Ancient Egypt Before Writing: From Markings To Hieroglyphs

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Following the disastrous defeat of the Japanese naval forces at the Battle of Midway the head of the Nakajima Aircraft Company drew up a new battle plan. He clearly understood that the enormous industrial capacity of America would soon make Xlibris Corporation. There is no question about the millennium in which the first state formation systems occurred in the Mesopotamian world.

Although dates are relative, the fourth millennium BCE saw the emergence of Susa and Warka as centers of those systems. The millennium for the emergence of the Egyptian state is more or less accepted as also the fourth millennium BCE.

Although it is in question still in which part of the four millennium BCE the Egyptian state may have developed. At the time when Susa and Elam witnessed their first states, their counting and communications systems were being developed from tokens to impressed tablets in order to convey information by markings.

These markings were also used to identified merchandise, ownership and provenance of goods. En Egypt, this system of markings has been found in Predynastic pots, labels and seals of Dynasty 0 Bard, The origin of Egyptian writing has been the subject of several studies Fairsevis, Arnett, Fischer, some of these scholars have hinted at the possibility of Mesopotamian influence in the development of Egyptian writing.

Others have indicated that this invention may have facilitated the state formation in Egypt. However the latest excavations in Abydos and its environments by Gunter Dreyer have uncovered lots of engravings on pots and labels and tags on wine jars, showing that these markings were
Indeed a form of rudimentary writing already in use Dreyer, An attempt will be made here to correlate and coordinate all data to the possibility that the invention of writing contributed to the pristine state formation in Ancient Egypt.

Egypt, the State and the Graffiti Pot-marks Royal writing in Egypt may have been one of the consequences of state formation in Egypt, since its invention and use may have helped to legitimize and early unstable state.

A time of instability during which writing may have served the function of legitimizing the new regime. Instead writing was used as an additional specific pictorial message, while elaborated and general pictorial representation and symbolism was not writing Bard adds that hieroglyphs of Dynasty 0 were used to caption political information portrayed pictorially with writing, specifying the meaning of graphic art and that contra Baines, who asserts writing needed representation to explain statements and ideology; hieroglyphic signs are part of an elaborate system representing a compelling centralization and power of the king However, Gunter Dreyer findings at Abydos, such as mud seals, similar to those of Mesopotamia and dating from Dynasty 0 and protophi- signs and tags on jars, have prompted him to say that the expansion and consolidation of the Egyptian state may have occurred before Dynasty 0.

In this way, an increasing administration would have used writing to help to order and control. These marks on pots were made with a sharp instrument before firing. A system of markings used all over Egypt for more than three hundred years, these pot-marks were listed by various excavators, such as Petrie at Tarkhan, de Morgan at Naqada and Cecil Firth at North Saqqara Emery also observed that this system of marking commodities was related to the one used in Mesopotamia, as it is indicated by Mesopotamian cylinder seals found in Egypt and which dated from Jemdet el Nasr Period, BCE. The Red Sea route may have been used for long range trade between Egypt and Mesopotamia.

However the Delta area also provided information about a more probable route between the two regions: Palestine and the Sinai. Emery explains that there is a record on labels found at Abydos from Naqada of the building of a temple in Sais by King Narmer and of the founding of Memphis in Saqqara, Emery also found many small objects and small pottery jars with painted inscriptions.

Among the records from Nubia at Wadi Halfa there is a rock inscription on the west bank of the Nile depicting King Zer with his bound enemies. A collection of jewelry from the same site is in the Toronto Museum, an indication of an already sophisticated society, which supported craft specialists. During the reign of King Peribsen, the followers Seth, opposed to the followers of Horus, from the previous reigns are mentioned in the records.

They also mention the cult of Osiris in Busiris, a town in the Delta. This fact is interesting, since towns with fortified walls, such as those of the First Dynasty at Abydos and Hierakonpolis, were shown in the Libyan palette depicting the so-called Libyan campaign.

The architecture of these walls was similar to Mesopotamian temple-wall architecture, using the same brick size in their construction. Although most of the evidence provided above is late, for the purposes of this study it is important because it demonstrates that markings on objects were later related to hieroglyphs. There are objects described as gaming pieces, which are marked and there is a relationship between these objects, their marks and Mesopotamia.

The evidence comes both from Upper and lower Egypt showing there were two possible routes of connection, which is also attested in brick-wall construction similar to the Mesopotamian style.

The importance of the Delta towns is their influence not only on Egyptian politics, but also on its ideology, since Busiris is portrayed as the place of origin for the God Osiris. The Gods Horus and Seth also may have originated in a Delta town; therein, the followers of Horus and the followers of Seth, Emery was not the only archaeologist to have related all these facts tot the exchange relations between Mesopotamia and Egypt. Dominique Collon in a study of cylinder seals, indicates that they bear witness to trade relations between Susa, Syria and Egypt Collon believes that the routes for such trade were via the Persian Gulf and around the Arabian Peninsula and overland to the Mediterranean Sea.

Collon demonstrates that the Mesopotamian art motifs from Susa also are found in Predynastic and Dynastic palettes and knife handles from Egypt as well a in the architectural style of wall construction. While writing developed during this time, the art patterns used on Egyptian ceramics were similar to those used in Mesopotamia. These patterns were based on rows of standing animals and were executed with a drill similar to those used for stamp seals.

These designs found at Diyala, north of Baghdad, and from Syria and Susa to Egypt, are a clear indicative of exchange for Collon, who explains that, for instance, lapis lazuli was usually exchanged for gold throughout the Middle East as it is attested in the archaeological record Walter Fairsevis excavated the site of Hierakonpolis for a long time and he also proposed pot-marks as a possible origin for the Egyptian hieroglyphs.

He observed that sites from Amratian and Gerzean times had a continuous occupation and they had a great deposition of graffiti- inscribed pot-shards with more concentration on the Gerzean sites Based on this observation, Fairsevis speculated that an abstract symbolic system had already evolved at this time. This observation coincides with the results of the research on the Mesopotamian writing system done by Denise Schmandt-Besserat.

The importance of this coincidence is that Fairsevis denotes graffiti is not confined to just one site, such as Hierakonpolis, but is found in other Egyptian Predynastic sites as well S. Fairsevis observed that the problem in dealing with early state formation in Egyptian archaeology is that all the Predynastic sites have been treated as being of a homogeneous culture, such as Naqada, if they presented similar ceramic decoration, a problem that originated with the serigraphy system used to classify them.

There is also a series of conventional motifs found on Class D ware. A table showing the possible evolution of graffiti into hieroglyphs also is provided within the text William Arnett has also examined the Predynastic pot-marks and asserts that these marks expressed ideas of ownership or property and they were early means that later were formalized in hieroglyphic form D26, depicted as lips with liquid moving away from them.
The hieroglyph G. O40, was already depicted in very early painted tokens from Mesopotamia, the meaning there unknown. Also, according to Arnett, in Predynastic art there are carvings and figures in the round or relief that seem rudimentary forms of hieroglyphs, such as hawks, flies, scorpions, scarabs and plows. Meanwhile, carved palettes and mace-heads also were the beginning of monumental inscriptions to commemorate historical events according to M.

Gibson describes the Early Gerzean painted tombs from Hierakonpolis; one of them was the spectacular painted tomb depicting men dressed in.

Green excavated at Hierakonpolis, where he found the famous palettes with depictions resembling the art of Ancient Sumer and Elam. Hoffman worked at cemetery in Jebel Shaba, finding evidence that this culture had developed a highly sophisticated way of life as well as social complexity. Near Aswan, a sophisticated culture developed very early; the Qadam culture flourished already 10,000 BCE that yielded unidentified objects that could be painted tokens; Frederick W. Reisner and Wendorf, found evidence, that this culture had developed a highly sophisticated way of life as well as social complexity, at a much earlier date than that of Dynasty I in Egypt. Michael Hoffman did a comprehensive study of towns, such as Omari, which were engaged more than others in dealing with certain commodities. If we presume that these cities and those of Mesopotamia were involved in trade with each other, some goods may have been more appealing than others to certain cities.

Perhaps, direct access to resources or perhaps, other influencing factors, such as distance or the need or the desire for acquisition of these goods, played an important role in the way the goods were distributed. Nevertheless, if during early Predynastic time these activities were taking place, this is an indication that, at that time, proto-writing was similar in both regions in Mesopotamia and in Egypt and the system of communication was viable and easily understood by both societies.

Moreover, in spite of differences in language, the Semitic influence is undeniable in Ancient Egyptian grammar. Although Egyptian language also had African roots, this similarity in written communication demonstrates that the language belonged to the Afro-Asiatic family of languages. In the course of evolution throughout time, both systems of marks eventually developed into their respective indigenous expression of language, with some similarities remaining in both of them.

However, the signs resulting from those marks in cuneiform and in hieroglyphs turned out to be different from each other. The need for securing long range trade, made Egyptian pot-marks more elaborated; as proto-signs, these markings then, were transformed into the hieroglyphic writing system.

The proto-signs were used for classifying and storing merchandise, as well for labels and tags that provided information of ownership, provenance and year.

The archaeological evidence that supports these events also provide information of how and when, social complexity began in Ancient Egypt. The Egyptian Predynastic towns had a parallel social development to that of writing during the fourth millennium BCE.

This social development can be compared to the Mesopotamian city states. A review of the archaeological work in the diverse Predynastic towns of Egypt show additional evidence for social complexity along the Nile. Michael Hoffman did a comprehensive study of towns, such as Omari, and Maadi near present day Cairo and the Fayum and Hierakonpolis, where he excavated many years along Walter Fairsevis.

Near Aswan, a sophisticated culture developed very early; the Qadam culture flourished already 10,000 BCE. Petrie, Reisner, Wendorf and Williams worked at cemetery in Jebel Shaba, finding evidence, that this culture had developed a highly sophisticated way of life as well as social stratification, at a much earlier date than that of Dynasty I in Egypt. Flinders Petrie excavated at Naqada, Balba, Abadiyah and Hu in tombs dating from BCE that yielded unidentified objects that could be painted tokens; Frederick W. Reisner and Wendorf, found evidence, that this culture had developed a highly sophisticated way of life as well as social complexity, at a much earlier date than that of Dynasty I in Egypt. Michael Hoffman did a comprehensive study of towns, such as Omari, and Maadi near present day Cairo and the Fayum and Hierakonpolis, where he excavated many years along Walter Fairsevis.

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strange costumes, some fighting and one holding back two animals in a motif typical of Iranian and Mesopotamian artistic style. A well stratified sequence showed that the Badarian, Amratian and Gerzean cultures were subsequent to each other, dating from BCE.

A el Amrah, Petrie found a model house made of clay that exhibited a Dynastic style of construction, such as those of Nubt and Naqada. A contrast between the occupations of Merimda and Maadi, in Lower Egypt and those of Hierakonpolis and Badari, in Upper Egypt, was that in the first two sites the prehistoric population was concentrated in large, deep sites, that had been occupied for long periods of time.

Instead, the last two sites were spread out and shallow resulting in structural remains often not being preserved. This explanation accounts for the fact that settlements in areas of Upper Egypt were difficult to assess in terms of population density and agricultural potential. Although these sites were thought to be poor and without much agricultural capacity, they were proven by Karl Butzer to have been the richest areas in Southern Egypt, which supported the largest populations. These factors may account for the reasons why the largest and most complex centers in Egypt were situated in the South.

Although these assertions are disputed by Egyptologists. Hermann Junker excavated Merimda Beni Salama, a town situated thirty-seven miles northwest of Cairo and he provided information about occupation, burial style and female and child mortality, which were tied to the farming practices. This community was much like that of the Qadan sites: people were interred within the settlements and their graves were almost never accompanied by offerings.

A good stratigraphy at Merimda showed a continued occupation from BCE. The site of Abydos was excavated by T. Eric Peet, who despite the small area excavated, found settlements arranged in concentric circles and grain-parching kilns. The evidence of hamlets of a specialized community showed the use of copper tools to work exotic stones, such as carnelian, agate, quartz crystal and diorite. Among the objects recovered, Peet also found impressed clay labels. This pattern dates to the start of the Predynastic at about BCE. Lots of polished pottery, pigments, palettes and stone bowls were recovered at this site.

This culture was compared to Merimda and presents a sharp contrast in pottery style to the cultures of Upper Egypt. Fayum A also was linked to the Kharga culture in the western Oasis that subsequently was linked to the Merimda and Mediterranean cultures Hoffman, Perhaps the sea shells found at these sites were being used as money to exchange goods following a tradition from other Mediterranean peoples.

Deborno found here individual reed-fenced houses, which seem to have been inhabited by nuclear families. The strata of Omari C was archaic and indicated connections to Early Dynastic times; small stones were found in graves, which may have been used as tokens. The town of Maadi was by far one of the most important and cosmopolitan communities. The houses were built underground in the style of houses found at the site of Bersheeba in Southern Palestine.

The Maadian houses had rooms for storage, where there were lots of vessels made of different stones, that seem to have been used for exchange. Carnerian beads, scoops and small pots also were found at this important center.

Kantor links this culture to the desert nomads through whom Maadi may have achieved exchange with other regions from afar. The copper industry in Maadi also was linked to trade, since this center had a large industry using the ore from the desert, allowing Maadi to export its finished products to other areas as part of a long-range trade connection Hoffman. At about BCE there was a change in burial tradition in Lower Egypt, which adopted customs from Upper Egypt, a manifestation of social changes and possible influence from foreign contacts.

According to a depiction on labels, the nomad dwellers of the Red Sea area in the Eastern Desert were engaged in trade. Perhaps, the same copper trade that they were controlling was also used for a long range trade with Mesopotamia. They were probably the same middlemen that were engaged in trade from Egypt to India. This route over the Eastern Hills to the Red Sea, can be inferred from a scene depicted on an ivory label in which King Den from the first Dynasty is seen smiting an enemy, the Easterner appears to be coming out of the mountains and he has a standard surmounted on a straight-hulled boat, which was classified by Frankfort as a Mesopotamian ship.

Hoffman interprets this scene rather as two Egyptian men fighting for control over access to the Nile. Nevertheless, the scene involves desert dwellers. At Saqqara, Walter Emery discovered in tomb inlaid alabaster disks.

At Helwan, south of present day Cairo, Zaki Saad unearthed tombs containing the already famous gaming pieces, cylinder seals and ivory labels. Hoffman found at Korn el Amrah culinary, domestic and miscellaneous features in storage pits along with small lumps of burnt clay listed in his report with an interrogation mark on the side, meaning that he did not know their function. Two groups of Predynastic settlements were discovered there by Faisevis.

According to his reports, one settlement was closer to where the main wadi emerged from the area of erosion and deposition; the other settlements were closer to the cultivation area on either side of the mouth of the great wadi.

The dating of this find is BCE. A village of phase C may have consisted of nuclear households gathered about some public structure represented by a stone pile. Outside of it there were individual households in relative isolation, along the cultivated land. Also there were two river pebbles with grooves punctured with small scattered holes, that suggest a cord had passed through them.

A cluster of six clay sealings were also found in a corner of the room. It seems this room was a service area of the temple Faisevis, A comparison can be made between the unknown pieces found in the junk deposit and some of the tokens examined by Denise Schmidt. These similarities may indicate that Egyptians at an early age were using this counting device system to communicate with Mesopotamia, scholars are skeptic about the function of these objects.

Predynastic Dating and Social Complexity J. Harlan proposed a new reorganization of the dates for the Predynastic Periods. The absolute
chronology of those periods have been disputed. Caton-Thompson, using luminescence, obtained BCE. Hoffman agreed with this division, with the exception that the Badarian began at BCE.

For instance, Joan Crowfoot Payne, from the Ashmolean Museum did a study on the conflicts between Hierakonpolis and its adjacent areas. Emery and Petrie linked the production of surpluses, which sustained population growth as attested during Gerzean times, to the development of social complexity, warfare and monumental construction.

Finds, such as the painted tomb at Hierakonpolis, from the Gerzean Period, which employed Eastern motifs, imported goods, such as timber from Lebanon found at Abydos, obsidian, Mediterranean Sea shells and vases from Palestine, also were facts that, according to Hoffman, could all be related to exchange systems.

These systems probably related to social relationships and the exchange of marriage alliances; a way to acquire these alliances was by exchanging wealth. These marriage alliances were part of the exchange system and later it became a tradition that was continued during Dynastic times. The development of social complexity linked to long range trade was also linked to exchange of marriage alliances, which may have incentivized production and full time craft specialists.

Harlan uses ceramic analysis to explain sociological phenomena at Hierakonpolis by predicting on several assumptions: patterns of archaeological remains reflect a pattern of prehistorical behavior; variability in distribution of ceramic remains at a site, or between contemporaneous sites results from specific activities or social groups and technique of manufacturing pottery is learned and passed on to the next generation. Harlan also mentions how specialist production was identified in early states and linked to local exchange and centralization in the Susiana Plains during the Early and Middle Uruk Periods Johnson. According to Johnson, specialization is reflected in increasing standardization and decreasing variability between contemporaneous sites and centralization or workshop.

Centralized pottery production may have produced a surplus that may have been stimulated by trade. Some wares at Hierakonpolis were similar to those of Naqada and the Abydos regions. These pots were probably imported, since the material available in the Hierakonpolis area is different. Also suggested by the impressive quantity of potsherds. The centers for production and distribution were the indicators of monopolization in ceramic production and these specific centers were directly connected to the central place.

These events can be paralleled with those occurring in Egypt during the Predynastic Period. The Nile Valley area had outside contacts at this time, that were probably part of the same network with Mesopotamia. The ceramic production and distribution from the diverse Predynastic centers in Egypt were possibly orchestrated in a similar way than those in Mesopotamia according to their importance and social complexity.

This type of sealing suggests an exchange of valuable goods in a regional or long range trade network. The town of Naqada was engaged in trade along with Hierakonpolis, Abydos and Maadi, where the copper trade was intensive, because this site was near the mines at Gebel Ataqa and the Sinai. Proof for all this traffic was the Pakistani pottery and the raw materials found at Maadi, such as obsidian, lapis lazuli, bitumen and resin, which were all status goods that had to be traded in, since Egypt did not have all these materials available in the Valley area Lucas. However, Egypt was able to trade these exotic commodities, because the Nile Valley did not lack any subsistence goods and was rich in other types of raw materials, such as alabaster, marble, basalt and gold.

According to William Stevenson Smith the growth of trade in West Africa was responsible for social stratification, since it was promoted by the movements of people. The relocation of pastoralists and agriculturists into the Valley occurred after the fifth millennium BCE, with the dessication of the Western Desert.

This expansion of peoples and trade among the growing towns provoked conflicts for the trade routes and the access to the resources, which consequently, led to militarism and leadership. The evidence for these conflicts among towns was in the construction of the two-meter thick walls, such as the mud brick enclosure at a southern town in Naqada and the model of a walled town found by Petrie at Diaspolis Parva. In his article about regional analysis in archaeology, Johnson indicated that direct interaction data is available to archaeologists involving distribution of goods, for which location of production is known; the most common selected alternative to identify interaction has been post-marital residence.

These processes may contribute to a different distribution of functional sizes in a settlement system, leading to hierarchical systems based on the effectiveness of coordination of the system. The increase in vertical complexity will favor the creation of different centers to minimize movement and costs. Functional size for unit of population decreases as population size increases, according to Zipf.

Also a linear rank size distribution is produced by a high degree of integration among cities in economically developed countries. A deviation from the linear rank-size distribution, such as a primate distribution or concave plot, indicates that large settlements are larger than expected and the small settlements are smaller than expected.

Instead, a convex plot may indicate that large settlements are smaller than expected and small settlements are larger than expected. Variability in rank-size distribution ranges from primate to linear to convex, which is the situation when size distribution of a settlement system approaches the discontinuous hierarchy posited by the Central Place Theory, at least in cases with multiple highest order central places.

A convex rank-size distribution should indicate the possibility that relatively autonomous settlement systems are being combined in the analysis. Instead, concave rank-size distributions appear to be related to the political administration of an economy and the minimizing of competition. The utility of this analysis is obviously important to infer information about long-term regional scale settlement patterns and about the interaction among cities, which gives information about social development and pristine state formation in the area.

A similar study will be attempted here, in order to test social development and state formation throughout the Nile Valley area. This development has as its end product the growth of social complexity and settlement size and, subsequently, pristine state formation. By budding off, these
settlements covered all the Nile Valley area, linking the Delta to Nubia. This network of centers for ceramic production and social and religious activities were responsible for the development of an homogeneous Egyptian cultural identity, which was consolidated later with the unification.

Not only these processes mentioned by Johnson and proposed by Fried were probably responsible for the development of the Egyptian settlement system. These processes also were responsible for the development of an intra-regional trade network that linked Egypt to Mesopotamia and which also probably involved a mating network well known and abundantly recorded during the Dynastic era.

The rapid increase in the number of management hierarchies within these Egyptian centers were triggered by forces operating from within those organizational units or settlements. Johnson mentions the studies made by Udy, that predict the number of levels of management hierarchy appropriate for coordination of a given number of activities. The degree of this integration among settlements can be attested by plotting the settlements in a ranking-size distribution.

Furthermore, the volume of trade involved in the local intra-regional exchange also can be calculated in basis to the surplus extracted from food production and its consumption.

Johnson explains that elites were built on surpluses. He calculates that a 5 ha of agricultural land per capita would have been an estimate of the subsistence requirement in Prehistoric Southwestern Iran. Prehistoric villages could cultivate about 2 ha of land per capita and becausel. These figures were the approximate surplus extracted by the population of Southwestern Iran during the fourth millennium BCE.

Besides learning about the degree of integration among settlements, the size-frequency distribution for settlements, in a settlement system, can be used to signal the operation of a variety of potential boundary phenomena Johnson. This strategy is based on rank-size rule in geography, which relies on the notion that settlement systems contain few large centers and a greater proportion of increasingly smaller settlements.

The plot of these settlements gives a negative skew in the direction of the smaller settlements. This plotting consists of a descending array of settlements by their size against settlement rank, in that descending array of sizes.

For instance, the second settlement would be one-half of the first or largest settlement, the third, one-third and so on. When the tenth settlement is one-tenth of the largest settlement and is plotted on a double logarithmic scale, the resulting curve is a straight line with a slope of Zipf has suggested that a linear rank-size distribution is produced by a high degree of interaction in an economically developed country.

Although some countries do not produce such straight-line curves. Convexity results in cases when the largest settlement in the system is smaller than predicted.

Convexity also is attributed to the pooling of independent or relatively independent settlement systems and to the presence of significant interactional boundaries within the area under analysis. The other basic deviation from rank-size linear is when the plot is primate or concave, indicating the largest settlement is larger than expected.

The factors responsible for this kind of plotting are various, such as the dominance of a primate center to the high availability of low-cost labor and when economic competition among settlements is politically minimized. The system may also be connected to an outside system, such as the case of colonial empires in which a colonial capital would be more closely articulated with the rest of the empire than would other colonial settlements.

According to Johnson, in highly integrated systems the size of a given settlement is dependent upon a conditional function of the sizes of other settlements in the system. The settlements are linked by a variety of social, economic and political processes, which affect settlement sizes. If settlement-system integration is defined in terms of statistical interdependence of settlement sizes, determination of settlement sizes should follow the rules of conditional probabilities and be a multiplicative function.

Therefore, a highly integrated system would approach a normal-log plot. Meanwhile, a convex distribution would indicate a low integrated system, which by becoming increasingly integrated, its rank-size distribution should become less convex and increasingly log-normal. The plain at BCE was occupied by four enclaves of settlements representing the remnant population from a breakup of a larger society in the previous period.

The rank-size plot at this time is very convex. After new settlements were founded in the area and the western portion of the plain was coming under the administrative control of elites located at two emerging centers, of which Susa was the dominant, the plot was still convex but markedly less than earlier.

As the elites were able to extract surpluses from the agricultural produce and labor, rural populations were incorporated into the administration of center control. Sealed shipments of commodities were being moved in increasing volume between centers and rural areas and the increasing workload had been met by both vertical and horizontal expansion of the administrative system. At this time, BCE, Susa had a size of 25 ha with an estimated population of around five thousand people dominating a three level administrative hierarchy, with a total population of about twenty-one thousand people.

The rank-size distribution reflecting the increase in system integration was very nearly log-normal. As stated before by Johnson, a convex distribution can be created by either pooling separate systems or by partitioning an individual system. A convexity exhibited in peripheral areas of larger systems is related to the organization of a dendritic system.

Dendritic systems normally exhibit regional primacy and decrease in settlement functional size with increasing distance from the system primate center, through which lower level settlements are integrated.

Horizontal interaction among lower-level settlements at the same level of hierarchy is weak. Material, personnel and information flows are primarily
vertical between the system primate center and lower order centers. Since additive process produces consistently hyper-convex distributions and multiplicative processes very rapidly generates nearly log-normal distributions, the determinants of lower order settlement size are thus probably largely additive and their low level of horizontal integration should generate rank-size convexity.

Johnson mentions the case presented by Paynter in which peripheries of dendritic systems show convex distributions. This area presented at the beginning of this time period, a very primate distribution that later became increasingly log-normal. At BCE the Warka area was occupied by a dendritic system with a four-level settlement hierarchy centered on the site of Warka itself. Warka provided an administrative integration for the four enclaves of settlements, which apparently had little interaction among themselves.

Enclave-center size was positively related to the sum of the sizes of associated settlements within each enclave and the individual sizes of enclave centers and larger villages were inversely related to distance from the system primate center at Warka.

The system having a low integration interaction at the horizontal-settlement level and strongly developed vertical administration from Warka, exhibited a primo-convex distribution. By BCE a considerable change in settlement system spatial distribution within the Warka area showed a lattice with five large centers and associated settlements.

The system also showed small specialized administrative sites marking the boundaries of the immediate hinterlands of adjacent centers. Although Warka was still the largest site, the system now exhibited a nearly log-normal settlement rank-size distribution. Archaeological material characteristic of Warka found beyond its immediate hinterland indicates the system was probably connected with another larger system or that further settlements dependent on Warka were articulated with it.

Johnson concludes that, perhaps, a combination of systems internal and external or boundary phenomena were responsible for such rank-size distribution. Plotting the Predynastic Egyptian settlements in a rank-size distribution presents the problem of using accurate archaeological data throughout the fourth millennium BCE.

The problem with Egyptian archaeology is that very seldom field reports present accurate site measurements. Nevertheless, persistence and a time-consuming search produced two kinds of rank-size distribution. In the first, Hierakonpolis or the Nekhben area, which would be the largest settlement within the Hierakonpolitan area, thirteen settlements of unknown individual size total an amount of 2 ha, appears to have been an 82 ha site Hierakonpolis.

The other sites, Naqada which was the rival center of Hierakonpolis, also an enclave of nine settlements of probably a total 40 ha, but with the site of Nubt as the largest settlement with 40 ha. Omrit in the Maadi region had 38 ha. Abydos, which later became an important center, had 27 ha. This site also presents the problem of having been used a cemetery and being near the Naqada area.

It is unclear whether it was part habitational or totally a burial place. In the Delta, Buto was the rival and counterpart center of Hierakonpolis.

It also was an important center in this area, with a continuous habitation, which had a size of about 22 ha; Merimda Beni Salam in the Western Delta apex had 16 ha; Maadi had 15 ha; Tell el Awad, near Buto, had 6 ha; El Kab, the twin city of Hierakonpolis on the other bank of the Nile, presented at this time about 4 ha; Ezbat el Tell, also near Buto, had 2 ha and the region near Badari, presented Abadiyah with 2 ha.

This region had several settlements that amounted to about 55 ha total. The resulting plot of this settlement system rank-size is a convex line that approaches the log-normal line and later falls in its tail Fig.

Perhaps at this time settlements were not well integrated in a system, but they nevertheless, had trade and cultural exchange with each other. Grouping the sites by regions, such as the Buto region and the Hierakonpolis region, produced twice about the same results using about the same data Fig. Hierakonpolis was very convex, dropping then nearly the log-normal line.

Buto, instead, curiously gives twice a primate distribution. This results can be interpreted as being two different distributions and two independent systems. It is interesting to see that the primate distribution presented by Buto may indicate a connection with an outside system in Palestine, Mesopotamia or the Hierakonpolitan region instead of South. Instead, the convex distribution this last region presented may indicate that although, intra-settlement integration was weak, the plot approaches closely then, the log-normal line.

To control this data, a comparison is done with another rank-size distribution using measurements of whole enclaves as a sole settlement. In this way a system resulted, which was the whole region from the Delta to Hierakonpolis Fig.

According to Johnson, the pooling of systems may produce this kind of distribution and in this case, the Egyptian towns obliged. Finally, the last plot of settlement-size distribution Fig. This distribution is primate and then rapidly approached the log-normal, dwindling a little to primate, but returning to log-normal. The conclusion is that the total system may have been primate, when pooled or connected to an outside system, or simply, it may have been growing dendritic with centers becoming larger with a centralized ceramic production.

The centralized ceramic production was connected to the main center Hierakonpolis, which later became its first capital. Moreover, a histogram Fig. Rank-size indexes and ceramic analysis may produce more information. First, the obvious influence of Mesopotamia in Egyptian Predynastic art that later transcended into pictorial symbols and religious concepts.

Second, the incredible exchange of material between the two regions, indicating an early parallel development of social complexity and two independent writing systems. Originally, either by marking tokens or by marking pots and subsequently, proto- signs, these writing systems of Mesopotamia and Egypt were able to express and represent, in their extent, their two languages in two completely different scripts and alphabets: cuneiform in Mesopotamia and Hieroglyphs in Egypt.
The reports of Walter Emery, who did extensive work in Predynastic sites and also in Saqqara, indicates that the Predynastic material uncovered presented an obvious connection with Mesopotamian art style; This influence could be seen in the representation of animals with entwined necks depicted on the Narmer palette and in the birds standing in a row, as shown on seals and decorations Figs.

This assertion was also corroborated by other scholars, such as Henri Frankfort; Henry Fischer and Elise Baumgartel, who hinted that this distribution could have been a result of artisans traveling from one area to another, bringing with them their own styles and skills.

This factor also could explain how some Egyptian pot-marks may have had a correspondence of design to the markings on Mesopotamian tokens. The commodities that may have reached Mesopotamia from Egypt may have been, as mentioned earlier, raw materials, such as alabaster from the mines at Hat-Nub in the Eastern Desert behind Helwan, basalt extracted from the Fayum area and diorite from the Eastern Desert, Aswan and Nubia.

Breccia was mined at a site near Esna in Upper Egypt and dolomite was extracted in the Western Desert. Schist and volcanic ash were procured at Wadi Hammamat and marble and porphyritic rock were extracted in the Red Sea coast area; purple porphyry was found in Gebel Dokhman in the Eastern Desert and serpentine and rock crystal also were coming from the Eastern Desert. From the Sinai, other raw materials were extracted an exported, such as copper, malachite and turquoise.

The export of stone vessels and precious stones, such as agate, onyx, amethyst, carnelian, chalcedony, green feldspar and garnet haematite jasper made possible the acquisition of lapis lazuli Lucas. By examining the fragment of a large Hierakonpolis mace-head with an impressed rosette on it, Baumgartel made some important observations For instance, she indicates that this motif has been represented in several circumstances in Egyptian history, such as in the knife handles of King Senefru and in the slate palettes of King Narmer and King Scorpion Figs.

Baumgartel explains that the rosette has been associated with the copulating snakes, a motif rare in Egyptian representation, but common in Sumer, where it represents fertility and belongs to the Great Goddess, also meaning good augury.

Baumgartel also thinks the rosette may have been associated with the Egyptian goddess Sheshat, with parallel symbolism than in Mesopotamia, as it is depicted in the foundation ceremony of Hierakonpolis carved in the mace-head. The scorpion, on the other hand, depicted together with the rosette, was a symbol of motherhood in both Mesopotamia and Egypt.

In Egypt, the scorpion goddess holds the feet of the god Amun in the marriage scene of Amun and the queen mother of Amenhotep III in the temple of Luxor; this scorpion has a life sign in each of its foremost claws.

The scorpion also protected Isis when she was hiding with Horus in the marshes of the Delta. Dozens of scorpions were found at the main deposit at Hierakonpolis as ex-voto to the goddess. Just as the rosette, it became a goddess: the goddess Selket.

In Egypt, from very early times during Naqada II, they were represented on pottery. In Egypt, the ear corn may have represented Horus, who also was identified with Min the ithyphallic god of harvest.

Horus may have been the counterpart of the scorpion and the rosette, which stand for the goddess. However, Ranke thinks this motif is of Libyan influence and that it is depicting the marshes in the Delta. Vandier also relates these places depicted in the palettes to the Delta, but he admits a Sumerian influence is seen in the two giraffes chewing palm leaves.

There is also a Mesopotamian influence in mace-heads, which depict the rosette, the symbol of Ishtar and the scorpion, the symbol of fertility and motherhood Baumgartel. The scorpion in Egyptian ichonography is the symbol of Selket, the goddess who causes the throats to breathe and who may have been connected to the goddess Hathor, this being the reason she became so important at Hierakonpolis.

A little mace-head of about 3 cm was found at Hierakonpolis by Quibell. It had engraved on it the classical Mesopotamian motif of lions biting dogs and dogs biting lions.

Among the objects found by Petrie at Naqada, there were very small palettes of about 5 cm, a necklace was found in a tomb with disk shaped beads of steatite, carnelian, turquoise and quartzite, lumps of malachite and ivory tags, some incised with diagonal lines.

He also found pierced shells that may have been Naqada II. The cult to the fertility goddess during Naqada I can be seen in the tombs from Naqada, where she was associated with Hathor in the depiction of her symbol, the cow horns. Along with Hathor is her male companion, who is also her son and lover and was venerated at his time. The god Min from Coptos is the strong bull, who later also was represented as an ithyphallic god, meaning fertility.

This fertility symbol reflected the important position that later women were going to hold in Egyptian society. In respect to the production of pottery, Baumgartel indicates that the slow wheel may have came to Egypt during Naqada II and this innovation may have played a part in the manufacture of spouted wares. Both of them common during Naqada II. The loop-handled pot was rare in Egypt, and Kantor relates this pottery to Palestine and Naqada I as Petrie had done. However, Baumgartel does not agree with this origin because the loop-handled pottery also has been found at Susa and at Yorgan Tepe during the Uruk Period.

For Baumgartel these Egyptian pottery types depend on the prototypes from Early Uruk. However, certain pottery types were related to Nubia.

For instance, the black-incised pottery from Naqada I, such as the Tasian beaker, is related to the Pan Grave people and the cultures from Nubia. According to A. Arkell, the white-incised pottery was attributed to the Khartum Neolithic. When Griffith excavated at Faras, he related the black-mouthed pottery found there to the Badarian pottery.
Although these seals were used and discarded in the area situated on the route from Mesopotamia to Egypt, Schulman argues that the making, use and discard of these fragments indicate a probable Egyptian post in Palestine, since they are duplicated in other seal impressions that were found earlier. The fragments all have Egyptian-style depictions on them. Ninety fragments from the First Dynasty or of Early Dynastic date were uncovered. Some of these fragments could have been part of envelopes or tokens, since they are duplicated in other seal impressions that were found earlier. They all have Egyptian-style depictions on them. The petrographic analysis has proven that the mud used is Palestinian clay and not Egyptian Nile mud.

As mentioned above, two possible sea routes were responsible for channelling all this exchange of information from Mesopotamia to Egypt. For H. Sumer and Susa were centers where certain art styles may have developed earlier than in Egypt. For instance, the motif of heroes dompteur on, the lines were written also horizontally in Egypt. Other motifs used in both Mesopotamia and Egyptian art styles were animals, such as goats, bulls and sheep, which also were represented by the horns. The representational style of part of the body profile and part of the body front also were used an shared by Susa and Egypt, as it is seen in two vases depicting archers. A pond drawn with circles at the bottom of the vase has convergent wavy lines of water also depicted in vases from Badari, Susa and Persepolis. A Badarian vase with the pond motif has four buffaloes with long horn grouped around the middle of the vase; a circle in the middle has a cross. Processions are also shown, carrying and bearing products similar to those processions in Egypt. Several representations of boat processions are depicted at tomb and on knife handles from cemetery L at Qustul. Processions are also shown, carrying and bearing products similar to those processions in Egypt. Several representations of boat processions are depicted at tomb and on knife handles from cemetery L at Qustul. Baumbartel interprets this cross as the pond having four equal arms, a motif shared by Diasponsor Parva, Naqada, Susa and Persepolis.

Two more pattern examples from Susa and Naqada show branch-like designs near the cross, which may have had the same symbolism in both places. The second pattern is the net pattern, which also occurs in Susa and Naqada I. The animal motif is used more in Egypt than in Mesopotamia, which uses more geometric designs. Egypt had more of a tendency to destroy the regularity of geometric patterns by adding water lines to the design. Perhaps, originally the signs were different and the wavy lines for water were confused with snakes in Egypt and in Susa, when they were taken into their respective scripts. Elise Baumbartel also did a review on the ivories from Abydos, where Petrie found a deposit with a quantity of objects in a room called M69, outside the temple of Dynasty IV and V. Among the objects was an ivory statuette of a woman, probably the wife or the daughter of King Aha from the First Dynasty.

The importance of these finds is that they support the evidence that sculpture in the round was already achieved by the end of the Predynastic Period, since other bigger statues also were found at diverse Predynastic sites. For instance, many scholars think the colossus of Coptos discovered by Petrie may have had counterparts in Mesopotamian art. The colossi belonged to the early Naqada Period. The colossi present graffiti depicting a catfish, a serdab or palace façade and a harpoon on the right leg. Bruce Williams compared these colossi with a striding statue found at Hierakonpolis and with other objects dating from the Naqada Period, such as a kneeling statue he found at the site of the main temple of Min and Isis at Coptos, where the colossi were found. These two finds located at the same site may indicate all these statues were part of a structural complex rather than isolated monuments. This is more evidence for the monumental construction of the Naqada Period.

For H. Sumer and Susa were centers where certain art style may have developed earlier than in Egypt. For instance, the motif of heroes dompteur is earliest attested at Susa I occupation in button seals and impressions, such as heroes taming lions and snakes vanquishing foes. In Egypt this motif is first seen in tomb at Hierakonpolis where a figure restrains two felines and at Naqada II another figure is macing three bouded, kneeling captives. The palace and temple façades appear in Unuk level IV a-b; in archaic Susa seals were above the paneled door, where there were two lotuses intertwined, similar to lotus representations in Egypt.

Petrographic analysis has proven that the mud used is Palestinian clay and not Egyptian Nile mud.

Therefore, according to Schulman, these fragments are from Canaan and of Egyptian manufacture, indicating a probable Egyptian post in Palestine. Although these seals were used and discarded in the area situated on the route from Mesopotamia to Egypt, Schulman argues that the making, use...
and discarding of these impressions were local activities. They were probably discarded by people living in the area and not from transitory middlemen in their journey to trade; nor do the objects represent an Egyptian military dominance in Palestine.

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