remnants of the old Zapotec rulers, and the Aztecs).

The circumstances of European history (the Spanish intrusions) made the Aztec civilization the best known in Western history. Likely they entered the Basin of Mexico in about 1300, coming into a region which was both populated and had already been involved in a considerable number of great power struggles. In the Aztec state, as an alliance of rulers of Tenochtitlan, Texcoco, and Tlacopan (soon dominated by the first), they grew up perhaps 50 towns and cities in a region of about 50 by 30 km. The island city capital may have had a population of 125,000 or greater, and ruled an empire of perhaps 10 million people. By 1500, like other American precursors, they were a full class society.

The European observer's (and thus the Western tradition) view of the Americas has been highly influenced by the particular slice of cultures encountered at the time of the Spanish conquest. Once this bias is discounted by the wealth of archaeological research, the Mesoamerican culture experiences enrichen, reinforce, and add more color to the story of evolution of phase two and phase three human life. The periodicities of unified cultures and civilizations still remain well within the range already estimated, 500 years, commonly ranging from 300 to 1200 years. Also in some vague sense, Mesoamerican history resembles Near Eastern and East Mediterranean developments, North America resembles Central Asian and Northern European developments, South America resembles African developments, but all these resemblances are weak, very weakly associated with ecological condtions.

Continuing now in the South American story, in the Andean region (half of Colombia, Ecuador through N Chile and Bolivia), following the *Chavin-Kotosh* civilization (through 2.1 Kyp), a complex society existed in the Moche culture in N Peru; also on the altiplano near Lake Titicaca (perhaps in the time frame 1-1.5 Kyp). A powerful state, emanating from near Aiacucho with Huari as its capital, arose in south-central Peru. This was a sizeable city in about 1.2 Kyp.

In this period 2 Kyp – 1500 AD many sizeable units existed in the Andes – kingdoms, states, and empires, with cities of considerable size. Their documentation is as yet marginal. (Examples: the kingdom of *Chimu* on the Peruvian N coast; Chan Chan its enormous capital; the kingdom of Lupaca in the Lake Titicaca region; the Chibcha of Colombia, and the Canari

of Ecuador). Their time scales may been a few hundred to 500 years. In about 1400 AD, the *Incas* brought together much of the Andean area into the largest empire of the New World. It lasted only until the Spaniards. The 3000 year discrepancy was then quickly 'rectified' by a more modern technology.

Highlighting South America (33): that continent can be divided into nine large culture areas. About six of them are worthy of comment. We will confine our remarks to post agriculture and settlement.

Northern and Central Andes

These were the regions of highest cultural development. In an Initial Period, 4-3.4 Kyp, nomadic people had settled and established villages with ceremonial centers. Agriculture, pottery and textiles were in early stages. (Serious settlements began from 5.5-4.5 Kyp and by 4.5 Kyp there were permanent villages. Monumental preceramic sites are found from this time, with huge centers by 4 Kyp; the largest are known in South American from 3.6 Kyp. Examples are Huaricoto, Aspero, El Paraiso. Even though of different style, one could hardly avoid noting the resemblence in monument activity to Europe's, as a comparable phase of life style in a time slot not very different). The Early horizon, 3.4-2.4 Kyp, culminated and is identified with the style of Chavin (Chavin 2.85-2.2 Kyp; Paracas culture 2.6-2.4 Kyp). The following Early Intermediate, 2.4-1.5 Kyp (see for example the Nazca culture 2.37 to 1.55 Kyp) was marked by a number of expanding chiefdoms, illustratively Modisca. The subsequent Tiahuanaco-Huari expansion defines the Middle Horizon, 1.5 to 1.1 Kyp, an imperial administration that may have been a forerunner to the Inca expansion. The Late Intermediate period (900–1476 AD) was represented by an aggressive kingdom (see, for example, the Chimu and their capitol of Chan Chan), which – when the Inca imperialism marched N – were able to confront the Incas with comparable strength, although conquered by them in ca. 1470 AD. In the Late Horizon, 1476–1534 AD, the Incas demonstrated their imperialism. Thus this leading region beyond village life demonstrated chiefdoms in areas outside the Central Andes, and a tendency to form empires in the Central Andes. At the same time, these developments unfolded at characteristic near 500 year epochs. Long distance trade, e.g., between the coast and the sierra, is found back at least to 4 Kyp.

Southern Andes

As civilization led off in the Central Andes, finally starting from a small chiefdom in the Cuzco area, derived from cultures in the Late Intermediate period, they expanded, conquered, built cities, all in a brief period under 100 years (until the Spanish conquest), and built a tremendous *Incan* empire. It stretched more than 3000 km in lenght (from Quito in Ecuador to past Santiago in Chile) and perhaps 500 km wide along the W coast. Obviously even though the period was brief (cut short by an historical accident), it was one of the great world empires.

In N South America, around the Equator, there were three other culture areas: the circum-Caribbean, the Antilles Island and land chain, and the large region of Amazonia.

In the Antilles, one finds villages and chiefdoms (e.g., the Arawak culture). Arawak-speaking people came to the Venezuela delta in the period 3-2.5 Kyp as incipient agriculturists, using manioc as a principal crop. A later, competitive culture was the Carib.

When the Spaniards came, they found communities of 1000 or more inhabitants among circum-Caribbean groups, organized into a hierarchy of chieftains, with top authority over a region beyond his own village. The society was stratified and exhibited considerable patterns of warfare as well as trade.

Such a collection of communities constituted a small civilization, or incipient civilization, not quite at the level of statehood (while many civilizationists require the presence of written language, our tour indicates that this is not an essentially required element. More to the point is that the number of people at their clustered and interactive density should preclude everyone knowing everyone else. The sharper criterion for that seems to be associations of numbers perhaps greater than 2500 to 5000. See (9)).

There are many sites in the circum-Caribbean area. These likely were organized as chiefdoms, over perhaps the extended time scale of 4 Kyp to 1500 AD. A considerable number of culture areas are found in central Colombia, with areas of perhaps a number of 1000 sqkm. None of these areas apparently coalesced sufficiently to produce strongly interacting cultures and civilizations, altough they certainly engaged in trade and warfare. The presence of metallurgy, particularly gold, traded in some of these culture areas, was responsible for much of the thrust behind the Spaniard's search for treasure.

Metallurgy in the New World dates from before 3.5 Kyp, and is to be found in Central America, N Colombia, and the Central Andes (gold, silver, and bronze).

While there were a great number of cultures throughout the rest of these areas, e.g., Amazonia (perhaps derived from the Arawaks), they likely did not get beyond tribal, village, and chiefdom levels (much like the Hopewell), although they did at times interact with the E coastal civilizations. Manioc cultivation may have begun as early as 9-7 Kyp, maize prior to 8.5 Kyp,also other root crops, nuts, pineapple, chili peppers, and beans. Ceramics began at perhaps 4 Kyp. Thus, in some sense intermediate between Europe and Africa, a fairly accommodating village life, without tremendous population density could coexist over an enormous period of time but isolated from explosive civilizations along the West Coast. However such a process was not unitary over such a, say, 7000 year period. Culture areas of perhaps a number of 1000 sqkm could maintain poorly interactive groups of village communities, a network of chiefdoms foreshadowing the kind of stronger network that marked civilizations and states. The success of local cultures, as oral cultures, could not have exceeded the 500 year period found elsewhere. To the disbeliever, these kinds of areas (central plains of Asia, the North American plains, the 'center' – jungles and plains – of South America, Australia, prehistoric Northern Europe) can be studied, via their cultural fragments, for a greater detailing of their post Mesolithic time scales. This very cursory exploration suggests cultures that could make distinct records, but not with traditions each lasting more than a few hundred years. They were too fragmentary.

Since the Spaniards (1500 AD), many other civilizational components have ingathered into the New World to reform its culture-civilizations. None of the newly immigrating components has lasted more than a few hundred years, and it is only the most optimistic that might claim that the conglomerate mixing pot that we call the United States (e.g., beginning in near 1800 AD) will last much more than 300 years. (The most optimistic may hold out for 500 years; the least optimistic 250-300 years).

Australia

Australia was colonized by homo sapiens more than 30 Kyp, which says something about an as-yet-unexplained capability for

very early sea voyaging of some considerable extent (water journeys of perhaps 80–100 km).

Intensive occupation of sites on the SE coast is found from perhaps 6 Kyp. The aboriginal society which emerged, even though without agriculture, developed rather large trade and exchange networks of tribal form.

"In recent times . . . spear points and axe blades were distributed far . . . Mount Wilson in Victoria . . . Arnhem Land. Ochre was quarried . . . in W Australia . . . Other material . . . circulated over wide areas were the narcotic pituri plant . . . wooden tools and weapons and sandstone grinding slabs . . . widely distributed . . . were baler shell ornaments . . . from the Gulf of Carpenteria over distances of 2000 kilometers to the south and west.

"Some of this distribution . . . through . . . individuals or small parties travelling within the confines of their tribal territory; . . . distances of up to 500 km . . . Objects were also exchanged at intertribal ceremonial gatherings, when five hundred people or more, from different tribal territories, might come together . . . In the more arid regions . . . whose populations were consequently obliged to journey far and wide each year in search of food, the catchment area from which the people and artifacts at a single gathering were drawn might be as large as 128,000 sqkm" (13).

While a great number of tribal societies, cultures (e.g., 600) are identified, no civilization arose until very recent times.

Oceania

Modern man is found in Oceania (Micronesia, Melanesia, Polynesia) as early as 26 Kyp, agriculture perhaps 9 Kyp, some long distance trade as early as 6 Kyp, and some rapid spread of some cultures (e.g., the Lapita) by about 3.5 Kyp. Oceania was fully colonized by 1000 AD. The settlement of even remote Oceania all seems deliberate.

A number of cultures are known that exhibited extensive long-distance trade networks, and that had pottery, that practised horticulture as well as fishing, that practised some warfare, that had large (or even quite large) population centers. On these accounts, these probably should be considered civilizations. Their life spans were highly likely all under a thousand years. However, from the point of view of the anthropologist, they were largely still only egalitarian societies. (Most of these problems of identification are similar to those in Africa). Tongan, Samoan, Tahitian societies were stratified, and Hawaii approached primitive statehood. As part of a general theory, one has to surmise that Oceania had exhibited a number of small civilizations, that the relatively short time and the enormous distances, also the technologies available precluded further development. Nevertheless the culture-technology-polity rule of temporal condensation, albeit largely of phase two, holds for this area too.

Modern Polities

Having made a light world tour, roughly speaking from Mesolithic and Neolithic prehistory, through Chalcolithic and even metallurgical (bronze and iron) prehistory and history, up to essentially modern times, and found our temporal rule for unitary coherent condensation to hold essentially with no exceptions, e.g., 500 year average, 200–1200 year variance, for culture, technology, polity, economic system, and ecological suitability, it is appropriate to attempt one final, test, the scale for modern state polities. The scene we can look at is the past 2.5 Kyp, the period, say, from the classic period in Greece (e.g., from 2.5-2.3 Kyp) [8].

Clearly that period is the one most dealt with by the past 2500 years of historians. Any cursory examination of their enormous literature clearly indicates that we are not dealing with a unitary history of thousands (e.g., 2000) of years. Much more common is a depiction and fracturing at the scale of (e.g., "the age of") centuries. But while local political history certainly changes at that scale or even more rapidly (a common catchphrase, compatible with the scaling of the generation, is that polities change their faces about three times per century), one certainly senses that cultures and culture areas persist over periods of hundreds of years. It is worth any reader's time to take a day or two and scan some such magnificent political history of the world like (4).

But how can we present some sort of quantitative measure of the political changes in the world? Loosely (in a western perspective), we have the classic Greek age, the Roman age, the Dark Ages, the Middle Ages, and the modern age. These, we easily recognize are scaled at loosely 500 years (200–1200 years properly covers their variation). But we can focus more narrowly on the modern age, generally recognized as 1500 AD to the present. That age is the age of 'nation'-states [9].

Loosely speaking, the history of western civilization, as it impacts directly on current events, is the 'archaic' period from Charlemagne (800 AD) to the beginning of modern 'nation'-states (1500 AD) in Europe which opens the 'modern' period. The four European 'nation'-states, which existed at that time were Portugal, Spain, England, and France.

In the following 500 year period, there have formed and reformed various 'nation'-states, numbering in the 500 to 1000 range, into what has become one connected ecumene. As of about 1980, for example, there were 165 'nation'-states continuing to undergo considerable turnover in their appearance (on the order of one state per year. For example, examining this issue in the recent few decades, we find that about 1.3 new 'nation'-states appeared per year in 1940, about 2.8 per year in 1960, and about 3.3 per year in 1980 (37)). Thus in 500 years, effectively all the polities in the ecumene have turned over. This is a most telling illustration of what that diffusive process of cultural-economic-political-technological-ecological turnover, as a change in social coherence, is about. As a sharp assessment of that process, it is no accident that we distinguish modern history as beginning 500 years ago, with what we call the Age of Discovery, to be distinguished from something more archaic, more 'ancient' that we identify as an earlier age.

Summary, Discussion, and Conclusions

A light historical tour over the regions of the world seems to justify rather uniform scaling for organized social processes involved in the history of man in permanent settlements, if not also before. That scaling period seems to fall in the range of 200–1000 years, averaging about 500 years. Th kinds of unitary coherence that seems to break down and transform are: *culture* (new ethnic groups, new ways promoted by infiltrating groups, or the diffusion of traditions that transform the culture); *technology* (the cumulative impact of new changing technology transforms the modes of production, and the entire cultural process); *polity* (the outlook of governance, e.g., stratification, group dominance, rule by the one, the few, or the many, transforms drastically); *economics* (through technological changes, availability of materials, changing patterns among trading partners, the mode of production, the rewards, access,

and distribution of resources in the ecological niche transform drastically).

Of course, this scaling requires much more detailed study and justification than we give in this brief paper. Sherratt (with 55 contributors) illustrates a remarkable but still early form of such study. However even such primitively derived results as we have been able to abstract is worthy of theoretical conjectures.

We would see such change as keyed by its number of generations measure, 10–30, averaging about 20 generations. We would see a number of strongly interacting causes, not one, not independent. Without ascribing any significant ordering to these causes, we elect:

Generational change itself:

The biocultural coupling (via a genetic code, but influenced by epigenetic factors of the changing local environment) is not 100% rigid. Thus the fluctuations, from generation to generation, are themselves considerable. One might think that in large groups, such fluctuations would wash themselves out. But this misunderstands the character of the replacement. For example, ethnicities as breeding groups themselves self-evolve, separate out, and last for nearly this kind of scaling. Also, as we see in ethnological studies, we are not only dealing with a rank order of governing status that emerges when individuals reach adulthood, but a group cooperativity within and between ethnic groups that results from mixing and having to lock around two major tasks – trade or war. Loosely, the issue is cooperation or competition. For this entire period of settlement, we find intense peaking of deadly 'quarrels' per generation. Whether in trade *or* war, both require very considerably dichotomous forms of cooperation, and a great deal of energy expenditure. Such so-called 'bang-bang' control (in engineering) is highly stressful on the individual organism *and* its social organization. It is a matter of empirical study to determine the 'fatigue' life of the social system under such high alternating stresses of cooperation and competition. Since it is not applied only to the individual, but appears cumulatively through generations (just as does ethnicity), it is not surprising to find it locked upon a characteristic number or distribution. One surmises that by 2.3 Kyp (cited both by Aristotle and Mencius), some such alternation of state forms was already clear from the prior history of Greek city-states and Chinese states.

Ecology:

Among the various scales of earth processes – weather, hydrology, lithospheric processes themselves – there are the mid-range processes of yearly fluctuations, and the kind of peakings that are known to occur over periods like 50–100 years (e.g., large floods, droughts). These processes tend to fill out the scale that ranges from rapid change, e.g., daily, to the slow changes of say 100,000 year ice age fluctuating processes of the Pleistocene. These mid-range processes have tended to tune and cause resonances in man's biosocial processes, particularly as man has gotten more attuned to a requirement for repeated yearly regularity to maintain large populations and trading nets (e.g., ecological problems of yearly production, storage, and distribution).

In addition, such increase in population begins to put stress on both local resources, and forces more dependence on the reliability of trade nets (and alternation with wars to review dominance or position among such trade nets). It is no surprise that a characteristic turnover should occur in societies seeking new ways to deal with the ecology. For example, it is no surprise that ethnic exoduses take place with appreciable regularity. (Each generation, as it were, assesses its ecological position, not as a group but as a process. A Kondratiev cycle of association of the life of materials and material based systems in the few generation range accentuates such assessment. If your house or your land wears out should you rebuild or move?).

Technology:

Technological change is associated with generational change. However each generation's change does not necessarily create a great deal of social change. Certain changes, or certain cumulations of change finally begin to alter the production forms appreciably. For example, those of us who have lived in the USA since the 1920's have witnessed a fantastic revolution in social organization as a result of the automobile, the refrigerator and fertilizer. The large 'fixed' agricultural population has evaporated. This certainly has been one of the greatest revolutions in the history of mankind, yet most of us are hardly conscious of the change. To lesser degree, such evaporation has also taken place in many other technological areas.

Political forms themselves:

Very possibly at one of the most highly conscious levels, we have the changes in political form that Aristotle identified as the rules of the one, the few, or the many, and that Polybius attempted to identify as taking place with rather strict order (which or course we doubt), with alternations between benign and malevolent forms of each type of rule.

We incline to believe that all large organized forms of polity (rule at a distance from central authority) are basically unstable. Thus it would be no surprise to find characteristic fluctuations to take place among such forms, and 10–30 generations of unified rule would not seem implausible.

We are not opting for a rigid mechanistic oscillator or switch form of such processes as Polybius envisaged. We would view the process as much more like turbulence or tendency toward chaos in hydrodynamic fields. (In fact, we consider society to be such a hydrodynamic field). At a point or time of instability, the next emergent form largely emerges opportunistically. One can study all the history of revolutions to sharpen up that particular view. Whoever is in position, at the time, with some modestly organized resources, and can find some resonant chord in the prevailing (or conflicting) value systems may be able to introduce or enforce a next change. In fact we would consider such change to be the subject of major study by political science based hopefully, in time, upon the guidance of a social physics. (See our general references).

As one final note, we now understand better our hesitancy in ascribing only a single step in the transition from hunter-gatherer to settled agricultural-civilizationist (see, for example, (6,19)). It simply wasn't a single stability transition step. Instead it was two fully distinct steps. From a phase one hunter-gatherer life style a transition was made to a phase two more interactive, slowed, nearly settled in place horticulturist, nomad, pastoralist, village-like, agriculturist tradition based on tribal or chiefdom political life. That lifestyle involved trade nets that might in fact be very extensive in space. It could also involve local wars to some degree. But it wasn't a phase three civilizational life. What made civilization was sufficient neighboring density of cultures crowding in on the local environment so that warfare between polities was forced at the near generational level. That kind of

interaction is what raised the level of political relationship and economic relationship to the forms that we recognize as civilization.

Thus we are proposing a reinterpreted physical format than the Paleolithic, Mesolithic, Neolithic, Chalcolithic technological traditions. That decomposition was a brilliant first decomposition, and we respect it, but now we have to offer a more physicalist view. Man, we submit, developed within the format of three 'states' of matter. At low density (e.g., from perhaps local densities within a handful of hundreds to a few thousand sqkm of 0.015 to 0.3 persons per sqkm) in the form of a collection of bands making up a droplet-vapor or gas-like hunter-gatherer state, man operated typically under dominant hunter-like leadership. This was a pure gaseous-like culture. It lasted, largely, from 40 to perhaps 10 Kyp in the most advanced areas, and to perhaps 1 Kyp in the least advanced areas. Some residues have even coexisted up until the present or near present (there are effectively no more untouched forms). At intermediate densities (e.g., in regions as extensive as a handful of hundreds to a few thousands of sqkm, at densities of 0.3 to 3 persons per sqkm) clustered into perhaps a dozen or two settlements, or more mobile tribes, each involving largely kinship groups of a few hundred, comprising interacting and trading groups of a few thousand, the beginning of such groupings have represented a liquid-vapor state. They have organized politically as tribes and chiefdoms. The basic point that made them fluid-like was that their densities were not so great, particularly as far as a pressure from groups outside them so as to immobilize them and force persistent serious bouts of war. That was the phase two life style, one which was also capable of existing among human beings for a long time, e.g., from 10,000 to perhaps 1,000 years in most areas of the world, and not so forced for many such fragments that they fail to persist. But from the beginning of civilization condensations, starting about 10, ending in most areas by 1 Kyp, and certainly being forced upon the rest of the world between now and the next few hundred years (no more as far as phase one type of life is concerned), phase three life has been forced into a solid-like state with densities, in political fragments of thousands to a few million sqkm, above 3 persons per sqkm (up to perhaps hundreds of persons per sqkm). Here the units are so packed that wars per generation are inevitable among the surround of any polity. Thus these units are forced into sophisticated forms of internal and external trading and external defence. Political form *and* economic form are no longer avoidable.

It wasn't until a very late rereading and reediting of this paper that a more decisive assessment of its message was made clear to the authors. That overall assessment does not trivialize the paper; rather it puts into sharper perspective the great significance of Spencer's positive achievement in calling for and starting up an extensive systematic ethnographic inventory of cultures, and Murdock's attempt to make it as exhaustive as possible. The point at issue is not 'merely' an effort to offer a rudimentary quantification – in the misguided spirit of the physicist – but to arrive at an appreciation of the magnitude of the task. It is more like dating the process and time scale back to the big bang.

Murdock's conclusion (see his introduction) that cultures are independent at separations of perhaps 300 km or 1000 years was a first attempt at a profound characterization of the physical arena of an area of culture. It has the right flavor, and our amateurs' study resultant is still in the same ball park. But the Atlas' conservatism does overestimate the completeness of the required inventory.

Our conclusion, stated earlier as our first tentative inference, based on 'civilizations' (solid state-like, fully trading and warring, collectivities) of about 300 km and 500 year scaling (for the past 10 Kyp of the Holocene) makes the potential number of units requiring study to be about 30,000.

But if the liquid-like state of tribes and chiefdoms, involving areas of a number of thousands of sqkm, and 500 years, was the more common cultural scaling over most of that Holocene era, then the magnitude of the inventory, as we stated, is more like 50,000–200,000 cultural units.

For the reader who wishes to obtain a de novo sense of phase two life styles, we might suggest Osborne (38) for the story of Greek 'cities'; Horton (39) on the long distance Swahili trade net in E Africa; and (33) for its section on the formation and development of the Andean culture-civilization in South America. These sources quite properly emphasize the ecological character of social history, particularly in the important style that we wish to emphasize of phase two life style. We will underscore our final conclusions by dwelling quite specifically on what is to be found in (38).

Osborne, importantly, defines the Greek city as one or more urban centers and their locally supporting countryside (the town is defined as the largest urban village). Hereafter we adopt his notion as providing basic insight into the near universal self-scaling of human condensations. Thus Athens is the urban center of Attica, the city region. Note that such a nearly self-sufficient region is not necessarily a city-state. Such a group of cities can exist and engage in local trade because of their imperfect self-sufficiency. For example, neighbor may borrow from neighbor, or the city may arrange for more extended trade networks. The social network characteristics will emerge from these processes – the relation between urban center and countryside, the population density, the need for reciprocal and market trade. All three of the references, chosen only because they stress the ecological-geographic character of these phase two social processes, picture such life. The dominant social forms over very long periods of time are tribal, chiefdom, and moving toward small kingdom organizations. The social pressure tends to grow particularly as middling population densities are achieved and require the exploitation of resources at higher densities and concentrations (one may begin to grasp the pressure that existed in classical Attica with an area of 2500 sqkm and a population of 100,000 with its insecure source of its major crop of corn).

There is considerable merit in dwelling on the transition in Greece from the liquid-like city and its countryside to the plasticsolid 'city'-state, not for the evolution of specific political details but for its general implications as ecological history in the style of Braudel. In this context, it is not different from the development of the Andes culture, the North American cultures, Oceania, the African history, or Asian history. Its virtue is that we can more nearly detail its records almost from written history. Its defect is that it leaves us with the misimpression that it, our western history, was very unique.

What became the Classic Greek era, with its characteristic 'city'-state organizations, began after the destruction of the Mycenean civilization. Thus we are not dealing with a pristine development. (This is the Late Helladic period ca. 3.6-3.1 Kyp). ". . . a protracted series of migrations and invasions, beginning rather before [3.2 Kyp], afflicted the whole of the Near East, including Greece, Asia Minor and the Levant. Little is known about the origin or national composition of the invaders . . ." (Sealey (40)). In a few generations, Late Helladic civilization was destroyed. Henceforth for a long time Greece was a land of villages and hamlets, with a much smaller population than before. These migrations lasted a long time; perhaps by about 2.9 Kyp settled conditions began to emerge. In later Greek tradition, the invaders were called the Dorian Greeks. Actually

the peoples and their languages were a mixture of these invaders and older peoples who had migrated a millenium earlier, about 4 Kyp (Aeolians, Ionians, Arcado-Cyprians). In the historical period, people recognized themselves as Dorians and Ionians, involving a fiction of common origins and customs. But effectively there was no *political* transfer over the Greek dark ages of about 3.15-2.75 Kyp. So we wish to confront that somewhat pristine 'new' age, perhaps 2.9 to 2.5 Kyp. For this we transfer our attention to Osborne. (Sealy tends to be misleading, not wrong but mesleading. For example, he states: "Within the pols [cities] early in the archaic period public authority was weak and political institutions were rudimentary." This is a valid statement, but its concomitent has to be that in the Greek region, its 'cities' were *not* 'city-states'. Thus, in fact, it is only Osborne who clearly identifies that we are dealing with a different kind of organization than a political state. As we shall attempt to indicate, it is in this type of organization, very generally, that we find the 'liquid' state of social organization. In a modern social science sense, it has only rudimentary polities and economics).

Politics, in our modern sense, likely begins in Archaic Greece as a result of increasing conflict among these cities, and loosely culminates with the formation of (using a modern term) the Peloponnesian League, arising from a series of bilateral treaties between Sparta and other cities. "The alliance with Tegea was probably the first of these and launched Sparta on the course of winning allies instead of absorbing territory, as she had done in the 7th century. But at some time the bilateral treaties were replaced by a multilateral agreement; this bound all members of the League to accept any decision reached by a majority at a federal congress, to which the several member states would send deputies. . . . [this occurring late in the 6th century]. . . . [This Peloponnesian League] was a lasting organization. . . . But it did not arise from mere local ties reinforced by a belief in common descent; it was an artificial creation, brought into being by political power. A league of this kind was a new experiment among the Greek city-states; there would be further attempts to found such leagues and they would draw on the experience of the Peloponnesian League" (40). We submit that in this near 400 year period we can obtain a very definite idea of what constitutes the liquid-like state of post-Mesolithic (including post-Neolithic) human society. As we shall see, as a settled or near settled relatively dense interactive form, it existed in many parts of the world (as tribes, chiefdoms, kingdoms, and other rudimentary forms of political-economic organization within a cultural solvent) for periods up to a number of millenia, periods over which further expansion into land areas had ceased, population density grew perhaps from a few persons per sqkm to tens of persons per sqkm. At these transitional densities, one expects there to be sufficient social pressure – from the peripheral 'outside', or from the ferocity of internal conflict – that war and 'hard' market economics become characteristic forms of behavior, whereupon 'hard' political forms also emerge within the culture and a solid-like state emerges. In Greece this becomes the hard 'city!-state organization. It arises, with growing density, both from internal warring and the external threat of the Persians.

But we ask that the specific detailed 'cultural-political-economic' story of Greece and its specialized environment be overlooked. It tends to prejudice our preconceptions of specific political forms. We need to look at the composite forms of all liquid-states, e.g. the pre-civilizations of the Andes, of Mesoamerica, of North America, of Africa, of Asia, of Oceania, before achieving a sense of the generality of that intermediate state. Greece only serves as a starting point for study because we have a reasonable history of the state there.

So, if we start from Osborne, we find the following notion defined three times – in Greek times themselves, by the classical scholar Louis Robert, and by Osborne forty years later.

"It is necessary to repeat, time and time again, that it is no good being interested simply in the site of an ancient town. An ancient city must always be considered along with its territory, its fields and its forests, which fed it and on which a part of its population lived. The territory cannot be separated from the city. It is always vital to study the territory and to recover its boundaries" (Robert, quoted in Osborne).

Because of the concentration of both the Greeks themselves and Classical scholarship, the countryside has always been neglected. "Twenty years ago [Osborne's] book would have been largely inconceivable" (38).

In Osborne, ". . . 'city' is used to refer to the independent political unit of town and territory: it does not mean 'urban unit'. 'Town' is used to refer to the largest settlement in the city, even if in absolute terms that settlement would normally be reckoned only a small village. This systematic use of 'city' and 'town' is in fact alien to Greek usage, in which the word used for town and territory, *polis*, was also used to refer to the town alone. . . . The territories of various Greek cities were referred to by special terms derived from the name of the town: Thus Attica refers to the territory of Athens, Laconia to the territory of Sparta, and the Argolid to the territory of Argos."

In a territory of perhaps 75,000 sqkm (the Greek peninsula) there were perhaps 50 such cities, namely an average area of perhaps 1500 sqkm, involving an average separation of perhaps 50 km. Attica, as a fairly large city had an area of about 7500 sqkm, and – in Classic times – a population of perhaps 150,000.

Osborne describes the rudimentary form of economics and politics in these cities. "For some cities political decision outside their own control were as important as their own choices. Every city aimed at self-sufficiency, but few suceeded. Many cities needed not just food from outside, but also military help and protection from or against more powerful neighbours or imperial cities. These needs created pressures which were reflected both in the political organization and in the settlement pattern. In the 5th century one major source of such pressures was the Athenian empire. After the great war against the Persians the Athenians took the lead in a League of Greek cities . . .". [And conversely, the pressure was not high much before the end of the 6th century].

In earlier than the Classic period (2.4 Kyp), warfare consisted basically of raids on neighbor's territories. Such raids had to be fitted in with the seasonal farming schedule. "These raids do not try to gain control of the disputed territory; they aim directly at the agricultural wealth of the region. [Recall that Greece was not a particularly wealthy region]. The border dispute[s] provide an excuse for a sheep-raid. Warfare like this, consisting of raids, was the perfect complement to farming. Gaining agriculture supplies by raiding was an alternative to farming, a way of making up deficiencies in one's own supplies. . . . The farmer had to be central both to political decisions and to military activity. [Even in Classic times] the matters that top the agenda of the Athenian assembly ten times a year were the corn supply and the defense of the territory. Both of these issues put the countryside at the center of the political stage."

Thus we understand the liquid state: a fluid countryside which supports and is in near equilibrium with a number of denser 'town' population concentrations, surrounded by only modestly threatening similar units. The total population density is in the few to tens of persons per sqkm range. It will only precipitate into a solid-state of strong political and economic

form when the density is high and the threat from interacting with outside requires a more solid-plastic state form.

How long can the liquid state last? Quite a number of 500 year epochs until the population density grows precipitously locally and/or the peripheral threat from outside becomes too pressing. In the Greek case, it was likely the relative poverty of the land resulting in a considerable amount of internal or local bickering, and the near centrality of location to Near Eastern pressures that resulted in such a 'short' (400 year) transformation from liquid to 'plastic' (liquid-gel)-solid-like state, 'city'-state, organization. (As compared to other regions where liquid-like states even persisted for millenia, with lives perhaps up to 5–10 millenia).

Drawing the Greek illustration toward an end: "The traditional pattern of Greek warfare was a pattern of wars being fought by forces of limited size which had limited aims [neighborhood raids] . . . Changes in the pattern of war between Greeks began only after the great war against Persia. . . . The changing aims of warfare altered the priorities for defense. . . . When wars had openly political aims the defense of the town, the political center had to come first. . . . From the 5th century on seige operations became frequent. . . . Political disputes about defense are [still] virtually unheard of in the 5th century. . . . In the traditional strategy war never came near the town . . . [later t]he spoils of victory were the control of the town. . . ."

Thus, in general, the need for more complex political organization would depend primarily on how much external intrusion might take place and the growing size (population or area) of a simpler more liquidy polity. The intrusions could depend on a considerable number of factors, e.g., the value systems of infiltrating neighbors, long range intrusion from afar. Then the development of long range trade and war would ultimately begin to force the appearance of higher ordered organization if local growth and bickering did not. As can be seen in the Swahili corridor or in the Andean evolution, one would see emerging forms of higher political organization taking place over thousands of km, or more compactly in the Greek 'city'-state case.

The major continuing and shaping local ingredients remain: local supply and trade, diffusion of ethnicity and other local sources or attacking incursions, and long range trade. When a local 'city' structure begins to emerge (the urban center and its surrounding countryside), one begins to suspect that such structures are found locally in the tens of km diameter range. That is, they are more nearly fixed structures that replace the mobile hunter-gatherer roaming range at increasing density, e.g., in the tens of persons per sqkm range), they have to emerge near self-sufficiency. What emerges in detail depends on external conditions: e.g., climate, ecology, the degree of strength of attacking incursions or other long range forces. Without incursions, the organization tends to remain almost tribal, a connected network of network relations, commonly only with leadership by group elders. There are few leadership crises that can't be so handled. With considerable external incursions, or growing internal friction inside with no place outside to go, individual strong leadership has to emerge, by chiefs, or kingship or similar organization. As shown very clearly in the Swahili corridor case, outside processes can polarize greater organizational forms, e.g., long range trade in luxury goods. And then beyond, lies phase three life.

Of course the point of finally stumbling upon a three state social physics that depends upon short, medium, and long range processes and forces, indicates that we have likely reached the correct track for a scientific physics of society.

"Physics, after all [as must be equally true for a social physics] is an experimental science."

References

1) Iberall, A.; Wilkinson, D.: Human Sociogeophysics – Phase 1: Explaining the Macroscopic Patterns of Man on Earth. GeoJournal 8, 2, 171–179 (1984)
2) Iberall, A.; Wilkinson, D.: Phase 2: The Diffusion of Human Ethnicity by Remixing. GeoJournal 9, 4, 387–391 (1984)
3) Martin, P.: Clovisia the beautiful! Nat'l Hist., 10–13 (Oct. 1987)
4) Barraclough, G. (ed.): The Times Atlas of World History. Hammond, Maplewood, NJ 1984.
5) Iberall, A.; Wilkinson, D.: Human Sociogeophysiscs – Phase 2 (cont'd): Criticality in the Diffusion of Ethnicity Produces Civil Society. GeoJournal 11, 2, 153–158 (1985)
6) Iberall, A.: Contributions to a physical science for the study of civilization. J. Social Biol. Structures 7, 259 (1984)
7) Hamblin, D.: The First Cities. Time-Life, NY 1973.
8) Iberall, A.; Soodak, H.: Physical basis for complex systems – some propositions relating levels of organization. Collect. Phenom. 3, 9 (1978)
9) Murdock, G.: Ethnographic Atlas. Univ. Pittsburgh, Pittsburgh, PA 1967.
10) Mellaart, J.: Earliest Civilizations of the Near East. McGraw-Hill, NY 1965.
10a) Moore, A.: The Neolithic of the Levant. Vols. I, 2, Univ. Microfilms International, Ann Arbor, MI 1987.
11) Aikens, C.; Higuchi, T.: Prehistory of Japan. Academic Press, NY 1982.
12) Clark, G.: World Prehistory in New Perspective. Cambridge U. Press, Cambridge 1977.
13) Sherratt, A. (ed.): The Cambridge Encyclopedia of Archaeology. Crown Publishers, NY 1980.
14) Chard, C.: Northeast Asia in Prehistory. U. Wisconsin Press, Madison 1974.
15) Chang, K.: The Archaeology of Ancient China. Yale U. Press, New Haven 1986.
16) Hassan, F.: Demographic Archaeology. Academic Press, London 1981.
17) Kenyon, K.: Archaeology in the Holy Land. Norton, NY 1979.
18) Fried, M.: Tribe to state or state to tribe im ancient China. In: Keightly, D. (ed.) The Origins of Chinese Civilizations. Univ. Calif. Press, Berkely, CA 1983.
19) Iberall, A.; Soodak, H.; Arensberg, C. In: Ruel et al. (eds.), Perspectives in Biomechanics. Vol. 1. Harward Acad., NY 1980.
20) Renfrew, C.; Cherry, J.: Peer Polity Interaction and Socio-Political Change. Cambridge U. Press, Cambridge 1986.
21) Hawkes, J.: The First Great Civilizations. Knopf, NY 1973.
22) White, J.: Discovery of a Lost Bronze Age: Ban Chiang. U. of Pennsylvania, Univ. Museum, Philadelphia 1983.
23) Curtin, P.: Cross-Cultural Trade in World History. Cambridge U. Press, Cambridge 1984.

24) Clark, G.; Piggott, S.: Prehistoric Societies. Penguin, London 1970.

25) Benedict, P.: Austro-Thai Language and Culture with a Glossary of Roots. HRAF Press, New Haven 1975.

26) Howell, J.: Early farming in northwestern Europe. Sci. Am. 257, 118 (1987)

27) Milisauskas, S.: European Prehistory. Academic Press, NY 1978.

28) McEvedy, C.: The Penguin Atlas of Ancient History. Penguin, Baltimore MD 1967.

29) Blegen, C.: Troy. Praeger, NY 1963.

30) Cotterell, A.: The Minoan World. Scribners, NY 1979.

31) Wells, P.: Europe's first towns and entrepeneurs. Archaeology 39, 26 (1986) – Wells, P.: Farms, Villages, and Cities: Commerce and Urban Origins in Late Prehistoric Europe. Cornell Univ. Press, Ithica, NY 1984.

32) Denbow, J.; Wilmsen, E.: Advent and course of pastoralism in the Kalahari. Science 234, 1509 (1986)

33) Coe, M.; Snow, D.; Benson, E.: Atlas of Ancient America. Facts on File, NY 1986.

34) The World of the American Indian. Nat'l. Geog. Soc., Washington, DC 1974.

35) Polanyi, K.; Arensberg, C.; Pearson, H. (eds.): Trade and Market in the Early Empires. Free Press, Glencoe, IL 1957.

36) Matheny, R.: El Mirador: An early Maya metropolis uncovered. Nat'l. Geog. 172, 317 (1987)

37) Iberall, A.; Cardon, C.: Physical science modeling of social processes. General Technical Services, Inc. report to Dept. of Transportation, Cambridge, MA 02142; report no. DTRS57-81-P-80357, March 1981.

38) Osborne, R.: Classical Landscape with Figures: The Ancient Greek City and its Countryside. Sheridan House, Dobbs Ferry, NY 1987.

39) Horton, M.: The Swahili corridor. Sci. Am. 257, 86 (1987)

40) Sealy, R.: A History of the Greek City States, ca. 700-338 BC. Univ. Cal. Press, Berkeley 1976.

Other General References

The following references generally have extensive pertinent bibliographies. The list we have provided are some of the books that gave us an introductory picture to man's social history. If we were asked to offer a very minimal reading list, it might consist of: Hawkes' The Atlas of Early Man, Sherratt's The Cambridge Encyclopedia of Archeology, Darlington's The Evolution of Man and Society, and Barraclough's The Time Atlas of World History. Oh, yes, one should first leaf through all the pages of the Times-Life series on The Emergence of Man, and . . .

Time-Life Series: The Emergence of Man, 20 vols. Life-Time, NY 1973–1974.

Klein, R.: Ice-Age Hunters of the Ukraine. Univ. Chicago Press, Chicago 1973.

UNESCO Series: History of Mankind, 6 vols. UNESCO, NY 1965–1970.

Hawkes, J.: The Atlas of Early Man. St. Martin's Press, NY 1976.

Peoples and Places of the Past. Nat'l. Geograph. Soc., Washington, DC 1983.

Bibby, G.: Four Thousand Years Ago. Knopf, NY 1963.

Streuver, S. (ed.): Prehistoric Agriculture. Natural History Press, NY 1971.

Flannery, K.: The origins of agriculture. Ann. Rev. Anthropology 2 (1973).

Muhly, J.: Copper and tin: the distribution of mineral resources and the nature of the metals trade in the bronze age. Trans. Conn. Acad. Arts and Sciences. New Haven 1973.

Rouse, I.: Migrations in Prehistory. Yale Press, New Haven 1986.

McC.Adams, R.: The Evolution of Urban Society. Aldine, Chicago 1966.

Time-Life Series: Great Ages of Man, 17 vols. Life-Time, NY 1967.

Darlington, C.: The Evolution of Man and Society. Simon & Schuster, NY 1969.

McNeill, W.: The Rise of the West. Univ. Chicago Press, Chicago 1963.

Lamberg-Karlovsky, C. (ed.): Ancient Civilization and Trade. Univ. N. Mex. Press, Albuquerque, NM 1975.

Norman, A.; Pottinger, D.: A History of Man and Weapons, 449–1600. Thomas Crowell Co., NY 1966.

Johnstone, P.: The Sea-Craft of Prehistory. Harvard U. Press, Cambridge 1980.

Service, E.: Origins of the State and Civilizations: The Process of Cultural Evolution. Norton, NY 1975.

Naroll, R.: Imperial cycles and world order. Peace Research Society 1, 83 (1967)

Two general references that can serve as an introduction to our social physics, both to its general field theory, its spectroscopy, and to an earlier history of social physics, are:

Iberall, A.: Outlining social physics for modern societies – locating culture, economics, and politics: The Enlightenment reconsidered. PNAS 82, 5582 (1985)

Iberall, A.; Wilkinson, D. In: Modelski, G. (ed.), Exploring Long Cycles. Lynne Rienner Publishers, Boulder, CO 1987.

The following is our bibliography of regional history:

Near East

Lloyd, S.: The Archaeology of Mesopotamia. Thames & Hudson, NY 1984.

Roux, G.: Ancient Iraq. Allen, Unwin, London 1980.

Kramer, S.: The Sumerians. Univ. Chicago Press, Chicago 1963.

Anati, E.: Palestine Before the Hebrews. Knopf, NY 1963.

Sandars, N.: The Sea Peoples. Thames & Hudson, London 1979.

Oates, J.: Babylon. Thames & Hudson, London 1978.

Macqueen, J.: The Hittities. Westview Press, Boulder, CO 1975.

Cook, J.: The Persian Empire. Schocken Books, NY 1983.

Kohl, P. (ed.): The Bronze Age Civilization of Central Asia. M. E. Sharpe, Armonk 1981.

Indus Valley

Wheeler, M.: The Indus Civilization. Cambridge Univ. Press, Cambridge 1968.

Possehl, G.; Rojdi, L.: The investigation of a prehistoric town in India. Am. J. Arch. 90, 467 (1986)

China

Treistman, J.: The Prehistory of China. Natural History Press, NY 1966.

Keightly, D. (ed.): The Origin of Chinese Civilization. Univ. Cal. Press, Berkely, CA 1983.

Gernet, J.: A History of Chinese Civilization. Cambridge Univ. Press, London 1982.

Europe

Pigott, S.: Ancient Europe. Aldine, Chicago 1965.

van Doren Sterne, P.: Ancient Europe. Norton, NY 1969.

Shennan, S.: Central Europe in the third millenium BC: An evolutionary trajectory or the beginning of the Bronze Age. J. Anthrop. Arch. 5, 115 (1986)

Renfrew, C.: Shennan, S.: Ranking, Resource and Exchange: Aspects of the Archaeology of Early European Society. Cambridge U. Press, Cambridge 1986.

Wolf, E.: Europe and the People without History. U. Cal. Press, Berkeley 1982.

Herm, G.: The Celts. St. Martin's Press, NY 1975.

Oxenstierna, E.: The Norsemen. NY Graphic Soc., Greenwich, CT 1965.

Dudley, D.: The Romans, 850 BC-AD 337. Knopf, NY 1970.

Barraclough, G.: The Crucible of Europe. Univ. Calif., Berkeley, CA 1976.

Cochrane, E.: Florence in the Forgotten Centuries, 1527–1800. Univ. Chicago Press. Chicago 1973.

Asia

Phillips, E.: The Royal Hordes: Nomad Peoples of the Steppes. Thames & Hudson, London 1965.

Grousset, R.: The Empire of the Steppes. Rutgers Univ. Press, New Brunswick, NJ 1970.

Pacific Science Congress: Southeast Asian Archaeology: Origins of Agriculture; Metal and the State. Berkeley 1983.

Kohl, P.: The balance of trade in SW Asia in the mid-third millenium BC. Curr. Anthrop. 19, 463 (1978)

Africa

Clark, J.: The Prehistory of Africa. Praeger, NY 1970.

Murphy, E.: History of African Civilization. Delta, NY 1972.

Megaw, J. (ed.): Hunters, Gatherers, and First Farmers Beyond Europe. Leicester U. Press, Leicester 1976.

Wendorf, F.; Schild, R.: Prehistory of the Nile Valley. Academic Press, NY 1976.

Hoffman, M.: Egypt Before the Pharoahs. Knopf, NY 1979.

Greek

Renfrew, C.: The Emergence of Civilization: The Cyclades and the Aegean in the Third Millenium, BC. Harper & Row, NY 1973.

Chadwick, J.: The Mycenaean World. Cambridge Univ. Press, London 1976.

Taylour, W.: The Mycenaeans. Thames & Hudson, NY 1983.

Ward, A.: The Quest for Thesus. Praeger, NY 1970.

Hopper, R.: The Early Greeks. Harper & Row, NY 1976.

Islam

Lewis, B. (ed.): Islam and the Arab World. Knopf, NY 1976.

Americas

Sanders, W.; Marino, J.: New World Prehistory. Prentice-Hall, Englewood Cliffs, NJ 1970.

Farb, P.: Man's Rise to Civilization: The Cultural Ascent of the Indians of North America. Dutton, NY 1978.

The World of the American Indian. Nat'l. Geographic Soc., Washington, DC 1974.

Adams, R.: Prehistoric Mesoamerica. Little, Brown & Co., Boston 1977.

Van Hagen, V.: The Ancient Sun Kingdoms of the Americas: Aztec, Maya, Inca. World Publ. Co., Cleveland, OH 1961.

Hardoy, J.: Pre-Colombian Cities. Walker & Co., NY 1973.

Soustelle, J.: The Olmecs. Doubleday & Co., Garden City 1984.

Oceania

Bellwood, P.: Man's Conquest of the Pacific. Oxford Univ. Press, NY 1979.

Australia

Peterson, N.: Tribes and Boundaries in Australia. Humanities Press, NJ 1976.

Allen, J.; Golson, J.; Jones, R. (eds.): Sunda and Sahul: Prehistoric Studies in SE Asia, Melanesia and Australia. Academic Press, London 1977.

Arctic Region

Giddings, J.: Ancient Men of the Arctic. U. Wash. Press, Seattle, WA 1985.

[1] We have to confront the detail of the last of such large scale expansions, which seems to have been the expansion into the Americas, a still not perfectly settled issue. While we are completely in sympathy and generally in accord with the arguments and notions of Paul Martin (3), nevertheless we believe he overstates his case. If we take our modeling (1,2) as a basis for discussion, we obtain a more conservative depiction of that expansion, yet one which is in the spirit of his work and which takes care of a study detail, one of many, which would otherwise interfere with the flow of ideas we are trying to present.

Martin claims a population doubling time of about 20–30 years in the Americas as feasible. As we shall show, we would believe a doubling time of perhaps 150 years as more plausible. While it still leaves a net Malthusian constant (the net growth of population – the difference between birth and death rates, having first taken care of immigration) that was 'explosive' for pre-Neolithic times, nevertheless as part of an expansion into a pristine, perhaps 'Eden-like' region (following an expansion from cold N climates into what had to be a hunter-gatherer's paradise), it can be imagined as conceivable.

So we accept and start from an initial expansion into the Americas about 12 Kyp (not necessarily the first and only human intrusion into the Americas, but the one that 'took', as the final large expansion of man into his total habitat. As Barraclough (4) points out, this terminal expansion was only possible after 12 Kyp). And we assume that a significant expansion took place over the 'axial' length of the Americas (about 15,000 km) in perhaps 2,000 years (In our modeling, this would be quite rapid, for we have estimated a nominal propagation rate of about 1.7 km/yr. However the situation may be more like a pristine 'convection' along the axial path – the gradients of temperature and unhunted game may have been the powerful convective drive – whereas the off-axial 'lateral' path may have been more nearly diffusive. This is like the diffusion of a chemical dye introduced along a streamline in a laminar or turbulent liquid flow field in which the dye is driven convectively axially and diffuses laterally. Thus in some averaging sense, the overall mixed expansion may not have been so markedly different from 1.7 to 3 km/yr, rather than, say, the axial near 8 km/yr. In any case, such modeling is more moderate than Martin's assumption of a strong convective drive towards the South American tip in 1,000 years).

If we then assume our nominal hunter-gatherer occupancy of perhaps 50 people per 5000 sqkm, we would thus except a nominal population (in 50 million sqkm) at the end of 2,000 years of about 500,000. Further if we assume a startup from a band of perhaps 100 people, then we can estimate the net Malthusian constant

$$P = Po\,[\exp(\text{lambda } t)]$$
$$\text{lambda} = \ln(P/Po)/t$$
$$= \ln(500{,}000/100)/2000$$
$$= 0.004 \text{ per year}$$

This represents a doubling time of about

$$t = \ln(2)/\text{lambda}$$
$$= 140 \text{ years}$$

Except for such a quite rapid initial startup (12-10 Kyp), one may say that the story of the Americas, as the terminal event of man's unmixed diffusion, decays toward the common background for the rest of man's world habitat. The expansion into the N Eurasian tundras was an event which quite possibly took place a few millenia earlier, loosely speaking as an accompaniment to the N shrinkage of the earth's glacial regions as the end of the last ice age began.

[2] In Hamblin (7), it is noted that "In Mexico, for instance, prehistoric people domesticated at least 10 types of food plants, including maize, by about [7 Kyp] and yet never settled into towns. They kept right on refining the agricultural process, and being semi-nomads, for another 3500 years. Similarly, in the areas that are now Thailand, Vietnam and China . . . But [continuing a query as to what new organizational forms might arise] if agriculture was not the necessary and sufficient key to give rise to cities, what was?" As we have suggested (5), density itself became the factor to be dealt with. Past the end of the last ice age 12 Kyp, the ecological balance was stable and rich for man in the Near East. Man's numbers increased. "The choice was either to fight the neighbors [for land] or to join them. All the territory was occupied lightly but permanently. One solution was to congregate to form a cluster in some particularly fortunate niche. These were places where land and climate favored intensive food gathering or food production . . ." (7). One notes, thus, that a life style, at least partly nomadic, certainly was one of the most common new intermediate states. One should also note that among birds, fish, and quite a few mammals, a 'nomadic' life, differing seasonally in breeding epochs, has been practised over geological time scales. Such fluctuating space scales are not unusual among a great variety of living forms for their social organization when their local density is increased.

[3] Apropos of that statement, we also would not be surprised, say, to find or to have found various startups and aborted attempts at agriculture and settlement in such a period as 15+/−5 Kyp or perhaps even more narrowly 15+/−3 Kyp. In fact there exists evidence that a number of such events likely took place, e.g., in Egypt, in China, in the Levant (10a), in Japan, and in SE Asia.

[4] Densely distributed riverine settlements of thatched roof wattle and daub houses in the Kwang Ho/Wei River basin, practicing slash and burn agriculture at this time, shifted after short periods of occupancy, but were recurrently occupied. The population density of such an early farming village in China in 8 Kyp, with 2 ha (5 acres), 35 houses and a population of 400 might be comparable to Jericho in 9500 ybp with 4 ha (10 acres) and perhaps 300−600 people (extrapolating from Hassan (16)) − but the Chinese village, although semisedentary, would have a denser surrounding population. 1500 years later, the Chiang-Chai farming village of ca. 6 ha (15 acres) and 100 houses is again of similar size to the comparable later phase of Jericho with perhaps 1,500 people (Kenyon (17) estimates the capacity of the town by modern density levels to be 2,000); again, the latter is more nucleated but less densely surrounded.

[5] In (19), it was pointed out that isolate island populations in a few thousand sqkm do not continue to thrive for very many generations, and that even an island population isolated in an area of 64,000 sqkm regressed very seriously in what had to be a major technology of fishing techniques within a period of perhaps 5,000 years. Obviously based on a very limited data sampling, nevertheless it was possible to propose some general sort of size-life scaling in earth habitats. Japan with an area of about 370,000 sqkm, but narrowly confined, could similarly be expected to exhibit certain kinds of regression in any periods in which it suffered isolation. And, perhaps conversely, one might expect great outbursts of vigor whenever it opened up to a largerr world. We believe that a similar tendency can be found in all other narrow strip cultures in the world.

[6] To the student seeking to acquire greater expertise, in particular to comprehend Asia, we might refer him to an examination of the literature that supports the following pictures in (13):

lower Paleolithic sites	(Fig 11.3)	1 Myp
middle Paleolithic sites	(Fig 12.1)	40−100 Kyp
Pleistocene sites	(Fig 11.4)	15−50 Kyp
late Pleistocene sites	(Fig 13.1)	10−40 (e.g. 20) Kyp
vegetation origins	(Fig 21.1, 21.2)	3−18 Kyp
spread of agriculture	(Fig 15.5)	7−10 Kyp
climate, post-Glacial	(p. 101)	as of 10 Kyp
prehistory	(Fig 38.1. 38.2)	7.5−2 Kyp
Bronze Age, E Asia	(Fig 23.2)	5−8 Kyp
migrations	(Fig 38.3)	500 BC-1300 AD
forest cultures SE Asia	(Fig 42.1)	500 BC-0 AD
Chinese empire	(Fig 37.2)	as of 2 Kyp
prehistory-forest zone	(Fig 49.2)	7.5−2 Kyp
cities, SE Asia	(Fig 40.2)	as of pre-1200 AD

Also Fig 64.14 (6 Kyp); 64.15 (agricultural spread); 64.16 (6 Kyp); 64.18 (4 Kyp); 64.19 (4-3 Kyp); 64.20 (3 Kyp); 64.23 (2.5 Kyp); 64.25 (3 Kyp); 64.26 (1 AD); 64.29 (1.5 Kyp); 64.32 (1000 AD); 64.35 (1500 AD).

[7] It has been argued that Chinese borrowed its words for copper, tin-lead, and iron from Austro-Thai (Benedict (25)), and it is both plausible (22) and consistent with the earliest bronze artifacts in China that the metallurgical technology was borrowed too.

[8] A Brief Review of Growing Settlement Size
It is of some modest interest to note the growth of settlement size for the condensed phase of man's existence. Some salient examples are [time, size, settlement, houses, people, place]:

9.5 Kyp, 4 ha (10 acres), Jericho, 50? houses, 600? people, Pelestine;
8.4 Kyp, 2 ha (5 acres), P'ei-li-kang, 35?, 400?, China;
8 Kyp, 4.5 ha (11 acres), Jericho, 100?, 1500?, Palestine;
8 Kyp, 13.4 ha (33 acres), Catal Huyuk, multistory, 6000, Anatolia;
5.5 Kyp, 20 ha (50 acres), early Uruk, town & ziggurat, 6000?, Mesopotamia;
5.5 Kyp, 30 ha (75 acres), Ta-ho-ts'un, 440 houses, 6000?, China;
4.8 Kyp, 400 ha (1000 acres), Uruk, 50,000, Mesopotamia;
4.5 Kyp, 18 ha (44 acres), Ch'eng-tzu-yai, walled, stratified lineages, China;
4.5 Kyp, 80−100 ha (200−250 acres), El Paraiso, 3,000−4,000, Andes;
4 Kyp, Mohenjo-Daro, 40,000, India;
4 Kyp, Harappa, 40,000, India;
3.2 Kyp, 24 sqkm, Yin (An-Yang), 300,000?, China (Shang);
2.4 Kyp, 16 sqkm, El Mirador, tens of thousands, Yucatan;
1.5 Kyp, 20 sqkm, Teotihuacan, 125−250,000, Mexico;
1.2 Kyp, Tikal, 100,000, Yucatan;
1000 AD, Cohokia, 20,000, Illinois.

[9] We note that while states refer to polities, nations originally referred to ethnicity. Thus the usage *nation-state* is a misnomer even if now conventional. Thus our continuing use of quotation marks. This will be seen as more than merely pedantic when our subsequent discussion on the city-state is offered. As we shall see, the heart of the issue of phase three political life will become involved.