



- 1 Athens State
- F
- 1 Keos
- 2 Thera
- 3 Delos



Fig. 2. Man's elementary relation to space

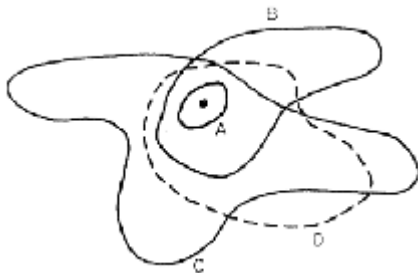


Fig. 3. Man's relation to space: effect of natural forces

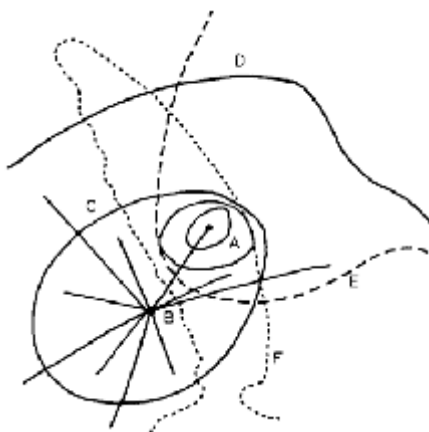


Fig. 4. Man's relation to space: effect of social and cultural forces

Since at the moment this is not possible, we have started with the area of present-day Greece as our first-phase study area. We hope that experts from other countries, from India to Spain and from Egypt to the U.S.S.R., will in parallel and in the near future proceed with similar studies. Only cooperation with them will finally lead to the completion of the picture of life in the ancient Greek world.

We start our study with the area of present-day Greece because, besides the advantage of the easier collection of data for us, and the fact that it is one main area where Greek civilization was developed, it is also of great interest to follow the relation of man to space in an area where the population density reached such high levels at different periods in ancient times that it led to the creation of colonies.

### Period covered by the study

A big question was what period of time such a study should attempt to cover. The decision was to try and cover the whole period from the first data, which are Paleolithic, to the end of the Roman period. By saying this we want to make it clear that, as we are missing many data for the earlier periods, the degree to which we cover every period varies from very low to high.

### How the study is done

This study was started by the Athens Center of Ekistics on its own initiative, but it has been helped over the last two years by the Ford Foundation, and we are particularly grateful to all those who understood the meaning of this effort and supported it. Special thanks are due to McNeil Lowry for his helpful advice and support.

The study has three divisions: the first covers the long term planning of the project and general policy and direction. All the responsible research experts are represented here, as well as Arnold Toynbee, who wrote the first report of the series (to be published as Volume 1), and the author of this article, who is the president of the team.

The second division includes the archaeologists and historians who are responsible for studies of particular areas. The studies that have been completed to date (which will appear as Volumes 3, 4 and 5) are the following.

- a. Thasos and its Peraia, by D. Lazaridis (RR-ACE 161)
- b. Cassopaia, by S. Dakaris (RR-ACE 163)
- c. Corinthia-Cleonea, by M. Sakellariou-N. Faraklas (RR-ACE 164)

These studies are now being published in a preliminary form by the Athens Center of Ekistics for restricted circulation to interested groups, archaeological schools, etc, and other studies covering other areas will follow (Fig. 1). Simultaneously, an archive of data cards for items of a questionnaire and by study



Fig. 5.

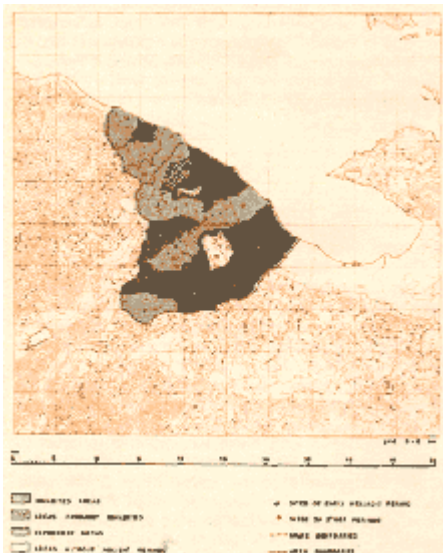


Fig. 6. Sicyonia: demes of Early Helladic period, 2800-2000 B.C.

- 1 OENOE
- 2 Kaki Skala
- 3 Skoinos
- 4 Zoodochos Pege - PEIRAION
- 5 Sterna (Ktena)
- 6 Monastiri
- 7 Panagia
- 8 Hagios Vlasios
- 9 Megalo Lithari
- 10 Flambouro
- 11 Hagios Demetrios
- 12 Vouliagmeni Ca
- 13 Vouliagmeni Cb
- 14 Vouliagmeni B
- 15 Vouliagmeni A
- 16 HERAEUM
- 17 Hagioi Theodoroi CROMMYON
- 18 Moulki
- 19 Sousaki A-SIDUS
- 20 Sousaki B
- 21 Klisiza
- 22 Hagios Charalambos
- 23 Kalamaki B
- 24 Kalamaki Aa Schoenus
- 25 Kalamaki Ab Schoenus

area is under preparation, as well as an archive of maps and drawings, which in the near future will be available to anyone interested.

This division also includes the teams of architect-planners, topographers, etc. The latter are under the direction of T. Samaras and S. Lagodimos, and the whole group is under the supervision of Mrs. Maria Zagorisiou.

The third division covers an attempt to arrive at a synthesis of all the facts collected by the research experts of the second division and is the responsibility of only the author of this article.

Thus the whole study proceeds through the following phases:

a The conception of policy and methodology in which many experts are cooperating.

b. Studies of areas for which the research experts are responsible.

c. Conclusions and synthesis, to the realization of which all the research experts have contributed, but for the eventual faults of which only the author of this article should be held responsible.

It is many years since I wrote my first thesis on the synthesis of ancient Greek space, and it is five years since this project began to be organized. Actual work upon it only started in August 1968, and it is very early for conclusions on such a difficult subject. I am writing this article at this early stage for two reasons: first, to inform others who may be interested in this research study, and second, to present my hypothesis, so that discussions upon it can start immediately which may enable us to arrive at more certain results. For if there is no basic hypothesis which can be constantly examined and criticized, there cannot be such fruitful discussion.

## Chapter 2: the hypotheses

To develop my hypothesis I have used many notions of average sizes and simplified sketches of settlements. I believe we shall have sufficient specific examples to lead us to more statistically accurate averages which can then be constantly adjusted. We shall also be able to observe the range of variations of these averages and in this way strengthen or weaken the original hypothesis.

I feel the need to mention that the hypotheses that I use have been based on a general ekistic experience and they are under continuous control through the findings of the studies of the research experts of the team.

I want very much to emphasize that much of what I say here has been said by others in more general terms or for very specific cases. I am merely trying to give measurements to many of the hypotheses others have made and link them into a single system. This can then be accepted or rejected on the

- 26 Kalamaki Ac SCHOENUS
- 27 ISTHMIJA
- 28 Hagia Kyriake
- 29 Aspra Chomata
- 30 Damari
- 31 New Corinth
- 32 Korakou
- 33 LECHAEUM
- 34 Hagios Gerasimos
- 35 ? ASAI
- 36 Aetopetra
- 37 Mylos Chelioti



Fig. 7. Corinthia and Cleonea: Classical period settlements ascertained or presumed, 480-338 B.C.

basis of concrete measurements and concrete examples by which the general hypotheses can be adjusted, and we hope to publish these results annually at the beginning of each year.

### Interpretation of settlements

Many interpretations are given of the evolution of ancient Greek settlements, of which two are more prevalent. The first is based on the idea that the geographic and the topographic conformation was the most important cause of the evolution of the Greek city-states. However, concrete studies, especially in the Middle East (where any city-states were created on the plains) have shown that this interpretation is not applicable.

The second interpretation is based on assumptions of social organization. This interpretation is influenced by Aristotle, who based the evolution of settlements on their social or political organization. I have personally accepted that the evolution of the Greek city-states resulted from the combination of the following three factors:

- a. The local geographic and physical conditions which influenced man's life, production and movement, thus creating special kinetic fields.
- b. Man's social and political organizational abilities and traditions.
- c. Many other factors, such as the size of groups of people, their level of education, the progress of their technology, outside forces, etc.

We do not know today which of these forces is most important in every case or how far they combine and connect with one another. But if we can systematically study some hundreds of city-states we should have enough data to estimate the value of the different factors. This is an optimistic prediction, but it is quite possible it may come true.

### Relationships of Man and Space

Even if we accept the simplest type of settlement, where Man produces all his own food, clothes and any other article that he needs, we cannot say that man's relationship to space is entirely determined by the land on which he dwells and works (Fig.2); for, this does not take into account the winds and the water, or the pollen which fertilizes the plants, all of which come in form a much larger area. (Fig. 3).

Relationships are even more complicated when we see Man live in a group with other men, for we can see that the man who lives in settlement A is affected not only by settlement B with which his settlement has economic or administrative relations, but also by space C, because B is a center for all this area. Settlement A is also affected by space D, from which it receives religious influences, space E from which it receives language or





Fig. 8. Sicyonia: Hellenistic period inhabited areas, 330-146 B.C.



Fig. 9. Cassopaia: Hellenistic period - settlements ascertained or presumed, 343/342-168/167 B.C.

1. Bestia
2. Elaphos
3. Toskesi
4. K. Mousiotitsa
5. Gephyra Zeta
6. Derviziana
7. Georganoi
8. Sistrouni
9. Romano
10. Alpochori-Botsari
11. Polystaphylo

other cultural influences, etc. (Fig. 4).

In spite of all these complications, experience shows that we can understand the relationships of man and space, if we make a hypothesis that each settlement is part of a hierarchical system, although it has numerous other relations with forces and settlements outside it. For instance, a settlement may belong administratively to one hierarchical system and yet depend upon certain economic services it offers to settlements outside this system.

### Types of settlements

Although settlements can be classified in many ways- temporary or permanent; small or large; agricultural or urban; specialized; etc. - the hypotheses made here are based only on the sizes of permanent settlements (which can themselves be divided into several categories). This size is considered as the territory that each settlement covers, that is, the whole extent of its living space, not just the cultivated land or the built-up area, because this living space is the only area that can be determined more or less accurately. It is very difficult to arrive at any degrees of accuracy if we try to compute social or economic measurements because we have much less data on them.

### Chapter 3: Hypothesis A: the basic settlement

One basic settlement has most certainly continued to survive from Neolithic times (or even from the end of the Paleolithic era) to today. This is the type of settlement usually called a "village", whose inhabitants are engaged in cultivating the soil, rearing livestock or fishing.

Though small-scale examples of this type of settlement had appeared in Greece thousands of years ago, in the early Helladic period, numerous villages of different sizes appeared all over Greece. In two places that have been carefully examined, the whole area was then covered with villages. These are regions of Corinthia (Fig. 5) and Sicyonia (Fig. 6). These villages disappeared after the invasion of the Dorians around 1,100 BC. But the interesting thing is that approximately the same number gradually grew up again, reaching a maximum either in the Classical period, as in Corinthia (Fig. 7) or in the Hellenistic period as in Sicyonia (Fig. 8), Cassopaia (Fig. 9), and Thasos (Fig. 10).

Today these areas still contain a similar number of villages, though the position is beginning to change, as industry, communications and technological progress attract their inhabitants to the big cities. However, there is no doubt that for thousands of years the basic settlement in Greece has been the village, and even when great catastrophes have led to their disappearance, they have redeveloped again in the same localities and in the same numbers.

We only speak here of the size of the area surrounding each

12. Paliochori-Botsari
13. Assos
14. Kleisoura
15. Voulista-OROPOS?
16. Kerasson
17. Gymnotopos
18. Ammotopos
19. Hagios Georgios
20. Asprochaliko
21. Kokkinopito
22. Rizovouni
23. Thesprotiko
24. Krania
25. Vrysoula
26. Trikastros
27. Glyki
28. Mouzakeika
29. Skaphidoti
30. Kastri -PANDOSIA
31. EPHYRA
32. ELAIA
33. ELAIAS LIMEN (Ammoudia Bay)
34. Kerentza
35. Dromos Skalomatous
36. Aidonia
37. Valanidia
38. Ano Rachi
39. Ano Kotsanopoulo
40. Rizovouni-BATIAI?
41. Pantanassa
42. Palaia Philippias-CHARADRA?
43. BOUCHETION-Rogoi
44. Kastri
45. Stephani
46. Louros
47. Paliorophoro-ELATREIA?
48. CASSOPE
49. Kryopigi
50. Cheimadio
51. Riza
52. Kastrosykia
53. Strongyli
54. Sampsous
55. Michalitsi-BERENICE?
56. NICOPOLIS
57. Pantokrator

settlement, the area from which it is supported; for we have very few records of the numbers of their inhabitants (and these only for certain moments in their history). However, we can be sure that they usually numbered a few hundred and only very seldom, at critical moments, may have exceeded a thousand people; for the area occupied by the land of the settlement would not support more.

### **Hypothesis A1: Type of basic settlement**

The basic settlement of Greece is therefore a "village", whose size ranges from a few hundred inhabitants to, at the most, just above a thousand people. We have no indications that it ever passed this size without changing its character and thus ceasing to be a "basic settlement".

With the advent of mechanization, the situation changes, but we can still say that the village is the basic settlement which directly links man with space.

In terms of the Ekistic Grid, the basic settlement belongs to Community Class III or Ekistic Unit No. 6. In the context of this project, we are calling it Type C.

### **Hypothesis A2: Number of basic settlements**

We have no complete population figures for basic settlements before the last 140 years, and it is very difficult to find earlier figures for many villages. On the other hand, we know the exact size of the territory of settlements for the last 140 years and we can find corresponding sizes for the past.

The basic way of life in basic settlements in Greece did not change appreciably from the Neolithic revolution until the beginning of the twentieth century. We can therefore hypothesize that the size of the villages did not change either and that the land continued to have the same number of places for villages of this type. These places would be filled or left vacant according to the size of the population of the country and the general conditions of life.

In accordance with these assumptions (subject to later more exact examination) we now accept that within the borders of the present-day Greek state there has always been space for 6,061 basic settlements; i.e. as many as the present total of all settlements.

An example will show that this assumption is not unreasonable. After Greece gained her independence from the Turks, she acquired a Bavarian King with Bavarian advisors in 1833. The country, which then consisted of 47,516 sq. km., was divided by them into 457 demes, each of which contained many villages. These demes never worked because they were too big; their average size was 103.9 sq. km. Thus, in 1912, a special law divided the land into 2,561 self-governing units, each of which incorporated several basic settlements, and the system worked

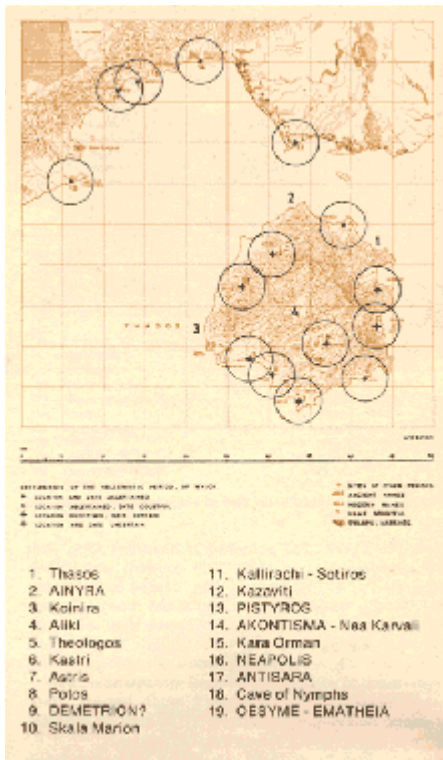


Fig. 10. Thasos and its periaia: Hellenistic period - settlements ascertained or presumed, 350-196 B.C.

1. Thasos
2. AINYRA
3. Koinira
4. Alikí
5. Theologos
6. Kastri
7. Astris
8. Potos
9. DEMETRION?
10. Skala Marion
11. Kallirachi - Sotiros
12. Kazaviti
13. PISTYROS
14. AKONTISMA - Nea Karvali
15. Kara Orman
16. NEAPOLIS
17. ANTISARA
18. Cave of Nymphs
19. OESYME - EMATHEIA

much better. Their average size was reduced to 47,56 sq. km., as the total area of Greece in 1913 was 121,794 sq. km.

In now turn to the first city-states that have been studied in detail. In Cassopaia (Fig. 9) 37 ancient settlements have so far been found from the Hellenistic period, 343-168 BC (the time of its greatest density). However, present-day Cassopaia has 63 full communities and sections of 16 others, or the equivalent of 71 communities. This means that either:

- a. the whole available space was not occupied by human settlements or,
- b. hypothesis A (especially A2) is incorrect and the ancient basic settlements were bigger than the present-day ones, or
- c. in fact there were 71 settlements, though we have found only 37.

In Corinthia (Fig. 7) - the city-state of ancient Corinth - 25 settlements of the Classical period have been found (21 settlements certain and 4 questionable). The same space today contains 19 whole communities and sections of 8 others, or the equivalent of 23 communities. Consequently it seems that in ancient times there were as many settlements as at present.

In Cleonaea (also Fig. 7) only one settlement of the Classical period has been found, though contemporary Cleonaea has two full communities and sections of 8 others, equivalent to 6 communities. This means that we can assume either that the present basic settlements are smaller, or that we have still to find 5 ancient ones.

In Sicyonia (Fig. 8) 18 demes of the Classical period have been found - equivalent to 18 basic settlements (15 certain and 3 questionable). Present-day Sicyonia contains 31 full communities and sections of 8 others, equivalent to 35 basic settlements. A similar reasoning shows that the contemporary basic settlements are smaller or we have still to find 20 or 17 basic settlements, or that man did not occupy the whole space available to him.

On the island of Thasos (Fig. 10) we have an exact correspondence of the present-day and ancient times, for 10 ancient settlements have been found and there are today 10 communities.

Thus we find that these five regions contained a total of 84 or 91 settlements, though today they contain the equivalent of 145 communities (Table 1). That is, the regions which have been studied today contain more that 1.5 communities for each of the ancient settlements that have yet been found.

The conclusion is clear, either man has not occupied the space available to him, or Hypothesis A (especially A2) is wrong and the ancient basic settlements were about 50% larger than the present ones, or we have yet to find 61-66 settlements in these areas.







largest radius of 3.4 sq. km., a smallest one of 2.95 and an area of 30 sq. km. (Fig. 11c).

On the other hand, the total length of the Greek coastline is 15,020 km. If this were divided among the 3,230 present-day communities which are on the sea, each community would have 4.63 km. of coastline. The difference between these two numbers shows that either the seaside communities use a larger area of the land than of the sea, or that the inland communities occupy more land than the coastline ones.

To complete our picture of an average basic settlement, we need to compare the area of its cultivated and uncultivated land. In 1958, 28% of the total surface of Greece was under cultivation: 46.8% was pasture, 18.6% was forest and the remainder was 6.6% (Fig. 12).

It is logical to base the area of the average settlement upon its land surface, but we must bear in mind that radii which show the same length on a map do not necessarily have the same meaning. If the land is flat, a man can walk at a rate of up to 6km. per hour, but if it has a steep slope, his speed diminishes sharply.

We will now proceed to examine some of our examples.

### **Cassopaia**

1. The study showed that, at its largest development, Cassopaia had 37 settlements covering an area of 1,080 sq. km. : i.e. the average size of each settlement was 29.20 sq. km. (Fig. 9) compared with our theoretical 21.8 sq. km. (Fig. 11a).

Cassopaia's 6 seaside settlements, which raises the average of each settlement to 31.6 sq. km. against our theoretical 30 sq. m. We can add  $6 \times 30 = 90$ sq. km. to represent the extent of sea for. (Fig. 11b).

2. When the colonists came to southern Epirus from Elis in the N.W Peloponnese, they first established coastal settlements and then slowly penetrated inland. This sequence is clearly marked along the road from Elaia to Mouzakeika (Fig 13). Each new settlement is between 3.4-4.8 km. distant from the older one; corresponding reasonably closely to the diameter shown in our diagrams. Studies now show that these were not only established as commercial settlements (as had often been supposed) but that they were mainly agricultural settlements, which also played a commercial role.

3. According to our diagram (Fig. 11), Cassopaia, with 1,080 sq. km. and a coastline of about 100 km., should have:

- a. 17 coastal settlements (100 km. : 5.90 km)  
 b. These would include 255 sq. km. of the sea's surface  
 c. This gives:
- |       |                            |
|-------|----------------------------|
| land  | 1,080sq. km.               |
| Sea   | 255sq. km.                 |
| <hr/> |                            |
| Total | 1,335 sq. km. living space |

d. For this 1,355 sq. km., the theoretical number of settlements (30 sq. km. each) is 44-45.

e. Comparing these figures with the 37 settlements of the study we lack 7-8.

4. Figure 9 shows that there are some gaps between the settlement boundaries which may indicate where the missing settlements could be located. The location marked (1) on the map should almost certainly contain a settlement; also (5), (6), (7), (8) and (9). The remaining empty areas consist of mountainous land, where there are few possibilities for settlements to exist. However, in the north, settlements might have existed on the present sites of Bestia, Elaphos and Toskesi.

We can therefore conclude that there could have been at least 8 more settlements which have not been found and that the maximum total settlements of the region of Cassopaia could have been 45, each with an average area of 29.7 sq. km.

### Corinthia

1. The largest number of settlements in historical times appears in the Classical period (Fig. 7) when the city-state (which then included a portion of Megaris but not Cleonaea) had a total of 21-25 settlements upon an area of 811 sq. km. per settlement. This area can be compared with the 21.8 sq. km. of Figure 11a.

When we add the area of surface of the sea for the 12 coastal settlements of the Classical period, we arrive at a total of 991 sq. km., giving an average area for each of the 21-25 settlements of 47.9-39.64 sq. km. as against the theoretical 30 sq. km. (Fig. 11b).

2. We have previously noted that 24-29 settlements were found in the Early Helladic period (Fig. 5) when the city-state idea did not exist, and the total land area was 993 sq. km. This gives an average area of 41.3-34.24 sq. km. per settlement on the land.

3. Theoretically Corinthia, with an area of 811 sq. km. and a coastline of around 120 km., should have:  
 a. 20 coastal settlements (with an additional sea surface of 300 sq. km.)

- b. The resulting situation is :
- |       |                          |
|-------|--------------------------|
| land  | 811 sq. km.              |
| Sea   | 300 sq. km.              |
| <hr/> |                          |
| Total | 1,111 sq.km.living space |

- c. This gives a theoretical total of 37 settlements.
  - d. Compared with the 21-25 settlements of the study, we lack 12-16.
  - e. We should note here that three additional settlements are mentioned in ancient texts, but they have not been located.
4. Figure 7 shows that it is possible to locate sites for several of the missing settlements. Three at least (Nos. 1, 2, 3) could be on the shore of the Gulf of Corinth; and perhaps another (4) on the shore of the Saronic Gulf. One more settlement on the Saronic Gulf (5) is just possible as well as others in the mountains; but these are not very likely even though some contemporary settlements do exist there.

Thus, if we accept a theoretical total of at least 26-30 settlements their average area would be 42.7-37.0 sq. km.

### **Cleonea**

- 1. The study shows only 1 settlement in the Classical period (Fig. 7) within an area of 135 sq. km. However, in the early Helladic period, when Cleonea was not a city-state, there were two settlements (Fig. 5). Ancient texts mention an additional place in Classical times, but no trace of it has yet been found.
- 2. Theoretically the area of Cleonea (135 sq. km.) could support 4-5 settlements.

### **Sicyonia**

This study has not yet been completed, but preliminary data gives the following information.

- 1. Sicyonia, with an area of 318 sq. km. had its largest number of basic settlements in the Hellenistic period (Fig. 8), when it had 18 demes - comparable to basic settlements - (15 certain and 3 doubtful) giving each an average area of 21.2-17.6 sq. km. The exact location of the built-up area of each of the basic settlements is not yet determined, so that we cannot estimate the extent of the sea related to the coastal settlements.
- 2. An area of 318 sq. km. and a coastline of 58 km. theoretically should have:
  - a. 10 coastal settlements with an additional sea surface of 150 sq. km.

b. The resulting situation is:

land	318 sq. km.
Sea	150 sq. km.
<hr/>	
Total	468 sq. km. living space

sq. km. per settlement. d. This corresponds to the preliminary findings of the study.

### Thasos

1. The area of the island of Thasos is 379 sq. km. and its coastline measures 95.4 km. The study shows that there were at least 10 settlements in Hellenistic times. The length of coastline shows that these would each have an average of 9.5 km., which is much larger than the theoretical average of 5.9 km. The area of 379 sq. km. gives an average 37.9 sq. km. per settlement. If we add an additional sea surface, the average rises to approximately 53 sq. km., which implies they were either very much larger than we have assumed or that other settlements remain to be found and Fig. 10 shows that Thasos has a number of uninhabited areas.

2. Theoretically, an area of 379 sq. km. with a coastline of 95 km. should have:

a. 16 coastal settlements with an extra sea surface of 240 sq. km.

b. The resulting situation is:

land	379 sq. km.
Sea	240 sq. km.

Total 619 sq. km. living space

c. This gives a theoretical number of about 20 settlements with 30 sq. km. per settlement

d. This is double the number of settlements given by the Thassos study, so we lack approximately 10.

3. Figure 10 shows that it is feasible for there to be three or more coastal settlements in places 1, 2 and 3 and perhaps another one (4) on the mountains near the mines, as we know that these mines were worked in ancient times, and it does not seem reasonable to believe that all who worked in them went up and down from the coastal settlements. However, it is probable that such a mining settlement would not be a typical settlement, because it would have very little agriculture; but it could have had quite a large income, both from mining and forestry. Thus we conclude that Thasos could reasonably have had 14 settlements.

This conclusion conflicts with our Hypothesis A2, which stated that the number of settlements in the past, probably corresponded to the present-day number of basic communities. At the moment, we can point out the conflict and conclude that probably the truth lies between the 10 settlements found, which must have been bigger than our theoretical average (maybe justified by the mountainous character of the island) and the hypothetical location of 14 or more settlements which would correspond in size more closely with the average settlements of



the country.

#### **Hypothesis A4: Evolution of settlements in time**

Hypothesis A2 stated that the basic settlement of Greece was always small; it always approximately the same size with the same radius of movement for its inhabitants, and the survey of 5 regions of the country shows no major deviations sufficient to discount this hypothesis. I wish now to put forward another hypothesis relating to the evolution of settlements in time. One could say that the area of each basic settlement in the past was larger and that it gradually became reduced; or that the area of each basic settlement remained the same over time and that, as the number of its inhabitants grew, new settlements were founded.

General experience as well as the evidence of our studies leads us to accept the second hypothesis: that settlements increased in number without decreasing the average size of their area to an important degree. The reasons are:

a. We have no evidence of large basic settlements which were abandoned in order to found several small ones.

b. We cannot reasonably accept that farmers walked much greater distances to their fields.

c. Though we have every reason to believe that the population of settlements slowly grew larger from the Paleolithic period to the Neolithic, we have no evidence that settlements ever grew smaller in area during an era of the same technology of production. If the settlements had been reduced in area, the number of the inhabitants ought also to decrease because, at this time, they were obliged to produce locally everything they needed for survival. Thus reduction in the area of a settlement would necessarily involve a reduction in the number of its inhabitants. We must therefore accept that the basic settlements did not get smaller in area during the same era, although their population could have decreased at certain times.

In Corinthia (including the area of Cleonaea) we find almost as many settlements in the Early Helladic period (24-29) as in the Classical period (22-27). In between there were far fewer. Thasos, like Cassopaia, reaches its most extensive development in the Hellenistic period.

#### **Hypothesis A5: Structure of settlements**

Although considerable evidence has been found of houses, groups of houses and a few other buildings, no detailed studies have been made of any complete basic settlement, mainly because such studies do not provide impressive enough material for the extensive work involved; people who excavate and investigate prefer to study central places of any civilization from which they get more information. I can therefore only hypothesize that the structure of these basic settlements:

a. was similar to today's villages; that is, their buildings were more scattered on the sloping sides where the herdsmen live with their animals around them; more dense on the plains, where the arable farmers live; and even more dense near the sea, in the fishing villages.

b. It is likely that the agricultural and fishing population did not all live in the actual settlement, but that some lived in scattered groups of farm buildings or even isolated farms.

c. However, probably all inhabitants would come into the basic settlement from time to time to make contact with others or to stay for certain seasons or periods. It is also likely that all inhabitants were administered in some way from the basic settlement and it is very probable that many of them had one in the settlement, where they lived in times of danger or in times where they did not need to be near the crops, and another amid their fields.

All these assumptions are based on present-day practice, which has persisted in Greece for centuries or possibly millennia.

#### **Chapter 4: Hypothesis B: hierarchical development of settlements**

After a certain place in their development, basic settlements tended to be organized in groups. This is inevitably led to one central settlement acquiring more functions than the others. This phenomenon appears probably in the Neolithic period, when arable farming enabled enough food to be produced to allow for the development of other trades and occupations, but we cannot prove anything specific.

The hierarchical development of settlements occurred in different ways:

a. From down, up: this usually resulted from the exchange of products and labor, which tended to create a central market place.

b. From up, down: this resulted from the pressure of the strong on the weak; a pressure that might be exerted by military, political or religious forces, or any combination of them.

c. Various combinations of the two preceding methods. Several other hierarchical relations also affect the organization of settlements:

a. More totalitarian or more democratic relations between the inhabitants.

b. The size and functions of the central settlement.

c. The strength and the ties which hold the whole hierarchical system of settlements together.

In general we can say that the gradual hierarchical development of settlements reflects a hierarchical tendency inherent in man or perhaps even in nature. In the beginning this hierarchical pyramid is often very weak. It is much more vulnerable if it extends from a single central settlement, controlled by a few men who rule over a number of small basic settlements, than if the hierarchy is gradually built-up via a number of intermediate linkages. These linkages can arise from geographical causes- a narrow valley leads easily to the cooperation of neighboring basic settlements; or, there can be social causes, such as the homogenous composition of groups of people; or, there can be other causes such as defense against a common enemy, etc.

It seems that men naturally tend to develop a hierarchical pyramid by their demands for larger incomes leading to more services and more ease in life. This social pyramid has a basic relation with the hexagonal disposition of settlements as was shown by the theories of Christaller.

### **Hypothesis B1: hierarchical pyramid**

Following Christaller, we can hypothesize that this hierarchical pyramid of ancient Greek settlements was based on a ratio of 7 to 10, which means that there is a central hexagonal settlement surrounded by six similar hexagons (Fig. 14). This means that every 7 basic settlements include one central settlement which corresponds to settlement D (Fig. 14). In other words, there are 6 basic settlements of type C (Ekistic Unit 6) and one larger settlement or small town of type D (Ekistic Unit 7).

Further (Fig. 15) every 7 small cities (type D) in turn create a central place which corresponds to a regular city (type E or Ekistic Unit 8). This includes 49 settlements in all: one class E, 6 class D and 42 class C. We can conclude further by showing how a group of 7 cities gives to one large city (type F or Ekistic Unit 9). The territory of mainland Greece does not provide a setting for cities of a larger size.

Thus our pyramid has been presented with four levels of composite settlements (Fig. 16): the large city F, the city E, the small town D, the basic settlement C, but it has definitely lower levels of composite settlements for A and B, because we know very little about them. There are also the non-composite settlements of house and room.

Correlating this theoretical pyramid with our project we can assume that a Greek city-state can be a city of level D, E or F and we do have in fact examples of each. At above levels we can also have the type of "koinon" as is that of the Cassopaians. At the level of type E we can find a city-state but also a political union as in the Union of Epirus. Finally, at the level of type F, we can have a city-state as well as a "Sympolitia" or Confederation.

Geographical and social conditions as well as historical events may prevent the development of a completely regular hexagonal hierarchy. Different degrees of organization will therefore appear at different times and in different places. However, behind each

of the actual case studies we can usually discern the basic hierarchical pyramid of settlements which tends to govern their organization.

### **Hypothesis B2: number of settlements**

We have assumed that the Greek mainland contains 6,061 places for basic settlements; that is for settlements type C and above. This means that one out of every seven of these basic settlements should be settlements of type D and above (i.e. 866 settlements). This again means that one out of seven of these (i.e. 124 settlements) should be type E and above, leaving 742 settlements of type D. A similar reasoning leads us to assume the existence of 18 type F settlements, leaving 106 in type E. In the same way we say that Greece could only contain 2 settlements type G which would theoretically leave 16 settlements of type F, 4 of which would have no strong central settlement. Thus the territory of Greece should be covered by:

5,195	sett. type C: basic settlements or	Ekistic Unit 6
742	sett. type D: small cities or	Ekistic Unit 7
106	sett. type E: small cities or	Ekistic Unit 8
16	sett. type F: large cities or	Ekistic Unit 9
2	sett. type G: metropolis or	Ekistic Unit 10

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6,061 Total settlements

In present-day Greece, Athens in the south and Salonika in the north are very much larger than all other settlements. This is only one of several reasons why it would only be profitable to attempt to compare the ranges of sizes of Greek cities before the onset of industrialization. But the total political area of Greece was then so much smaller that there could be no useful comparison of the total number of settlements by size. However, direct comparisons can be made for special areas at certain periods, particularly on some of the Greek islands.

We do not say that all settlements above the category of type C actually existed. What we say is that there were places for this number of settlement types, and that such a hypothesis can be justified in many ways if we think of orders of magnitude and not of specific numbers. For instance, if we consider the 866 settlements which belong to the category of small cities and above, we see that the assumption is not unreasonable, because we know from various data that in ancient Greece there were hundreds of such towns and cities. We know also that sections of the country were covered by national states, as the states of Thessaly, of Macedonia, of Molossis, of Aeolia, of Acarnania, and others, which imply capitals of a higher category of settlement.

There are several sources for the number of ancient Greek cities. For example, Aristotle and his students wrote a history of 158 political systems. Many of these had developed outside the



Nevertheless, it is clear that at that time there must have been at least 158 city-states with organized political systems. If we assume that these were all the larger cities (i.e. belonging to type E) our assumption shows that we have at most 106 such city-states in the territory we are studying, and, let us say, as many again further out. In other words, Greece at that time would contain about 200 city-states of this size. We know that many city-states were much smaller than this, so that we can assume that there then existed many hundreds of city-states in the Greek world, of which Aristotle and his students studied 158, including some non-Greek ones.

We also know that the Athenian Confederation contained more than 150 city-states, and that, in 425/4 BC, 675 cities (from Crete to the Black Sea, and from the Aegean to Palestine) paid tribute to the Confederation. If we assume that at least half of these cities were in the territory we are studying, it must have contained 300 cities belonging to the Athenian Confederation. Further, if we accept that an equal number of cities were either against the Confederation or neutral, we arrive at 600 city-states in our study area, which can be compared with the maximum number of 866 settlements of higher order than category C that we have assumed could have existed.

Turning to the assumption that every seven basic settlements (type C) give rise to a type D settlement, we believe that, bit by bit, we shall find many relevant facts. At this moment we can only say that in the territory of Cassopaia, we find a ratio of 4:1; in Sparta, the relation at different times was 3, 4, 5, and 6 to 1; in Thasos, we know there were 7 or 8 "fatries" in all. This implies that we have some evidence of ratios of 4:1 to 10:1, which does not contradict a general average ratio of 6:1.

### **Hypothesis B3: extent of settlements**

Proceeding from our earlier assumptions, the size of the total basic settlement (land plus sea) is about 30 sq. km., which means that the size of settlement D is about 210 sq. km.; settlement E is 1,470 sq. km.; and settlement F is 10,300 sq. km. Thus we have now established average areas for a hierarchy of settlements, which will become closer to the truth as we test them against concrete examples (Table 2).

At this point, we can only repeat the theoretical picture that we have built up is not contradicted by such facts as we have assembled, and that we shall continue to test and refine it as more facts come to light. We are simply beginning a process that may prove to be valuable for many aspects of human settlements which we need to understand.