

Inaugural Essay:

The Definition and Relevance of Astrosociology in the Twenty-First Century

(Part One: Definition, Theory and Scope)

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by

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Introduction

The purpose of this essay is to articulate a preliminary understanding of **astrosociology** in terms of its definition, scope, and its relevance as a new subfield of sociology. As an *introduction to astrosociology*, this essay represents a foundation on which interested scientists can build a new *focused* body of astrosociological knowledge and literature. It is crucial to generate interest in this subfield of sociology precisely because it does not yet exist on any mainstream or coherent level. Beyond that, there is currently no concentrated effort to consolidate the subject matter at this time; although the elements of astrosociology exist as parts of many sciences in an unorganized and dispersed form. The astrobiological literature, for example, makes frequent references to sociological concepts. A search on the World Wide Web for “astrosociology” results in very few legitimate resources. As such, there is currently no astrosociological scientific community. Astrosociology is unknown to most sociologists and other scientists.

The goal of ***Astrosociology.com*** is to alter this state of affairs into one in which sociologists and others deliberately contribute to a single body of knowledge called ***astrosociology***. This website was created to serve as (1) a forum for the collaborative construction of a new body of sociological knowledge and (2) a depository for the astrosociological literature focusing on issues such as those presented here. This website exists because astrosociology is not yet a widely recognized subfield of sociology, and therefore it can benefit from a centralized approach. It is intended to serve as a catalyst for the growth of astrosociology from a general state of nonexistence. As such, the consolidation of this knowledge and future collaboration focusing on a single, widely-recognized sociological subfield is overdue.

The intention here is to promote astrosociology so that it becomes recognized by (1) astrosociologists who contribute to it and (2) sociology departments that offer courses at some point in the future. An early objective involves the recruitment of sociologists (and others) to “become” *astrosociologists*. Currently, this means that social scientists in other areas will have to change their area of concentration and recognize astrosociology as their preferred subfield of sociology. Of course, students may declare their area of concentration as *astrosociology* from the outset (when this becomes an option). For the most part, however, training in astrosociology must initially exist “in the field” and as part of a virtual community since no departments offer it in their existing programs. Astrosociology should be acknowledged in sociology introduction courses and later on as entire courses and areas of concentration (i.e.,

majors). It is expected to be a slow process, but its importance is undeniable as this essay attempts to demonstrate.

Consider the following argument which illustrates the necessity of understanding astrosociological issues. Astrosociology is not only a relevant focus of the sociological study of past and contemporary social systems, but an absolutely vital one for understanding social conditions and social forces that will characterize societies in the future. One area serves as a good example of this. Societies become more dependent on science and technology as they become more complex. And indeed, very little is known with very much precision about the interactive effects between science and technology, on the one hand, and society on the other hand. Even less is known about the impact of astrosocial phenomena on a particular society. Another complication involves the increasing cooperative interactions among nations as all human societies mature. These types of issues make astrosociology both interesting and invaluable. Before exploring such issues further, however, a precise definition of astrosociology is the first step for moving toward a greater understanding of this unexplored area of sociology.

Defining the Conceptualization and Scope of Astrosociology

The term ***astrosociology*** is adopted here over such phrases as “sociology of astronomy,” “socio-astronomy,” or “social astronomy” for at least three reasons. **First**, and most importantly, the term *astrosociology* is much more broadly inclusive than a

focus only on astronomy. It focuses on **astrosocial** phenomena, as will be explained shortly. Astronomy comprises only one subset of the astrosocial phenomena falling under the wide-ranging scope of astrosociology. It is not limited to the study of astronomical phenomena. That is, astrosociology is not narrowly focused on how astronomy is carried out by astronomers and their societies, or on the details of their findings. This is included under the purview of astrosociology, but it is just one component of the overall scope. Any particular astrosociologist could concentrate on a specific set of astronomical phenomena, as a subset of astrosocial phenomena, just as a narrow focus is advisable in any other major subfield of sociology such as criminology or medical sociology. Thus, astrosociology is not specifically concerned with astronomical discoveries or technological innovations themselves, but it is concerned about how such discoveries and innovations affect various elements of a particular society.

Second, the currently growing field of **astrobiology** is of a similar scientific approach. It therefore makes logical sense to use similar terms. If each word is dissected, “astro” for both refers to “star;” and the second part, “biology” or “sociology,” indicates the scientific discipline. Astrobiology has been adopted by NASA and other scientific communities around the world. It is anticipated that a similar positive future awaits astrosociology. The two fields have much to offer and, in several ways, are complementary to one another. For example, astrosociology would study how astrobiology is conducted, its impact on society, and the ways in which it is important to various social groups and institutions. Astrobiologists have already indicated interest in

such matters. The astrobiological literature already touches on the impact of discovering extraterrestrial life. (Ideas related to astrobiology and SETI will be considered in more detail at later points in this essay). Finally, the use of terminology similar to astrobiology also helps to give the uninitiated a general idea of the subject matter which can only be helpful to a new sociological subfield. This term has the potential to attract both sociologists and astronomy-related scientists based solely on its construction.

Third, the term *astrosociology* is more simple and concise. This attribute may seem trivial, but a good “catch phrase” can help a new field to grow more easily in popularity in the scientific and lay communities. A single agreed-upon term is needed so that interested parties can contribute to the same dynamically-evolving body of knowledge. Although this term provides a good indication of its general focus, which is a good start, no single term can characterize the complexity and scope of this new sociological subfield, as will soon become evident to the reader.

There is no claim that term “astrosociology” is coined here. For example, a passing reference is made in Allen Tough’s (1995) discussion about the positive consequences of SETI even before the detection of extraterrestrial life. Tough also mentions “social astronomy” as a possibility, but this term suffers from the implied focus on only astronomical matters rather than the more inclusive astrosociological ones. There are other references to astrosociology as well. For an example, see Helmut Abt’s (2000) discussion concerning “bibliometric” studies focusing on the study of

astronomical publications and accomplishments. (Another term in this area is “socio-astronomy.” For a good example, see André Heck’s *Updated Bibliography of Socio-Astronomy* web page). **Astrosociology**, it is argued here, is the best term for the proposed subfield of sociology. Additionally, this essay calls for a decided shift away from a definition such as these types of approaches and to one more in line with the approach of mainstream sociology.

So, astrosociology is not a new term unknown to the world. That is not the contention here. Rather, it is contended that astrosociology is undefined in the context described here and the effort initiated by **Astrosociology.com** is necessary to promote it to its proper state of understanding and acceptance. It is time to study the connections between space-related activities (science, technology, and human activities) and human societies. Efforts focusing on the sociology of science and technology exist, of course, but they are not dedicated exclusively to astrosociological issues. This reality is unacceptable since human efforts are increasingly focusing on the mysteries and challenges of space. Activities related to outer space are becoming more relevant to the lives of ordinary citizens.

A central theme in this essay is that societies tend to incorporate more and more characteristics of a spacefaring nation as they become more complex. However, the ways in which astrosocial forces are shaping societies (overall, as well as their institutions, social groups, and cultures) are currently not the focus of a dedicated effort of scientific understanding. The definition of astrosociology, and the pursuit of it as a

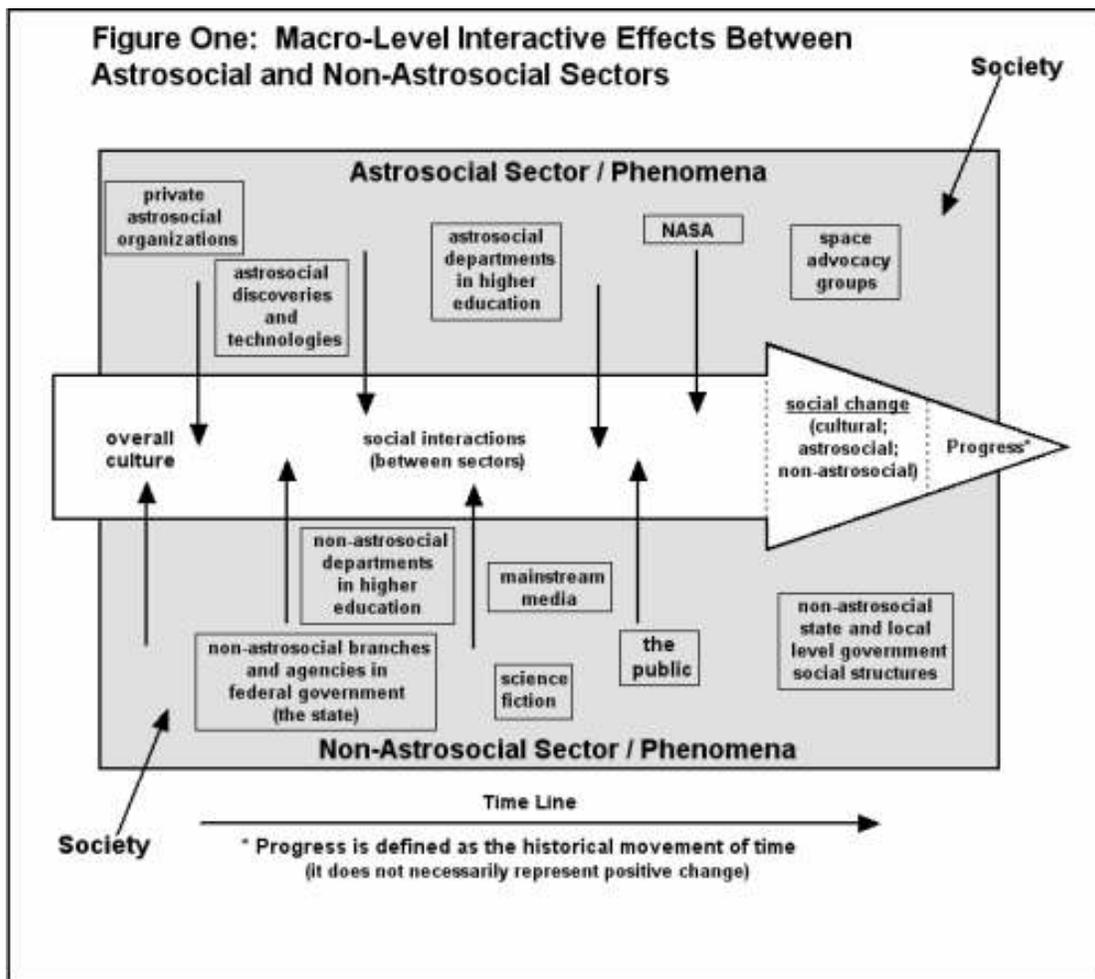
social science, changes that reality. The definition of astrosociology that follows is the first step to launching astrosociology as a viable subfield of sociology.

A Working Definition. ***Astrosociology*** is defined as *the sociological study of the two-way relationship between **astrosocial phenomena** and other aspects of society (i.e., **non-astrosocial phenomena** or other social phenomena) at the various levels of social reality and organization (i.e., the micro, middle, and macro levels of analysis).* The concept of **astrosocial phenomena** (have I coined a new concept?!) pertains to all social conditions, social forces, organized activities, objectives and goals, and social behaviors directly or indirectly related to (1) spaceflight and exploration or (2) any of the space sciences (e.g., astronomy, cosmology, astrobiology, astrophysics). It includes all outcomes of these phenomena in the form of scientific discoveries and technological applications, new paradigms of thought in the astrosocial and non-astrosocial sectors of society, as well as any resulting changes of social norms and values in any of the social structures of a particular society.

Another component of the concept of *astrosocial phenomena* is that it includes all the norms, values, roles, and statuses that characterize social structures in the *astrosocial sector* (which is introduced in the next section). The concept of *social phenomena* is thus broken down into two major parts: astrosocial phenomena (as defined above) and non-astrosocial phenomena (a category which includes all types of social phenomena not considered to be astrosocial in nature). Astrosocial phenomena are thus a form of social phenomena which describe all the characteristics of social

structures, social groups, and societies created through human interactions and activities.

The Astrosocial and Non-Astrosocial Sectors. As depicted in Figure One, astrosocial phenomena originate in the astrosocial sector of a given society, while non-astrosocial phenomena originate in the non-astrosocial sector. Interactions and



overlaps exist where the two sectors meet. The separation of a particular society into two sectors interacting at the macro-level of complexity represents a dimension of

social life previously unexplored as an important element of cultural character and an instigator of social change.

A major part of early astrosociological thought must address where to draw the conceptual line between astrosocial and non-astrosocial phenomena. Indeed, as soon becomes clear upon thinking about the relationship between astrosocial and non-astrosocial phenomena, the two are connected and routinely interacting with one another. The separation of a society into astrosocial and non-astrosocial sectors is an artificial academic exercise, but it forces attention upon the conception of a separate astrosocial sector. This is important because the conception of an astrosocial sector is not found in the sociological literature.

Figure One represents only an approximation without the complexities of the astrosocial sector, the non-astrosocial sector, and the interaction between the two. As will soon become clear, the relationship between the two sectors is both dynamic and ever-changing. Cooperative efforts between government agencies (e.g., NASA) and private companies (e.g., Boeing), or educational organizations, are commonplace in contract work and research efforts. Connections also involve the funding of efforts that benefit astrosocial and non-astrosocial sectors.

The distinction between the astrosocial and non-astrosocial sectors is further complicated by the fact that many organizations possess elements of social structure that are parts of both astrosocial and non-astrosocial segments of society. Examples

include universities, branches of government (and their agencies), and corporations. Universities have astronomy departments in addition to non-astrosocial departments such as Spanish and agriculture. The federal government includes agencies such as the IRS in addition to NASA. And a single corporation may have one division that manufactures rockets and another that manufactures commercial jets. Again, the line between the astrosocial and non-astrosocial sectors of a single society is often difficult to draw precisely; but it is necessary in formulating an astrosociological theoretical framework.

The interaction between the astrosocial and non-astrosocial sectors is but just one social dimension generating social change. The separation of society into only two sectors serves to focus attention on this type of interaction; it does not imply that a particular society is divided only along this dimensional line. Thus, it represents an astrosociologically-centric approach aimed at placing the focus of the sociological imagination squarely on a new area of sociological inquiry.

Other Definitional and Theoretical Issues. This essay focuses mostly on developed (industrial and post-industrial) societies. Developing societies, in contrast, possess weakly defined astrosocial structures as a rule, but they may increase their cohesion and influence with the assistance of astrosocial structures in developed societies. For example, the astrosocial sector of a developing society may be bolstered by the United States space agency (i.e., NASA) providing a contract for construction of a piece of space-related equipment or the training of an astronaut to fly in space as part

Figure Two: Areas of Astrosociological Study Categorized by the Four Major Sociological Perspectives

<u>Sociological Perspective</u>	<u>Level of Analysis/ Complexity</u>	<u>Examples of Social Phenomena Studied</u>
Conflict Theory	macro level	social conflict between astrosocial and non-astrosocial social groups and institutions and how it drives social change
	macro level	extent of societal resources (e.g., wealth, power, prestige) gained from astrosocial sector by various subpopulations (astrosocial elite?)
	macro level	social conflict between NASA and private organizations intent on space activities; and social conflict between NASA and federal government regarding funding for astrosocial projects and programs
	middle level	conflict between management and labor within astrosocial organizations (such as over safety issues)
Functionalism	macro level	how astrosocial structures and non-astrosocial structures contribute to the proper functioning of a given society
	macro level	study of evolutionary cultural change resulting from the positive interactions of astrosocial and non-astrosocial sectors
	macro level	study of astrosocial functions and their relationships to other parts of society
Feminism	macro level	gender inequality in astrosocial groups and institutions; including differences in power; and the roles of women in astrosocial groups and institutions
	macro level	gender inequality in the astrosocial sector compared to the non-astrosocial sector
	middle level	the characteristics and determinants of discrimination against specific women in astrosocial organizations; and conversely, the progress of specific women in astrosocial organizations
Interactionism	micro level	various focuses in terms of how social interactions contribute to astrosocial goals of a particular social group
	micro level	how social interaction contributes to both cooperation and conflict between members of astrosocial and non-astrosocial organizations
	micro level	how interactions within astrosocial organizations create and shape an “astrosocial reality”

of one of its missions. For all societies, then, the development of the astrosocial sector is part of the general modernization process. Each society is assumed to be characterized by a unique astrosocial sector. This assumption is thus built into the very definition of astrosociology.

Astrosociologists must look at all levels of social reality or complexity. The macro-level model offered in Figure One is of central importance, but it in no way represents all the considerations of astrosociology. This implies that the major perspectives of sociology (i.e., functionalism, conflict theory, interactionism) should be applied when appropriate to the study of space and society as defined by astrosociology. A diverse approach is vital as all perspectives and levels of complexity provide additional insights into any understanding any sociological phenomenon.

As with sociology in general, this multidimensional approach yields the best well-rounded understanding of astrosocial phenomena and their interactions with non-astrosocial elements of society. Figure Two provides examples of issues of interest to astrosociologists in the four most prominent sociological perspectives. Undeniably, other perspectives also have important contributions to make as well. The reader should keep these examples in mind as various aspects of astrosociology are discussed throughout this essay.

Before moving on, it is important to note that this essay does not offer a “theory of astrosociology.” Its purpose is to provide an initial working definition and briefly

discuss some of the important issues. This essay sets the parameters and scope for understanding astrosociology as a sociological subfield, but it is much too early to completely shape this body of knowledge. Theoretical models will be offered by many of those who join the astrosociological community and research will contribute in the formulation and refinement of theories to follow. On the other hand, this essay does offer several research hypotheses which may serve as starting points for astrosociological inquiry, and thus the creation of one or more major theoretical models.

At this early stage of development, however, even the definition of *astrosociology* is subject to minor refinement at one end of the continuum to total reformulation at the other extreme. Thus, this essay represents a serious starting point from which the meaning and scope of astrosociology can move toward a greater consensus as the astrosociological community forms and contributes to the growth of this new body of knowledge and literature. At the outset, one fact is immutably clear, however: ***astrosociology must take a sociological approach in terms of theoretical orientation.*** That is, the development of the sociological imagination is vital and astrosociology must be approached as a sociological subfield at heart.

The Scope of Astrosociology. This definition clearly implies a focus on a wide-ranging collection of certain types of social phenomena. Below, the five ***central themes of astrosociology*** summarize important points of focus. Other issues are added as this discussion proceeds, but they are all based on the following areas of focus as they are fundamental to an astrosociological approach:

- (1) the nature of the line separating astrosocial and non-astrosocial phenomena (including how each can directly interact with, and influence, the other) which is the basis for the four following themes of astrosociology [society separated into two sectors, as shown in Figure One];
- (2) the impact of astrosocial phenomena (e.g., discoveries and new technologies, space policies, astrosocial activities of all types) on social/cultural change in other parts of society [impact of astrosocial sector on non-astrosocial sector];
- (3) how the various non-astrosocial forces (including norms and values) combine to influence astrosocial forces in terms of direction, priority, and other aspects of astrosocial change [impact of non-astrosocial sector on astrosocial sector];
- (4) how astrosocial activities are organized and pursued by people, organizations, social institutions, entire societies, and global consortiums [middle and microsociology in the astrosocial sector]; and:
- (5) how the interactions between the astrosocial and non-astrosocial sectors -- including cooperation, accommodation, and conflict -- contribute to the various forces of social change generated by society to shape larger cultural norms and values, and thereby future activities and priorities/policies [interactions between sectors].

Social and cultural change is thus driven by activities in the astrosocial sector, the non-astrosocial sector, and interactions between the two sectors. The scope of astrosociology is indeed vast in many ways. The themes above serve to organize the discussion in this section. Again, an initial understanding of astrosociology, and this entire essay, is fundamentally tied to these five themes.

Regarding the **first theme**, the separation of a particular society into the astrosocial and non-astrosocial sectors is a central component of the astrosociological framework. This point was already discussed with the presentation of Figure One. It is important to point out that this general approach, as presented in this essay, leads to the study of astrosocial phenomena in a new and more organized manner. In this

context, astrosociology is an area of study currently neglected by sociologists in a systematic and focused manner.

The **second theme** focuses on the astrosocial sector's impact on the non-astrosocial sector, and society as a whole, as activities within it are carried out. This theme includes a focus on astrosocial phenomena and takes into account the current level of development of the astrosocial sector. The growing importance and scope of astrosocial forces extends from the time humans first sought to understand the cosmos; and elements of the astrosocial sector form at that historical point in a particular society's development. From that time on, astrosocial phenomena are generated by human activities within astrosocial groups. Astrosocial phenomena tend to increasingly influence all parts of a particular society as science and technology become more sophisticated and entrenched in the overall societal social structure and larger culture. Social structures dedicated to science and technology will increasingly concentrate on astrosocial phenomena.

The second theme also implies the scope of astrosociology includes the study of the impact of astrosocial science and technology on the non-astrosocial sector. An obvious example is how the outcomes of research and technologies created by NASA are transferred to the non-astrosocial sector, including how larger culture and social structures are affected. The level of astrosocial influence on overall society will increase in significance and scope as a particular society becomes increasingly dependent on science and technology. The second theme is therefore critical to the

astrosociological approach because it characterizes the general shift in such a society's emphasis toward astrosocial priorities and influences. Astrosocial forces become increasingly important.

The **third theme** must be emphasized because the non-astrosocial sector is still the most influential as it includes all social phenomena and social structures not related to those considered to be astrosocial in nature. These aspects of society are historically dominant, especially before space-related activities (and, of course, flight itself) became possible. The hypothesized increasing influence of the astrosocial sector must be seen in relative historical terms. Much of the control of astrosocial activities, such as the pursuits of various objectives, is controlled by elements of the non-astrosocial sector. For example, when the House Science Committee decides on future funding for NASA programs, a non-astrosocial institution of society is having a clear and direct influence on the astrosocial parts of that society. This relationship not only affects NASA, but also all the contractors and their workers involved in any program under consideration.

Thus, the non-astrosocial sector will lose some of its importance in relative terms, but it will still represent the dominant sector. There are many non-astrosocial institutions serving important social functions. Such non-astrosocial needs will remain and require fulfillment. Examples include meeting the needs for food, shelter, defense, education, religion, and community.

The **fourth theme** relates to the study of astrosocial organizations and the middle and micro levels of complexity. It is important to study how astrosocial groups carry out their functions within an organizational subculture. This essay focuses most strongly on the interactive effects between the two societal sectors, but the study of astrosocial organizations is no less important. Astrosocial subcultures function in way that often impact on the astrosocial sector in particular and the entire society generally. Diane Vaughan's (1996) study concerning the *Challenger* launch decision that resulted in tragedy due, in part, to a culture that normalized risk, and the lessons not learned from it (which carried over to the *Columbia* disaster), is a good example of astrosociological research in this area. Of course, it is not seen as part of an astrosociological literature because, technically, it does not yet exist. How astrosocial organizations operate and how they interact with non-astrosocial organizations and groups are both of central interest to astrosociologists.

The **fifth theme** is a vital component of the astrosociological approach. The scope of astrosociology is unquestionably extended to cover the complex web of relationships and behaviors associated with all forms of astrosocial phenomena. However, a major concern of astrosociology must focus upon how the astrosocial sector interacts with the non-astrosocial sector. A major concern, therefore, involves the relationships and mutual influences between the astrosocial sector and non-astrosocial sector and, in turn, how they affect a given society as a whole. Although the line separating the astrosocial and non-astrosocial sectors is not always obvious, even to the participants, and may not be the most important social dimension in a particular

set of circumstances, the interplay between the sectors does create social forces that impact on the particular society on an overall basis.

While astrosocial forces contribute more to social change as time passes, a great deal of overall social change for a particular society results from social forces generated by the interactions between the astrosocial and non-astrosocial sectors. An important area of research is related to how much social change results from these interactive effects. In fact, it is important to measure the proportion of social change created by non-astrosocial, astrosocial, and interactive forces at different points in a particular society's history.

The interactions between the astrosocial and non-astrosocial sectors of a given society are the general focus, and this implies a two-way or mutual influence of each on the other taking place on an ongoing basis. Each focus is one side of a two-sided coin. Both sides are vital to the overall understanding of how a particular society functions on this previously unexplored social dimension. There is cooperation, accommodation, and conflict between the two sectors as ongoing relationships between the two continue to work themselves out. Again, the implication of why astrosociology is becoming more relevant to sociology relates to the increasing importance and influence of the astrosocial sector and astrosocial phenomena; assuming that a given industrialized society continues to develop into a spacefaring society.

Concluding Remarks Concerning Definition and Scope. The remainder of this discussion touches on some of major areas of astrosociological study in terms of how science is carried out and what technologies are developed in astrosocial sectors of society; but most importantly is how these results contribute to the present social environment and to social change. In summary, then, the general approach is to study how astrosocial and non-astrosocial phenomena are interconnected, how they mutually influence one another, how these effects influence a given society endogenously on an overall basis, and finally how all these interactions and phenomena affect other societies as exogenous social forces.

It is important to take a multi-perspective approach (see Figure Two). All three levels of social complexity (i.e., micro, middle, and macro) each contribute important insights as well. Much of this discussion focuses on the macro level, but this reflects the objective of this essay which is to provide the reader with an overall understanding of astrosociology.

The exploration of astrosociological issues in the remainder of this essay is based on the foregoing discussion. It is not an exhaustive coverage of such issues, being essentially the first comprehensive treatment of astrosociology; but it is intended to provide a solid foundation for the generation of the further development of astrosociology. It is therefore far from the last word in determining the definition, scope, and implications of astrosociology. It is, in fact, only an initial attempt to shape the fundamental issues of this proposed new sociological subfield.

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(revised on 04/18/2004)

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