THE TAXONOMIC SYSTEM OF EKISTICS

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We must understand the process of irrational growth, decay, decline and death of the human settlement and its parts. Only when we understand the natural process can we adjust ourselves to every occasion and realise the specific requirements of all or part of the settlement we are dealing with. - Constantinos Doxiadis 1968.

INTRODUCTION

In 1968 Constantinos Doxiadis published his book *Ekistics: An Introduction to the Science of Human Settlements*. In any highly complex field of study there needs to be a systematic form of classification. Ekistics provides a full and complete taxonomic system which facilitates the study of the physical, social, and organic nature of human settlements. This section forms a condensed description of that taxonomic system.

Doxiadis classifies human settlements in the following way:

- by Ekistic units
- by Ekistic elements
- by Ekistic functions
- by Ekistic evolutionary forces
- by factors and processes in accordance with the requirements of the particular study.

EKISTIC UNITS

This classification takes into account the different scales of settlements. The logarithmic division of scale is based upon the population occupying a distinct settlement or homogeneous parts of the settlement. There are 15 Ekistic units:

Table 1: Ekistic Units

Unit Number	Ekistic Unit	Population
1	Man	1
2	Room	2
3	Dwelling	4
4	Dwelling group	40
5	Small neighbourhood	250
6	Neighbourhood	1,500T
7	Small town	9,000
8	Town	50,000
9	Large city	300,000
10	Metropolis	3,000,000
11	Conurbation	14,000,000
12	Megalopolis	100,000,000
13	Urban region	700,000,000
14	Urbanised continent	5,000,000,00
15	Ecumenopolis	30,000,000,000

EKISTIC ELEMENTS

According to Doxiadis, human settlements are systems which consist of five basic elements as follows.

- Nature
- Man
- Society
- Shells
- Networks

Nature provides the foundation upon which the settlement is created and the frame within which it can function. Nature includes geologic resources, topographical resources, soil resources, water resources, plant life, animal life, and climate.

Man (or *Humankind*) is constantly adopting and changing to the forces of nature.

Society comprises all those aspects that are commonly dealt with by economists, social sciences, political sciences, technological disciplines, and cultural disciplines.

Shells, or the built environment, come within the traditional domain of architects and the engineering profession.

*Network*s are the transportation and communications systems of humankind.

Each element in Table 1 is further subdivided into sub-elements.

Table 2: Ekistic elements (Doxiadis, 1968, p35)

Nature
1. Geologic resources
2. Topographic resources
3. Soil resources
4. Water resources
5. Plant life
6. Animal life
7. Climate

Man
1. Biological needs
2. Sensation and perceptions
3. Emotional needs
4. Moral

Society
1. Population composition and density
2. Social stratification
3. Cultural pattern
4. Economic development
5. Education
6. Health and welfare
7. Law and administration

Shells

1. Housing
2. Community services
3. Shopping centres and markets
4. Recreational facilities
5. Civic and business centres
6. Industry
7. Transportation centres

Networks

1. Water supply systems
2. Power supply systems
3. Transportation systems
4. Communication systems
5. Sewerage and drainage
6. Physical layout (Ekistic plan)

An Ekistic grid of Ekistic Units and Ekistic Elements can show the coverage and extent of any particular study of human settlements.

Table 2: Ekistic Grid Coverage of Study

EKISTIC UNITS		1 Man	2 Room	3 Dwelling	4 Dwelling group	5 Small neighbourhood	6 Neighbourhood	7 Small town	8 Town	9 Large city	10 Metropolis	11 Conurbation	12 Megalopolis	13 Urban Region	14 Urban continent	15 Ecumenopolis
ELEMENTS	Nature															
	Man															
	Society															
	Shells															
	Networks															

According to Doxiadis, human settlements exist to make humankind happy and safe. He orders the five elements into a pentagon of goals with man, or humankind, at the top.

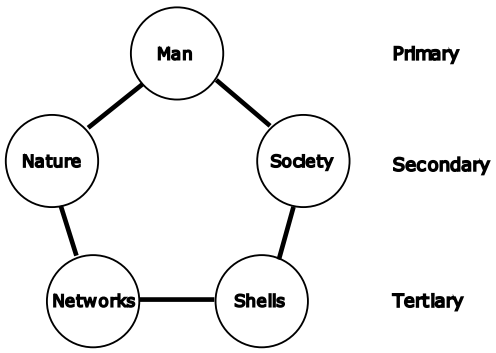

Figure 1: Ordering of Goals in Human Settlements (Doxiadis, 1968, p318)

I make the observation that if humankind is to continue to survive for millennia, then humankind should not attempt to dominate nature, but instead should regards itself as being a part of nature.

EKISTIC FUNCTIONS

Human settlements can be classified in terms of the functions that an Ekistic unit serves. In classifying a settlement as being industrial or commercial, it is better to talk in terms of the percentage of different functions carried out within that Ekistic Unit. At a smaller scale or Ekistic Unit the function is the activity carried out within that space. An example is sleeping and eating.

EKISTIC EVOLUTIONARY FORCES

This classification is based upon a macro-scale of history where settlements are classified as being nomadic, agricultural, urban, urban-industrial, and industrial. This takes into account the flow of time. The following time dimensions from the present are included in my Ekistics Relationship Matrix.

PAST

- 10,000 years
- 1,000 years
- 100 years
- One generation
- 5 years

PRESENT

FUTURE

- 5 years
- One generation
- 100 years
- 1,000 years
- 10,000 years

EKISTIC FACTORS & DISCIPLINES

This classification relates to the factors which contribute to the creation, maintenance, operation, and function of human settlements. In an Ekistics Relationship Matrix each of the following aspects are included:

- Economic
- Social
- Political
- Technological
- Cultural.

LAWS OF HUMAN SETTLEMENT DEVELOPMENT

In a summary of the *Ecological Systems* section, the growth and climax stage attributes of ecological systems are listed in a table. Human settlements also form a system and there are strong similarities between ecosystems and human settlements. Doxiadis' theory of the growth and development of human settlements in terms of statistical laws show a strong similarity with the growth of ecosystems.

Doxiadis' Ekistics theory of the growth and development of human settlement is based on:

- existing settlements

- extinct settlements
- critical interpretation of the phenomena of these settlements
- theoretical models the validity of which has been checked but
- with existing settlements.
- tests and experiments carried out in existing settlements.

The following is a list of Doxiadis' statistical laws that I considered to be the most relevant:

CREATION

LAW 7 The development and renewal of human settlements is a continuous process. If it stops, conditions leading to death are created; but how long the actual death will take depends on humankind factors.

LAW 13 Time is a factor necessary for the development of settlements. As such it is inherent in settlements and is physically expressed in them.

EXTINCTION

LAW 15 The gradual death of a settlement begins when the settlement no longer serves and satisfies some of the basic needs of its inhabitants or of society in general.

LAW 17 In the death process of a settlement its elements do not die simultaneously. The same holds true for the values that it represents. As a consequence, the settlement as a whole has much greater chances of surviving and developing through renewal even if some of its elements are dying.

LAW 19 The death process of a settlement is complete when every reason for its life has ceased to exist, or when the facilities it provided have been made in a location which can be approached more easily, or which can provide them to a higher degree.

LAWS OF INTERNAL BALANCE

LAW 21 The elements in each part of a settlement tend toward balance.

LAW 22 The balance among the elements of a settlement is dynamic.

LAW 23 The balance of the elements is expressed in a different way in each phase of the creation and evolution of a settlement.

LAWS OF SIZE

LAW 28 The population size of a settlement depends upon its role in servicing certain needs for its inhabitants and for its Ekistic system.

LAW 29 The physical size of a settlement depends upon its population, its needs, its role within the Ekistic system and its topographic location.

LAWS OF FUNCTIONS

LAW 30 The functions depend upon the geographic and topographic location, the population size and the Ekistic role of the settlement.

LAW 31 The role of a settlement in the Ekistic system depends on its function, its geographic location and its population size.

LAWS OF STRUCTURE

LAW 34 All communities, and therefore, all Ekistic units tend to be connected to each other in a hierarchical manner.

LAW 35 The fact that all communities tend to be connected in a hierarchical manner does not mean that this connection is an exclusive one. Many other connections at the same level or at different ones are equally possible, but for organisational purposes the connections are hierarchical.

LAW 37 The type of services and the satisfaction provided by every Ekistic unit, community and function of a higher order to those of a lower order depend upon time-distance and cost-distance.

LAWS OF FORM

LAW 40 The main force which shapes human settlements physically is the tendency towards a close interrelationship of all its parts.

LAW 44 The form of a settlement is determined by a combInation of the central, linear and undetermined forces in adjustment to the landscape and in accordance with its positive and negative characteristics.

LAW 45 A settlement grows in the areas of greatest attraction and least resistance.

LAW 47 Another force which exercises an influence on the form of a settlement is the tendency towards an orderly pattern.

LAW 50 The right form for a human settlement is that which best expresses all the static positions and dynamic movements of man, animals and machines within its space.

LAW 52 The densities in a settlement or in any of its parts depend upon the forces which are exercised upon it.

LAW 54 The satisfaction derived from the services provided by the Ekistic unit to the inhabitants greatly depends upon the proper density of the settlement." Doxiadis (1968, pp288-316)

ECUMENOPOLIS

Doxiadis coined the name *Ecumenopolis* for a global city of the future. His forecast of this global city was based on the world's population levelling out at 30 billion people by 2100. Doxiadis envisaged Ecumenopolis as being a utopian global city with a consumer level of life and energy consumption per capita much greater than it is now. It is doubtful whether Doxiadis in 1968 was aware that a human population of 30 billion people with a high level of consumption would far exceed the carrying capacity of our planet Earth. It is also doubtful whether Doxiadis was aware of peaking of fossil fuels before 2100 with the need to transition over to renewable energy, and that continued use of fossil fuels with subsequent emissions of greenhouse gases to the atmosphere would exacerbate climate change.

EKISTICS RELATIONSHIP MATRIX

Attributes of steady state settlements can be mapped onto an Ekistic Relationship Matrix which can then be used as a check list and catalyst for identifying and developing objectives, proposals, and policies required to ensure long term sustainability of human settlements. All policies would need to be mutually consistent and supportive without conflict.

Table 3: Ekistics Relationship Matrix

1 = Attributes 2 = Relationships With Other Attributes 3 = Objectives 4 = Proposals 5 = Policies																										
		Nature					**Man**					**Society**					**Shells**					**Networks**				
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Units of Space	Man																									
	Room																									
	Dwelling Group																									
	Small Neighbourhood																									
	Neighbourhood																									
	Small Town																									
	Town																									
	Large City																									
	Metropolis																									
	Conurbation																									
Unit of Time	Present																									
	5 years																									
	Generation																									
	Century																									
	1,000 Years																									
Aspects	Economic																									
	Social																									
	Political																									
	Technological																									
	Cultural																									

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