Map-induced semiosis

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A. Introduction

1 Based on his personal survey of the landscape of semiotics, Noth (1995: 3) observed that it has become "neither that unified science nor that 'unifying point of view' which Morris had in mind". It is not surprising therefore for there to be controversy over the nature of meaning in map semiotics (see Zarycki, 2001).

2 In Noth’s handbook (1995: 79) “the concept of sign is generally used in its broadest sense of a natural or conventional semiotic entity consisting of a sign vehicle connected with meaning”. Semiotics is not unduly concerned with the monadic model of the sign, with its 1:1 correspondence between the sign vehicle and the sign. It is more concerned with the factors or correlates of the sign1 which could explain how they establish meaning in various ways. The different schools and their theories vary the factors and/or their expressions to yield a different set of categories of signification. Applied semiotics studies specific classes and instances of sign systems in terms of these theories, factors and categories.

3 This paper summarises the main models of the sign, and then explores the nature of meaning within these approaches. Primary sources2 suggest that Peirce’s characterisation of the sign is capable of accommodating other theories of meaning. Greenlee (1973: 7) notes that “an understanding of what can have meaning requires an understanding of what meaning is. It should not be surprising, then, that Peirce’s sign theory is equally a theory of meaning and meaning-bearers”. The paper notes that computer-mediated map use for advancing the frontiers of cartography is punching holes in the boundary between meaning and significance, which Peirce and his followers insisted were just aspects of meaning. They themselves prioritised significance in signification. The paper concludes that the semiotic triangle may not be the most useful representation of Peirce’s semiosis in cartography.

B. MODELS of the SIGN

B.1 The Dyadic Model

4 Sassure’s (1857 – 1913) semiotics is a science of form - or of mental structures - not of material substances. His dyadic model interprets the sign as a relationship between a signifier and signified(s). This model was proposed to explain the nature of the linguistic sign within a synchronic, as opposed to a historical perspective. The sign is a polysemic, pure mental entity whose full meaning is to be found within an arbitrary system based on cultural conventions. The

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1 Greenlee (1973, p 8) notes that factors "cannot exist independently of the whole" of which they are a part; the whole in this case being the sign.

2 The primary sources in Hayden and Alworth (1965), were particularly illuminating and relevant.
signified(s) refers to the **content** or meaning (eg tree), while the signifier is not the material object but a **mental image** of it. Meanings may be inferred from the presence of other concepts within the semantic network of a system and especially from the **differential value of concepts** when they are compared with other opposing concepts.

5 Since meaning is arbitrarily defined, the model excludes consideration of the objects of the world (known as **referential objects**), which become irrelevant **extrasemiotic** objects. Noth (p 61) also notes that Sassure rejected the view that "ready-made ideas exist before words". Thought considered before language, "is only shapeless and indistinct mass". Language mediates and guides the way in which we experience the world, such that **man himself is a cultural product**.

**B.2 Metasemiology**

6 Hjelmslev (1899 – 1965) founded his semiotics on Sassure's structural linguistics, but he assumed a broader definition of language to include nonlinguistic forms. He too regarded the sign as consisting of **pure form**, consisting of Sassure's two inseparable faces of content-form and expression-form. He used a **biplanar symmetric projection** of these two correlates of form to explain how they relate to their respective pools of non-semiotic amorphous substance only through the mediation of semiotically-structured substances, which he called **formed substance** (see figure H2 in Noth: 67). Both the content and expression plane consisted of pure form and formed substance; and the relationship between form and substance was potentially complex. Even so, in the base system the sign is a **denotative** one. He defined a **hierarchical semiotics** in which either the content or expression plane of the first-order denotative sign could itself become part of a higher order semiotic (see Noth, p 71 - 73). In a **metalanguage**, the higher order system includes the content of a denotative system, such as a language, and extends itself through the addition of a new expression plane. All **grammars** are metalanguages; they define an additional expression plane containing new terminology to describe a given natural language. A **connotative semiotic**, on the other hand, extends a given expression semiotic through additional layers of semantic content. This connotative extension of a denotative sign may be a) form, b) substance, or c) form and substance. The inclusion of substance results in a tetradic model. Within his metasemiology, he did not regard entities which exhibit an isomorphic 1:1 mapping between the content and expression form, such as the 'red':'stop' relation of traffic lights, as semiotic signs - they were regarded as signals. Instead, he restricted the term sign to **twice-decomposable** semiotic entities (Noth: p 71).

7 The connotative semiotic, with its admission of substance, led to the recognition of two levels of linguistic meaning – public conventions of meaning within a system of signs, and an individual interpretation of meaning, both of which are arbitrary. Consequently, Hjelmslev's framework of metasemiology with its provision for connotation, has been extended within semiotic schools of aesthetics and literary theory. Hjelmslev also noted that signs consist of meaningless components, called **figurae**.

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3 Sassure's example of mouton and sheep (p 61) shows how the value of terms depends on the linguistic system, i.e. cultural conventions.

4 MacEachren's (p 239 - 240) account of Hervey's description of figurae, which accepts 1:1 mapping as in traffic lights, differs from the original Hjelmslev thesis.
Trabant (1970, cited in Noth, 1995: 73) built on the idea of figurai and regarded the first order content-form in connotation as empty-form since “Literary meaning exists only in every actual creation of this meaning by individual interpreters. The units, however, which are filled with meaning by their interpretations exist as empty units, independent of their interpretation”.

B.3 The Triadic Model and its Underlying Philosophy

9 For Peirce (1839 – 1914), semiosis, and not the sign, is the proper object of semiotic study. He had a pansemiotic view of the universe (see Noth, 1995: 41) in which anything could function as a sign. Semiosis is "the process in which the sign has a cognitive effect on its interpreter" and "semiotic is the doctrine of the essential nature and fundamental varieties of possible semiosis" (cited in Noth, 1995: 42).

10 Peirce’s polysemic sign is something which stands to somebody for something in some respect or capacity (Noth, 1995: 42). Semiosis involves three elements - a sign-vehicle, an object (that which it represents) and an interpretant (the mental image of the sign, which is itself a sign). "The sign can only represent the Object and tell us about it. It cannot furnish acquaintance with or recognition of the Object [...] it presupposes an acquaintance in order to convey some further information concerning it" (Peirce, cited in Noth, 1995: 43).

11 The sign-vehicle is “the perceptible object" [...] the vehicle conveying into the mind something from without" as the sign in "its own material nature" (Noth, 1995: 42). Despite this, Noth (2003) proposes that a mental map, which lacks a material sign-vehicle but which refers to geographic space in a meaningful way, could be considered as a Peircean sign. Pierce ‘s used the term representamen but sometimes calls it a sign. His note “all signs convey notions to human minds", but “there is no reason why every representamen should do so” (cited in Greenlee, 1973: 44) explains his insistence on the triadic relation. So, the term sign-vehicle is now widely used only when it functions as a correlate of the sign.

12 The signified object could be a material object, an imagined entity or a thought. It can be immediate or mediate (dynamic). The immediate object is the mental representation of the object, whether this object is real or fictive. The mediate object lies outside the sign, “which can only indicate it; the interpreter has to determine it by collateral experience” (Peirce, cited in Noth: 43; see also Greenlee, 1975: 66-67).

13 Interpretants are categorised into a) the immediate outcome due to the sign’s peculiar interpretability prior to further thought; b) dynamical outcome which could vary with each interpretation of the sign; and, c) final outcome “which every interpreter is destined to come if the Sign is sufficiently considered” (Peirce, cited in Noth, 1995: 44), by habit, law or logic. Since the interpretant is a sign which could provide an interpretation of a given sign even in the future, it is not the interpreter.

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5 Peirce maintained that the primary function of thought is to produce belief. Belief "involves the establishment in our nature of a rule of action, or say for short, a habit. [...] thought relaxes, and comes to rest for a moment when belief is reached. [...] it is a stopping place; it is also a new starting place for thought. [...] The final upshot of thinking is the exercise of volition." (Peirce,1878: 158). He adds “the whole function of thought is to produce habits of action; [...] what a thing means is simply what habits it involves. Now, the identity of a habit depends on how it might lead us to act, not merely under such circumstances as are likely to arise, but under such as might possibly occur, no matter how improbable they may be. What the habit is depends on when and how it causes us to act. As for the when, every stimulus to action is derived from perception; as for the how, every
14 Semiosis results in a series of successive signs ad infinitum since every sign creates an interpretant which becomes the representamen (sign-vehicle) of a second sign. This series can be interrupted but never really be ended since it presents the potential for interpretation in some further sign (Noth 1995: 43).

15 Peirce’s (1878) pansemiotics draws on the scientific philosophy of antecedent reality, which is independent of Man, and is tempered by his own empirical philosophy of pragmatism.7

16 Peirce’s sign represents (and not just refers to) the object. As explained by Bunge (cited in Noth, 1995: 95), reference relates a construct to a thing as a whole, representation matches a construct with some aspect or property of the thing. As explained later (see para 21), the function of representation does not imply that the referent is the only possible source of meaning.

B.4 Behaviourism

17 Morris (1971: 444 - 448) argued that “the interpreter may be included as a fourth factor” (p 19)) is consistent with Peirce’s ideas. His behaviourist definition of sign reads “If anything, A, is a preparatory stimulus which in the absence of stimulus-objects initiating response-sequences of a certain behaviour-family causes a disposition in some organisms to respond under certain conditions by response-sequences of this behaviour-family, then A is a sign” (Morris, 1971: 437). This definition advocates a black-box approach to the study of semiosis; “it is not necessary to deny ‘private experiences’ of semiosis, but it is necessary from the standpoint of behaviouristics to deny that such experiences are of central importance” (p 21).

18 Morris (1971: 55-59) dismissed the term meaning as confusing and as adding nothing to the set of semiotical terms. Instead, he analysed the sign along three dimensions to identify three sub-disciplines of semiotics - 1) Syntactics, unlike linguistic syntax which is only the study of rules or syntagmatic relations for combining words into sentences, his includes sign combinations in paradigmatic relations, which are relations of possible substitutions based on associations. 2) Semantics which focuses on the relation between the sign-vehicle and its referent. 3) Pragmatics which focuses on the relationship between the sign vehicle and their interpreters. However, he stressed that they are only aspects of the unitary process of semiosis (p 19). Morris produced a 4 x 4 table of qualifying adjectives for sixteen types of discourse based on his conviction “that the major types of discourse in purpose of action is to produce some sensible result. Thus we come down to what is tangible and practical, as the root of every real distinction of thought, no matter how subtile it may be” (p 160).

6 Postmodern deconstruction of old maps, for example, provides such unanticipated interpretant(s).

7 According to Hayden and Alworth (151) Peirce “is the acknowledged author of the philosophy of pragmatism”. This is corroborated by William James (1907) who worked out and expressed the philosophy of Pragmatism at Harvard (1880-1910). Peirce explains his idea with “the rule for attaining […] clearness of apprehension is as follows: Consider what effects, which might conceivable have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object” (1878: 161). Greenlee (1975: 103) explains that in Peirce’s version of pragmatism, “the meaning of an ‘intellectual concept’ consists in a precept or rule specifying what operations of a certain type would lead to observable results”. Greenlee (1973: 10) notes that “According to Peirce, the rule involved in symbolism is always a habit”, reflecting Peirce’s contribution to a movement which Greenlee calls naturalism.
everyday life can be distinguished by two dimensions of criteria, the characteristic mode of signifying and the primary mode of sign use” and gave examples of each (Morris, 1971: 205).

C. Sense, Meaning and Significance of the Sign

19 Not surprisingly, Noth (1995: 92) cautions that “The meaning of meaning is a semiotic labyrinth on both theoretical and on terminological grounds”. Meaning in Sausure’s model is defined by some arbitrary convention, relating signifiers to signified(s) through differential values of concepts within a system, which had to be learnt. In Hjelmslev’s connotative semiotic, Trabant proposed that meaning is projected by individuals (and groups).

20 Peirce’s (1878) scheme accommodates the Sassurean notion of meaning as defined by an arbitrary convention. However, he also accommodated the scope for the source of meaning to be located in an extrasemiotic referent which contrives to produce the final interpretant. But, in his words “The object of the sign is one thing; its meaning is another” (cited in Greenlee, 1973: 58).

21 For Peirce (1878: 160) “What a thing means is simply what habits it involves”; recall that behaviour is just one expression of habit. Lady Welby’s (1903: 213) proposed three levels of meaning, “(1) the sense, (2) the meaning and (3) the significance – that is the tendency, the intention and the essential interest of what is brought before their notice”. These have become key terms for mining the quagmire of meanings.

22 For example, initially, a tendency makes a baby cry when hungry. This is the immediate interpretant of an organism to a stimulus, due to some conditioning either by evolution or cultural belief. In this case, the referent is a physiological process producing the sign-vehicle, hunger, with the cry as an instinctive interpretant. The baby has no intention as such at this stage, but it has significance for the mother. The significance is more difficult to work out when the child cries with an intent which

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8 Peirce’s belief in objective reality comes through in “Different minds may set out with the most antagonistic views, but the progress of investigation carries them by a force outside themselves to one and the same conclusion. [...] The opinion which is fated to be ultimately agreed by all who investigate, is what we mean by truth, and the object represented in this opinion is the real.” (1878: 170).

9 Lady Welby (1903: 215) explains “There is, strictly speaking, no such things as the Sense of a word, but only the sense in which it is used - the circumstances, state of mind, reference, ‘universe of discourse’ belonging to it. The Meaning of a word is the intent which it is desired to convey - the intention of the user. The Significance is always manifold, and intensifies its sense as well as its meaning, by expressing its importance, its appeal to us, its moment for us, its emotional force, its ideal value, its moral aspect, its universal or at least social range.” She noted that many acts and movements may not be consciously ‘meant’, i.e. intended, but they are significant – “they impel us to search for these causes in order to direct, to utilize, or to counteract their effects” (p 214).

10 Some semioticians discount such pains of hunger as nonsemiotic, for it does not involve informed volition. Peirce, in his analysis of habit, allows that ‘Habits may or may not be distinguished from ‘innate dispositions’, and the distinction does not seem to be important for semiotic. Where Peirce does advance a distinction, the principle isolating the habit states that its genesis must be in ‘modifications of a person’s tendencies toward action, resulting from previous experiences or from previous exertions of his will or acts, or from a complexus of both kinds of cause” (Greenlee (1975: 125).
may or may not refer to hunger. The first-time mother has to judge the transition from tendency to intent and evaluate the cry (the symptom) in some context which takes account of the child’s development and other circumstances. In addition to the mother’s dynamic interpretant (a potentially incomplete assessment which may be intelligent but incomplete), the sign may contribute towards a higher level and more significant final interpretant (systematised medical knowledge based on extensive case studies), and further semiosis resulting in a doctor’s dynamic interpretant (in the presence of intelligence (information) on a range of symptoms and relevant referents, such as an epidemic, which the mother may be unaware of). So, it appears that innate tendency and intended meaning(s) are related to sign production (representation), inferred significance is related to sign use (signification), with the emphasis being on the latter.

23 The dimension of use does not necessarily imply psychologism. Interpersonal meaning is possible because the sign’s content implies a set of latent significations, irrespective of the presence of an instance (Greenlee, 1975: 30). Peirce distinguished between general would-be’s (habits and laws of nature), which can only be learnt through what happens to be (instances) and universal might-be’s (anything which can be described without contradiction). The universal need not be instantiated only the generals must be (Greenlee, 1973: 36 – 37).

24 James (1907: 227) explains that the pragmatic method entails “The attitude of looking away from first things, principles, categories, supposed necessities; and of looking towards last things, fruits, consequences, facts”. He goes on to state that “the word pragmatism has come to be used in a still wider sense, as meaning also a certain theory of truth”, namely that assumed by Peirce. Peirce (1878) makes a distinction between truth (the ultimate interpretant) and meaning (the intention); the latter being based on transient belief systems which prevail until doubt restarts the cycle of semiosis leading to another structural revolution. As signs produce new beliefs, there follows a “translation of a sign into another system of signs” (Peirce cited in Noth, 1995: 99). As such, the Peircean model of semiosis can subsume the Sassurean concepts of sign. For, it is the language of a synchronic paradigm (and not reality per se), which defines the intended meanings within a cultural paradigm that has to be learnt; science is no exception.

25 The prime focus of both the dyadic and triadic models are such cultural constructs. Mainstream semantics is concerned with the operational relationship of words and assertions to referents and/or Hjelmslevian content. Korzybski’s general semantics (as explained by Rapoport, 1952) regards culture as Man’s “extracorporeal mechanism of heredity”; like an in-born genetic tendency, it mediates understanding, experience and behaviour. Korzybski believed that language affects action through the functioning of the nervous system. This brings into the psychological and psychiatric realm the Gestalt principle of isomorphism (Katz, 1951: 55), which postulates a correspondence between phenomena as experienced and their physiological correlates. Korzybski argued that meanings based on type-
based cultural conventions, trigger psychiatric reflexes (immediate interpretants) of low self esteem, prejudice, and so on. He advocated an extensional orientation, focused on the uniqueness of things and events, to free the individual from the tyranny of words and higher order forms, and to sharpen their awareness of significant changes occurring in the non-static world system. He upheld the application of the methods of classical semantics, namely a) operationalism and b) the criterion of predictive value in establishing truth to audit belief-based habits (Rapoport 1952: 340). Thus, “For a general semantist, communication is not merely words in proper order properly inflected [grammar] or assertions in their proper relation to each other [logic] or assertions in proper relation to referents [semantics] but all these together, with the chain of fact to nervous system to language to nervous system to action” (Rapoport 1952: 350).

26 Although Peirce’s semiosis was paradigm-oriented, his recognition of the grip of unconscious habitualised thought does provide a place for general semantics. Although Peirce’s sign is a mental entity, it could refer to material referents. Moreover, he notes that there is “no first” nor “last sign” in semiosis. His semiosis does not exclude deconstruction of legisigns and symbols into dynamic and immediate interpretants. Greenlee (1975: 113) cites a passage from Peirce, where he argues against the necessity for a first cognition in semiosis which applies “just as well to the problem of ‘regress’ (or progress) forward as to the regress backward.” For without such extentionalism, there would be no progress.

D. Map-based Semiosis

27 Cartography has come a long way from the early days of fictive and Portolan maps. However, elements of current derived mapping, which have immense social significance, are still naïve and misleading (Visvalingam, 2000). Use of a Tektronix CRT for research on population mapping (Visvalingam, 1976) showed how cartographic maps have played a significant role in the refinement of concepts. With the availability of an ICL Perq with its window-based interactive graphics, such investigative use of maps was emphasised since the distribution of vast sums of public monies are informed by distribution maps (Visvalingam and Kirby, 1984). Here, maps function more like inferential rather than descriptive statistics; they are hypotheses-driven. Although visualisation (i.e. the perceptible aspect of sign) is not essential in such precept-driven statistical map use (see Visvalingam, 1990), visual map(s) play an indispensable role a) in engendering doubt; b) in the investigation and verification of concepts underpinning sign production and policy-related interpretations; c) in insightful derivation of alternative precepts for mapping significance; d) in subsequent demonstration of these new mapping concepts; and,

14 It is well-known that brain-washing, propaganda and advertising exploit this fact and create not just psychological but also physiological responses to language. Hence, it is now a crime in Britain to use language with abusive connotations and the Disability Law takes account of mental illnesses, including stress and depression arising from such use. So, the exclusion of general semiotics as a misconceived cult by mainstream semiotics appears incompatible with modern thinking. Korzybski’s use of the adage - the map is not the territory – has been well debated in cartography.

15 Rapoport (1951: 349) explains that “An operational definition is essentially an extensional definition, because it tells us what to do (instead of what to say) to bring the thing defined within the range of experience”. Protocol statements provide such operational definitions in science.

16 Indeed, artistic movements and scientific breakthroughs have come from an in-born capacity in individuals for both intensional and extensional mental activity.
e) in the use of new concepts in the process of political bargaining (Visvalingam, 2000). The focus of this type of mapping activity is on revising not only the belief systems which define the state-of-the-art of a discipline but also on the much more difficult task of changing the belief systems of end-users of maps. Such evaluation entails Korzybski’s extensional regression, which involves the cross-checking of the predictive implications of abstractions against a) facts – both data and ground truth – based on operationalism (see examples in Visvalingam, 2000); b) neural and psychological interpretants (Visvalingam, 2001; Visvalingam, 2002: last paragraph); and, c) wider consequences on referents (map model-based labelling). The interactive use of maps facilitates this and makes one realise why Peirce, Morris and Korzybski emphasised the unity of the sign and regarded syntactics, semantics and pragmatics as just aspects of study.

28 My use of maps led me to support ICA’s move to re-define the terms cartography and map and raise a few questions. The past emphasis (given the dominance of national mapping agencies) on map making is giving way to a new emphasis on map use in this age of dynamic online mapping. Cartography and maps help us “communicate, explore and understand spatial information” (Visvalingam 1988). In the past, academics only published the final maps; not their exploratory maps “private experiences” (see para 17). It is not surprising that Zarycki (1998: 77) could find that “only a small part of the pragmatic literature relevant to cartographic communication has been discovered so far”. Fortunately “private explorations”, often noted in some detail in unpublished reports, can now be placed in the public domain thanks to the Internet. Creative visualisation involves not just seeing but also hypothesis-driven re-presentations of the data from different perspectives. This involves the use of a set of interactive signs, including images, diagrams and maps; geography is just one aspect of reality. Visvalingam and Kirby (1984) therefore noted that the cyclic communication model assumed by cartography was inadequate for explaining the changing nature of map use. Visvalingam’s (1988) adaptation of Guptill and Starr’s model and the representation by Kelnhofer (2001: 5) provide a better starting point for exploring the multiplexed web of cartosemiotics. A clear distinction between cartology (for want of a better term) and cartography would help to cut out arguments at cross purposes. Without seeking to define these terms, I regard cartology as the academic discipline concerned with exploring, systematising and expounding the body of ‘habits’ (e.g. content and know-how) intended to guide the practice of cartography. The practical discipline of cartography is concerned with the use-driven making and use of all maps (signs), including mental maps.

E. Conclusion

29 Although Peirce himself stressed that semiosis, rather than the sign, should be the proper object of semiotic study, (t)this complex and dynamic process is often caricatured in the form of the semiotic triangle. Eco (1979: 59), quite rightly,

17 The attempts at re-definition are still on-going as of January 2003 (Mike Wood, personal communication).

18 Indeed, since the 1980s the Ordnance Survey of Great Britain has seen itself primarily as a vendor of digital data and information. Although it continues to publish visual maps, it addresses the trend towards on-demand mapping by end-users.

19 Both the uninformed ad-hoc mental maps of non-cartographers and the knowledge-based ad-hoc use by skilled researchers at the “private experiences” stage have the potential to lever advances in cartography.
complained that “the study of content is often complicated by recourse to an over- simplified diagram which has rigidified the problem in an unfortunate way; the diagram being the well-known triangle, especially that of Ogden and Richard’s (1923)”. Greenlee (1975: 110 -111) despaired at an even more fundamental level, “Having attempted to journey with Peirce as far as possible [...] in order to discover whatever insights into the nature of signification he might have to offer, I propose to part company with him on the question of the triadicity of signification. The insistence on his triadicity is arbitrary even on Peirce’s own grounds since Peirce maintains that the series of interpretants is unlimited. Accordingly, it would be better to describe the sign relation as polyadic – with the number of relata being unlimited – rather than as triadic.” His triad (p 111), which consists of a sign, interpretant and interpretant’s interpretant ad infinitum, rejects the requirement for an ‘object stood for’ as one of the three correlates. Greenlee’s recursive dyad is also too succinct and does not do justice to Peirce’s multiplexed ideas nor to cartography which, with its participation in physical and social engineering, mediates actions in the world of referents.

30 Peirce’s semiosis seems to accommodate a variety of relevant semiotic perspectives and my own past use of maps in concept refinement - in population mapping, cartographic generalisation and terrain sketching. The influence of endemic habits on sign production, the use of hypothesis-driven signs in changing these habits, and their verification, drive semiosis (the mind) both forwards and backwards. Yet, the central notion of habit, is given only a partial and implied expression in the linguistically motivated semiotic triangle, some interpretations of which dispense altogether with the referent. Cartographers have taken a lead in representing map-induced semiosis at a more appropriate level of detail (see Schlichtmann, 1999; Wolodtschenko, 2001). Descriptions of my use of sets of interactive maps have been posted on the web for the benefit of others seeking to represent semiosis in cartology/cartography.

REFERENCES


