Journal of Research and Didactics in Geography (J-READING), 2, 3, Dec., 2014, pp. 87-100
DOI: 10.4458/4403-07

J - READING
JOURNAL OF RESEARCH AND DIDACTICS IN
GEOGRAPHY
homepage: www.j-reading.org

"Now we need to make Italians". Semiotics and Semantics in Teaching Cartography

Russell Foster[a]
[a] School of Geography, Politics and Sociology, Newcastle University, Newcastle-upon-Tyne, United Kingdom
Email: russell.foster@newcastle.ac.uk

Received: October 2014 – Accepted: November 2014

Abstract

Cartography remains a cornerstone of contemporary pedagogy and everyday life, with a profusion of digital maps, mApps, and navigational tools intersecting in daily life. Included in this are uncounted maps circulating on coins and banknotes within the Eurozone. Yet despite this proliferation of cartography, geography teaching remains excessively focused on a mechanistic method of teaching mapmaking according to mathematics, composition, and components; while geographers who use maps often do so in isolation from maps' provenance. This article uses the example of maps on euro banknotes to make two arguments. First, that maps do not reflect reality – they create it. Through their banal omnipresence, these maps help construct an identity of "European" which does not reflect the reality of the EU. Second, this paper demonstrates the necessity of a semiotic and semantic approach to teaching maps, map language, and the power of maps to construct identity. This calls for a Lexical Approach in which maps are critically examined as the end process of complex performances which call the map into being, rather than a purely Functional Approach in which maps are treated and taught as neutral, value-free reflections of the world.

Keywords: Cartography, Identity, Semiotics, Functional Approach, Lexical Approach, Iconography, Euro

1. Making Sense of Maps

In contemporary geography teaching, cartography remains prevalent (Williams et al., 2013). Despite dire predictions of "cartophobia" (Gregory, 1994, pp. 62-64), maps remain a fundamental aspect of teaching (Rossetto, 2013). However, a potential problem remains. Teaching cartography in further and higher education is too frequently absent, or confined to the mechanics of map composition. Scales, projections, GIS, and the myriad of techniques which create today's computer-generated charts. This is valid, yet such forms are only one aspect of cartography. Frequently, the con*tent* of maps is less significant than the con*text* in which they appear.

The Rome Declaration on Teaching Geography (2013) stresses the fundamental importance of geospatial pedagogy in European education. If this noble aim is to be achieved, geographers must consider that maps are not simply ancillary illustrations of geographical concepts but are, in and of themselves, expressions of geospatial, geopolitical, and

political knowledge. Maps have the power to shape and fundamentally alter our worldview, and to effectively teach geography, this essential aspect must be considered.

This paper uses the cartographic content of euro banknotes to illustrate how the content of maps is subordinate, in influencing map readers' worldviews, to the contexts in which they appear. The everyday, banal omnipresence of currency affords the iconography of euro banknotes a political power far beyond that of mere graticules and gradients. Those using cartography in teaching must be aware of, and communicate, this fundamental power: maps do not simply *reflect* reality – they *make* it.

2. Making Reality

"L'Italia è fatta. Restano da fare gli italiani"[1].

Massimo d'Azeglio

A map is, quite simply, a form of communication. We create maps to communicate spatial information to others, or to communicate to our future selves by recording information for later reference. Thus the purpose of any map is to convey spatial information, which can be done in a myriad of forms – a map can be drawn, spoken, gestured, performed, and imagined. The most prevalent form of map, though, remains the graphic image via which we navigate our way through a perpetually changing world. As a form of communication, maps are, like any other communicative system, composed of a form of language (Foster, 2013). This specifically *visual* language is the heart of maps' inherent power to make identities.

Like any other form, visual language is composed of a number of components which merge together. Visual language is, due to its ability to transcend linguistic barriers, a uniquely powerful medium (Earnest and Fish, 2014). Spoken language consists of phonemes, pitches, tones, and other audio clues which, through mutual agreement and convention, have specific meanings within a particular language. Written language consists of symbols which are either arbitrary or lost in the mists of history, and like the sounds used in spoken language, the shapes and squiggles of writing again work through common convention in order to communicate a particular meaning. Maps' visual language works in precisely the same format – a collection of shapes, colours, lines, and mostly symbols which have, over the centuries, acquired the ability to convey information simply because we have collectively agreed what these otherwise random icons represent (Foster, 2015).

In all of these languages – spoken, written, and visual – particular elements which lack any inherent meaning are given a mutually-agreed convention, and are used in different permutations to communicate information. It can be persuasively argued that maps are no different to speech or writing, and that just as the teacher of letters or rhetoric must instruct their students in how to assemble the basic components of a speech or teach a child how to hold a pen or brush and form the arbitrary shapes which we use to record information in a human writing system, the teacher of geography must simply instruct his or her students the socially-agreed meanings behind map language so that the student, like a child learning to read and write or a person learning a new spoken language, can not only interpret a map to elucidate meaning, but to learn how to assemble the components in different styles in order to communicate their own information.

It would be tempting to leave such cartographic instruction at that, and press forward with techniques and philosophies of how best to instruct students in interpreting the bombardment of maps to which we citizens of the twenty-first century are exposed on a daily basis. Maps, after all, are now everywhere. We see them peppering newspapers and TV broadcasts; they (in)conveniently pop up on our smartphones to help us navigate without the dire consequences of asking our fellow pedestrians; they lurk, half-noticed, on currency, passports, letterheads and campus blueprints. Navigating this modern maze of maps composed by professional cartographers is sufficient evidence, it might be argued, that maps in contemporary society are neutral, apolitical, objective representations of the world. Yet nothing could be further from the truth.

[1] "We have made Italy. Now we need to make Italians".

To explain, let us consider once again the fact that communication is achieved through a particular form of language, in which components are assembled in different orders to convey different meanings. The words on this page are an easy example. You are currently staring at a collection of lines, dots, and semicircles which have meaning to us as a form of writing. In school, we learned what these little shapes represent; learning each symbol, then how these symbols can be formed into basic combinations, then finally how these combinations can be extended to form increasingly complex and elaborate structures whose meaning goes beyond the basic shapes used to express that meaning. We do not read the plays of Shakespeare, or the proclamations of Ramesses the Great, or the philosophies of Confucius, simply on the basis of what each little symbol represents. The symbols used – Latin letters, Egyptian hieroglyphs, or Chinese signs – are merely one component of the information communicated. We do not read writing purely on the basis of what the individual elements mean, but rather how these elements combine to communicate a meaning far more substantial than the sum of the individual components. The *message* is more than the *medium*.

It is arguable, then, that we do not interpret spoken or written communication purely on the basis of individual components, and that speech or text has the power not merely to communicate information but to create a new form of information. Maps are, ultimately, a form of communication. It is not enough to treat maps in the classroom and the lecture theatre simply as supporting information whose collected symbols convey information. These jumbles of visual and symbolic information can *create* new information just as effectively – if not more so – than the most lyrical written texts.

Crucial to this is the awareness that it is not simply the *content* of map language which frame our understandings. As semiologist Arthur Berger reminds us, the *context* of an object, primarily its location, is as much a part of its language as its text, graphics or colour. Just as speech or script can have different meanings based upon the context in which they are spoken or written, so can maps[2].

Map language may appear either so obvious that it is not worth examining, or alternatively, so inscrutable that understanding it is a futile quest. Yet as Alan MacEachren (1995, pp. 1-20), Mark Monmonier (1996, pp. 1-4), and Denis Wood (1993, pp. 95-142) demonstrate, map language can be understood through categorisation. The three categories appropriate to cartographic language are semantics, semiotics, and location, and through these methods it is possible to decipher the nuanced language of maps to identify messages embedded within. These embedded messages are discourses of identity and belonging, and thus assembling a framework for identifying them within map language is essential. But before we do this, it is necessary to examine precisely what are the two elements of map language. These are *tropes* and *meta-tropes*. Following this, we will investigate the shortcomings of the *Functional* approach and advocate teaching cartography within the context of the *Lexical* approach. We begin with tropes.

3. Tropes

"*Cartography does not qualify as an aesthetic art form... Unless a map bears strong fidelity to reality, the purpose of mapping will not be served*" (Robinson, 1995, p. 317).

Arthur Robinson's above words, in instructional textbook on mapmaking, form a bold statement which is in-keeping with a handbook on constructing charts. Perhaps a little *too* bold. As Paul Laxton (in Harley, 2001, pp. 14-15) demonstrates, whose version of "reality" it is trying to depict is an altogether different problem. Yet it must be acknowledged that a

[2] Berger uses the hypothetical example of a Coca-Cola can in two different public forums. In a diner in small-town America, that object represents traditional values and patriotism – or just a means of quenching thirst. But in a North Korean propaganda film, that same object would represent foreign aggression and decadence. This is an extreme example, but illustrates how seemingly innocuous objects can, depending on their location, communicate *very* different messages. See Berger, 2009, pp. 145-152.

significant aspect of cartography is indeed the symbolisation mapmakers use in their quest to represent the world around us. This is the most obvious form of cartographic language – tropes.

Tropes, as David Barnes and James Duncan (1992, p. 5) clarify, are simply the visual symbols we see when we look at a map and are the cartographic equivalent of phonemes or letters in spoken or written language. As we have seen, like verbal and textual language, the individual "words" or symbols of cartographic language have different functions, and are only comprehensible in relation to each other. Some are the equivalent of nouns and adjectives, signifying specific concepts. Others are more nuanced, collecting the whole into an understandable statement.

Much has been written on the ontology and origin of cartographic tropes – David Woodward's and J.B. Harley's multi-volume monument *The History of Cartography* offers a richly detailed interrogative narrative tracing the development of icons on the map. And while we may cast a casual eye over the extinct, quaint icons of premodern Western cartography – stylised bumps on the Waldseemüller Map to represent hills (Hodgkiss, 2007), little buildings on the *Tabula Peuteringiana* to indicate Roman towns (Riffenburgh, 2001, pp. 10-11), and snarling monsters on the Hereford *mappamundi* to denote non-Christian lands (Howgego, 2009, pp. 36-40) – the principle of such iconography is very much alive today. Admittedly, we are no more likely to find a banknote map which depicts rivers and railways than we are to encounter a one which warns us that *"Here be Dragons"*. However, a long evolutionary history has seen tropes morph and adapt over the millennia, and while many icons have not survived the evolutionary process, have entirely changed their meanings, or are simply not found on the maps of Brussels and Strasbourg, other tropic elements remain crucial.

Tropes are not merely the abstract or stylised icons which we must try and interpret to make sense of the map. Tropes are also the broader aspects or themes which are the foundation of said symbols. Let us return to the analogy of written language. Some elements perform the same function as nouns – for sake of argument, we will simply call these "tropes". Yet just as a random collection of words written on a page has no meaning without a unifying grammar, we cannot make sense of basic tropes without a broader theme to determine their meanings. Some tropes, then, have the function of forming a grammar through which we can make sense of the basics. We will call these broader ones "meta-tropes".

The basic tropes consist of those icons for topographic and anthropographic features such as rivers and cities, and this visual paraphernalia is noticeably absent from EU maps. The meta-tropes, though, go beyond individual symbols. The first of these are spatial determinatives (Robinson, 1995) which, like linguistic determinatives, are symbols which allow the reader to understand the context of other symbols. These include such aspects as the use of one shade or hue to signify one nation's territory, and the use of an alternate colour to signify someone else's. These will inevitably be separated by some sort of line. Also included are legends or labels – the use of written words to expressly denote something. These "signifiers" will be examined in greater detail below. And finally, tropes which remain as important to modern maps as to the cartographers of the Copper Age, are visual signifiers such as shapes and colours. Maps are essentially a visual art form existing at a peculiar crossroads where language, image, function and aesthetics meet. This must form the core of cartographic pedagogy. Yet the map is more than a mere composite of aggregate linguistic components – it is equally powerful as a holistic device. Akerman (2009) reminds us that one of the most potent characteristics of a map is prominent display in order to communicate a grand visual message. Thus an equally important aspect of any map, is its location and intended purpose.

It is not merely the *contents* of a visual medium which are worthy of examination. Location and intended audience are equally crucial. When considering map language, then, we must be conscious of the power of what Denis Cosgrove (1999, pp. 1-23) terms "The Public Gaze". This latter fundamental is the map's existence, boldly proclaimed and proudly displayed, within public space. This is a conscious act with the intention of appealing to the public's inherent scopophilia – the act of finding pleasure in viewing visual images which, as Freud asserts, is acquired subconsciously in

childhood (Rose, 2007, p. 107). This power is as old as cartography itself. Maps which appear in public arenas must be comprehensible to a broad readership which, in the case of the Union, is distinctly polyglot. Thus, public maps are not only more simplified and understandable than the esoteric military, commercial, ecological, governmental, and transport maps of specialist users, but by dint of their association with a public body they are transformed into expressions of political discourse which have immense potential. It is clear, then, that the physical location in which a map is displayed conveys a meaning beyond the simple elements which compose the map. Just as the words on this page have a particular meaning in their location, the same words would convey wildly different information were they to appear outside the location of academic text.

We have identified, then, two primary aspects of cartographic language – tropes and location. In order to make sense of these areas of study a connecting theory is required, one which addresses the potential power of language. This theory is a combination of semantics and semiotics, which must remain at the heart of map interpretation and cartographic teaching.

4. Semiotics of Map Language

"Thou art thyself, though not a Montague.
What's Montague?
What's in a name? That which we call a rose
By any other name would smell as sweet!".

Romeo and Juliet
II:1. 83-86

This Shakespearean snippet is perhaps the most widely-used opening to semiotics. As a field of study, semiotics deals with the relationships between the components of languages, seeking to understand how otherwise abstract symbols acquire a meaning in the minds of viewers, and how those meanings are communicated and perpetuated (Cobley and Jansz, 2012). The object being studied remains constant regardless of the language used to study it – Romeo may be from the House of Montague, bitter rivals of her House of Capulet, but the man remains the man regardless of what collection of letters and sounds are used to denote him. Yet language itself, as Juliet mournfully muses, can affect our perception of the object and the message(s) it conveys.

In his analysis of these symbols and the discourses they communicate, Berger (2009, p. 45) asserts that "nothing has meaning in itself; an object's meaning always derives from the language and the network of relations in which it is embedded". Like any object, a map has no intrinsic meaning in and of itself – it is merely an artefact which we must interpret. MacEachren (1995, p. 10) aptly summarises this by stating that "maps are as much a reflection of (or metaphor for) the culture that produces them as they are a representation of the earth or activities on it". As discursive artefacts, then, maps must be read (and taught) with a clear understanding of the role of *semiotics*.

Semiotics offers a valuable inroad to teaching students the fundamental power of maps. Initially addressing the spoken elements of verbal languages and the graphic symbols of writing, semiotics has been applied to a broad spectrum of disciplines overlapping humanities and the natural and social sciences (Berger, 1991). The origins of semiotics lie in positivist grand theories of Victorian linguistics, and an intellectual hangover continues to linger as a consequence of early semiologists' attempts to construct a grand theory – a "queen of the interpretive sciences" (Berger, 2009, p. 4) capable of explaining the totality of human existence. Thus, it may appear odd to apply semiotics to critical cartography. Yet the application of semiotics has advanced far beyond the linguistic philosophy of its nineteenth-century pioneers, Ferdinand de Saussure (Sanders, 2004) and Charles Peirce (Almeder, 1980). Semiotics is used to analyse the components of other forms of language – whether the language is verbal, visual, performative, conscious or not – and has been accepted within the social sciences as a contested, debated, but nevertheless valid, approach to phenomena ranging from texts and images to architecture (Flier in Perrie, 2006, p. 390) and illness (Berger, 2009, p. 4). From its acceptance in other social science disciplines, it is evident that semiological analysis offers valuable insights to be made beyond the confines of its linguistic origins.

MacEachren (1995, p. 11) flatly asserts that "we cannot eliminate the cultural baggage

inherent in any human artifact", urging mapmakers to consider the implications of their choices of cartographic language when making (and reading) a map. Certainly, these aspects exist. Wood (1993, pp. 17-22) argues that a map is a text which is "read" and interpreted in a similar way to a written piece. Cartographic language consists, like any visual language, of a complex interaction of what de Saussure termed signifiers (the symbols denoting a concept) and *signified* (the concept being denoted). For Saussure, these are bound together through a semantic "grammar" which enables viewers to combine the various elements of the image into a coherent whole (Kress and van Leeuwen, 1996). As Barber (2005) extensively discusses, this coherent whole – map language – is highly generalised and simplified in order to convey meanings to a broad readership. And like the phonemes and graphemes of any spoken or written language, these stylised symbological signifiers cannot be understood in isolation. They only make sense in unity, and can only be comprehended when structured within a mutually-agreed grammatical convention. Yet with this process, the meaning of the symbols forms a *gestalt* meaning of its own. The map comes to not just reflect reality, but create it.

Map grammar is a holistic process uniting signs and signifiers, and "since nothing has meaning in itself, the relationships that exist among signs (i.e. grammar), are crucial" (Berger, 1991, p. 12). And this grammar, as Charles Peirce argued, is of fundamental importance. In his semiological theory, Peirce identified the grammar uniting three varieties of signs: the *iconic sign* that signifies meaning through metaphorical resemblance to something else; the *indexical sign* that signifies meaning through cause and effect; and the *symbolic sign* that signifies an abstract meaning which must be mutually agreed-upon, and learned. While maps do contain an element of iconic significance in that they (partially) resemble the "real" world around us, this is not automatically inferable to us. Our limited vision prevents us from seeing the world all at once, thus maps must communicate knowledge only through mutually-agreed grammatical conventions *which must be learned* – and the only way they can be learned is through immersion in cartographic semiotics.

Semiotics, as defined by Flowerdew and Martin (2005, p. 191), "is concerned with the way words, things, pictures and actions come to be 'signs'. That is to convey meanings in particular times and at particular places", which only become understandable through a semiotic grammar. And as Berger (1991, p. 9) reminds us, the interpretive link between a sign and a signifier "is based on associations we learn and then carry around with us". These associations – the grammar of visual rhetoric – are acquired through the conscious replication of taught conventions. These conventions are learned in childhood (MacEachren, 1991; Myers and Liben, 2008), and throughout life via the unconscious accumulation of personal experience (Cassirer, 1946, pp. 1, 23, 83-99). Thus it is not only *useful* to teach semiotics alongside maps, it is indeed *fundamental* to passing on the knowledge that a map creates its own reality. For when faced with a map, we fall back upon these consciously – and subconsciously-acquired visual understandings in order to read the messages communicated by the map's visual and symbolic language as "maps are imbued with meaning by virtue of semiotic relationships" (MacEachren, 1995, pp. 213-214).

In addition to semiotics, hermeneutics offers a teaching solution; specifically Hans-Georg Gadamer's theory of the "effective historical consciousness" (Grondon, 1999, pp. 80-83). While the concept of infinite interpretability of a text lies at the heart of hermeneutics, Gadamer's development of the effective historical consciousness hypothesis merges with semiotics. According to Gadamer's hypothesis, we interpret a text (all things being "texts") not in a potentially infinite number of ways, but rather through styles and conventions which are acquired throughout life and which are generalisable among the population (Grondon 1999, pp. 40-57). Taking Gadamer's theories alongside those of modern semiologists, it is possible to approach map teaching through a "hermeneutic-semiotic" framework.

At this point, it might be wondered what relation any of this theoretical material has to teaching cartography. Does pedagogy actually *need* a focus on map semantics and cartographic semiotics? Arguably yes, as the grammar through which we interpret map information *creates* information.

5. Reflecting, or Remaking, "Reality"?

"Semiotics," states Umberto Eco (cited in Berger, 1991, p. 10), "is in principle the discipline studying everything which can be used in order to lie". In spoken and written discourse, lies work because they use the same semantics and conventions that we use to make truthful statements, and it can be extremely difficult to distinguish accuracy from misrepresentation when both use the same mechanisms of communication. Maps are far from exempt from this. Visual language is, like its spoken, written, and mental counterparts, based upon mutually-agreed conventions. And as Kress and van Leeuwen (1996, p. 3) highlight, our interpretations of visual language take place within an established framework. This framework can, in principle, be manipulated by the mapmaker in order to communicate the message that "the world looks like this", safe in the knowledge that such elements will be interpreted in a uniform manner framed through the visual rhetoric of cartographic semiotics. Indeed, this is precisely how maps work. But as Eco's statement suggests, this same language can be manipulated in order to communicate a message that is only partially true – part reflection, part recreation. A message which, due to the overwhelming faith we place in maps, is believable.

The concept that visual language can be manipulated in this way is neither new (Zanker, 1990, pp. 1-5) nor unique to cartography. Black (1997) discusses historical instances at length, while Kress and van Leeuwen (1996, p. 12) highlight how critical discourse analysis has identified how "apparently-neutral, purely informative discourses of newspaper reporting, government publications, social science reports, and so on, may in fact convey ideological attitudes just as much as discourses which more explicitly propagandize". Critical cartographers are right to stress the power that maps have, but a philosophical basis is required in order to validate these assertions. Cartography indeed has power, and a semiological methodology enables us to better understand it. Semiology, though, is but one epistemological framework of use to the critical cartographer. The signs and signifiers of map language are not only interpreted as stylised symbols which represent geographic features. The language of cartography operates by appropriating symbols in order to be understood – a symbology which is wrapped up in its own web of interpretive connotations which are best approached through appropriate methods of reading map language.

6. Reading Map Language

"We live in a world of signs that lie and mislead," claims Berger (1991, p. 11), "and many of us spend a good deal of effort trying to determine whether or not we are being 'conned'". In everyday life, this is arguably so: yet not with cartography. Indeed, Bruno Latour (cited in Akerman, 2009, p. 25) goes so far as to comment that with maps, "there is nothing hidden or convoluted, no shadows, no 'double entendre'". But maps lie. They have to, as any attempt to faithfully reproduce *everything* in the spatial realm results in a map that is either incomprehensible or useless. Indeed, Philip and Julianan Muehrcke (1998, p. 520) are justified in their assertion that "so many perversions of reality are inherent in mapping that the result is best viewed as an intricate, controlled fiction". Yet despite maps' having to distort reality, and despite Black's (2003, p. 9) reminder that "the language of cartography requires careful reading", the public – and students – retain trust in charts as infallible reflections of reality. The cause of this innate trust is what John Pickles (cited in Gregory et al., 2009, p. 66) terms "cartographic reason".

Cartographic reason, as a theory, argues that maps embody a "functional authority" (Heffernan, 1996) which readers subscribe to, thereby providing the map with immediate legitimation regardless of its content. Kristin Kopp (in Finney, 2006, p. 204) offers a clarification by declaring that "[maps] are not texts whose legitimacy is to be questioned; they are instead rationalized products of the most modern technologies". The result, as Muehrcke and Muehrcke (1998, p. 520) state, is that "we tend to accept the information on maps without question". Presuming that maps are neutral mirrors of nature, people retain an innate trust in them and the messages they propagate – and this cartographic reason is precisely what can seduce

readers into believing that the semi-truths contained within are in fact *whole* truths.

However, the map cannot lie outright. As Barbara Piatti and Lorenz Hurni (2009) discuss in their analysis of the counterfactual cartographies of novels, and as Hurni and Gerrit Sell (2009) assess, maps must contain enough truth to be plausible, or they simply do not work. The consequences for the imperial map are that the politically-motivated chart must portray a plausible semi-reality. While all maps exist in a cartographic limbo between truth and lies, the imperial map distorts its representations sufficiently to become what Benedict Anderson (1991, p. 175) terms "the map-as-logo" and what Johan Fornäs (2012, p. 43) terms the "logotype". The map recreates reality not through its language, but through the very purpose of its creation, its ability to capitalise upon cartographic reason, and public graphic illiteracy to propagate a vision which, without semiotic analysis, we take to be a faithful depiction of a world which may not necessarily exist. Maps of the EU are no different in that they are interpreted through a metanarrative, a discourse, which helps us understand the subtleties of their language. And these metanarratives can be understood through a combination of the functional and lexical approaches.

7. The Functional Approach

There are multiple methodologies of maps, and in recent decades perhaps the most popular trend has been to interpret map language as objective, no more politically-biased than the mathematics, theodolites, and computers which enable their construction. This is what Harley (2001, p. 151) called the "culture of the technics", and which MacEachren (1995, p. 244) terms the "Functional Approach". It denotes a methodology of cartography which focuses on the visual symbols of maps and the cognitive processes which our brains utilise to process and understand the abstract language of cartography. Certainly, this is the view encouraged by such cartographers as Judith Tyner (1992, p. 4), who insists that regardless of what they are depicting, whether toposphere, anthroposphere, or even noösphere, maps remain "neutral, value-free" reflections of the world around us. This approach to understanding and teaching maps is reassuring in its connotations of neat scientific accuracy, and can appear an attractive alternative to the slow emergence of postmodern studies which have gradually crept – usually with fierce resistance from the cartographic *ancien regime* – into critical cartography since the 1990s (MacEachren, 1995, pp. 10-11). Even Monmonier (2004, p. 21), arguably the most prolific writer of critical cartography today, hints at this; that "while I may feel like a heretic to say it, too much has been written on the apparent meanings in maps". There is arguably some truth in this, yet in spite of the tentative appeal of a clinical, objectivist approach to cartography, maps simply cannot be understood in this way.

Scientific approaches to cartography are as numerous as maps themselves. Indeed, any respectable modern textbook or course on cartography will devote significant space or time to the mathematics and science of constructing reliable charts, while giving only cursory mention – if indeed any mention at all – to the philosophies underpinning maps (Robinson, 1995). By examining theoretical frameworks which offer insights into the philosophical and theoretical mechanics of mapping, but which are as-yet only gradually beginning to gain acceptance, this thesis seeks to examine not the mechanical nature of map creation, but the mechanisms by which we interpret maps.

Traditionally, teaching map language has been dominated by this objectivist offshoot of the same strain of "scientification" that emerged in late-nineteenth century history (Tollebeek, 2004) and early twentieth-century regional geographies (Johnston and Sidaway, 2004, pp. 61-65). Despite the advances of critical cartographers, there remains some scholarly dismissal of maps as "peripheral and irrelevant" (Perkins, 2004), purely objective technologies of scientific inquiry, or awkward relics of contemporary geography's imperial origins (Godlewska and Smith, 1994). Consequently consigned to a "dry and unfashionable" subset of geography (Perkins, 2004, p. 381), cartography and cartographers have not yet escaped this assumption that maps are, and *should be*, neutral illustrations casually thrown in to illustrate increasingly esoteric theories. Perkins (2004, p. 384), indeed, draws attention to the multitude of

ways in which academics "take an atheoretical view of the map" with little or no consideration of the complex historical, social, and associative contexts of the map in question. But as Trudy Suchan and Cynthia Brewer (2000) highlight, critical cartography has recently seen a methodological shift in which theory-based teaching has gained – and continues to gain – popularity. As the foci of the cartographic analyst are "particular audiences, natural settings for research, and amplified explanation… hallmarks of qualitative research" (Suchan and Brewer, 2000, p. 146), this functional approach is therefore not entirely ideal.

For Ron Johnston (in Gregory et al., 2009, p. 608), it is intellectually dishonest and methodologically dangerous to create a false dichotomy between "the apparently mutually opposed techniques of quantitative and qualitative methods". The same can arguably be said for approaches. Neither exists in isolation, and a purely objectivist approach is arguably neither possible nor desirable, particularly in a discipline already fraught with accusations of over-emphasis on philosophical and theoretical work lacking a foundation in the sort of raw data which characterises the geographer's trade. A healthy skepticism of purely quantitative methods and objectivism is a hallmark of critical cartography, and by applying the techniques of an analysis which considers not merely the objects and mechanisms of the map but also the power-relations and discourses which underpin cartography, teaching using the functional approach can be avoided. Ultimately, the assessment of imperial cartography can only be properly realised through the application of a flexible, reflexive, and interrogative qualitative methodology. This is what MacEachren (1995) terms the "Lexical Approach".

8. The Lexical Approach

"If our goal", writes MacEachren (1995, p. 310), "is to *make* effective maps, a functional approach to map representation offers a method of logical structuring of information. [But] if...we set for ourselves the broader goal of understanding *how maps work*, a functional approach alone...leaves us well short of that goal". Certainly, attempting to teach cartography without generous use of the lexical approach is at best a waste of time; at worst it actively hinders students' understanding of the fundamental power of cartography.

As the product of a complex, interactive, and subjective construction process, maps are part of the hermeneutic/interpretative path with its focus upon "the reading of texts and literature to explore people's associations with and understanding of place" (Limb and Dwyer, 2001, p. 4). And as a qualitative method, the lexical approach ensures that we "do not start out with the assumption that there is a pre-existing world that can be known, or measured, but instead see the social world as something that is dynamic and changing, always being constructed through the intersection and connection of cultural, economic, social and political processes" (Limb and Dwyer, 2001, p. 4). This is arguably visible in the functional approach, but by adopting a lexical approach it is possible to construct a solution to a perennial problem of critical cartography: the absence of a unifying philosophical framework, or what Robina Mohammed (in Limb and Dwyer, 2004) describes as a "tangled web of loose ends that needs to be woven into coherence".

The value of a lexical approach to teaching cartography is that, as a concept, it does not treat maps in isolation as mere ontological objects, focusing only upon their physical elements. Rather, this approach treats the map as merely one aspect of a multifarious network of relations and contexts in which the purpose, creation, revision, and reproduction of the map – all of which take place not in a neat, mechanistic sequential order, but rather in an almost chaotic tangle of reciprocal relationships and interactive feedback loops – are subject to innumerable perceptions and interpretations. It is what Monmonier (1995, p. 3) terms "carto-anthropology" – the study of maps as institutionalised practises and processes, rather than mere objects. All of these stages are potential sites of manipulation to produce a desired result and desired interpretation among map readers.

The map is entirely unobjective, and semiological analysis, not to mention qualitative methods themselves, are inherently subjective processes. We cannot perform what Donna

Haraway (in Gregory et al., 2009, p. 683) terms "the god-trick" by examining a map and seeing a single, accurate, reality – assuming that such a thing even exists. To study maps this way is to deceive ourselves. Thus if the *study* of cartography can, by the very nature of maps' power, withstand this sort of empiricist vivisection, then the *teaching* of cartography must acknowledge not the mere *utility* but the *necessity* of a Lexical approach. This teaching method must, as has been argued thus far, be grounded in semiology. It may appear subjective in contrast to the apparently crisp, scientific (yet inaccurate) quantitative approaches which dominate so much cartographic thinking, but nevertheless contains, as Haraway (in Gregory et al., 2009, p. 684) identifies, "the possibility of critical promise".

This is not to say, of course, that the functional approach is without merit.

Without the functional approach we might run the risk of being lost in an infinity of interpretations which would, in theory, be equally valid. Few geographers would relish students' reactions to the idea that maps (and indeed, all communications) exist in an infinite loop of interpretations which can never be resolved. The functional approach has its uses. Yet without the lexical approach to offset it, we would simply replicate the erroneous idea that maps are objective and reducible to mathematical and diagnostic processes. Combining the two offers an intriguing potential teaching method. The lexical approach acknowledges that there are multiple interpretations of map language, yet the functional approach reminds us that these interpretations are not infinite – their validity is directly linked to the actual language. To illustrate these arguments, let us consider the maps adorning euro currency.

Figure 1. € 20 banknote. Source: http://www.ecb.europa.eu.

9. Making Europeans

"Banknotes", states Barnaby Faull (BBC, 2000), "are an advertisement for a country". They encapsulate the nation's history, and governments – particularly those of European nations – treading careful paths in selecting which of their historical figures can and cannot appear on these advertisements of the nation. The currency commissioners of the European Union were keenly aware of this (Fishman and Messina, 2006, pp. 28-31), and in order to avoid controversial figures not merely from current nations but *anyone* associated with Europe's quarrelsome past, euro banknotes appear, at first glance, to be the most apolitical produced by any issuing authority in history. The result is what journalist Fareed Zakaria calls "Money for Mars": cash which is so unrelated to anything human, let alone specifically European, that the banknotes circulating today in Europe look as though they were designed as low-budget props for a 1960s episode of *Star Trek* (Fishman and Messina, 2006, p. 16). Or indeed, might as well be from another planet. All that is vaguely real is the map – and even this is a half-truth.

Let us consider what can be gleaned from a purely Functional approach. The map on euro currency is a generic Van Der Grinten Projection of the western Eurasian landmass, appearing in a monochromatic hue. The map depicts Europe's physical topography without reference to political divisions. Alongside the map are pictures of architecture and the usual iconography of banknotes, which is deliberately complex and convoluted in an effort to deter forgery (European Central Bank, 2014). A simple Functional Approach, then, would allow us to teach students some technical jargon from cartography, and accomplish little else. Is this enough?

The answer, unsurprisingly, is a resounding "no". The *content* of the banknotes' maps can be quickly summarised. Yet the content is meaning-less without the *context*. These maps are not quietly sitting on bookshelves or hanging, half-noticed, in a frame on a wall. They are constantly circulating between tills, cash machines, purses, and fingers. They are one medium through which a political identity is formed – those who use euros, whether in Porto or Poznan, are to be imagined as belonging to a common brotherhood of "Europeans". Nor are the maps alone. They intersect with fake iconography which claims that the entire continent is to be imagined as a single community. The map may include the entire physical topography of the Western Eurasian landmass, but not all peoples of the Union are represented. As Figure 1 demonstrates, Western and Southern Europeans are represented iconographically but the Union's Eastern newcomers are utterly absent.

We have now identified that euro currency, through maps, spread an imagination of *empire*. Euro currency maps convey the ideology that all Europeans are part of the same community, but the images entwined with the map exclude those areas of the Union which did not, as Matthias Kaelberer (2004) alludes, experience the same historical epochs as Western and Southern Europe. The map may benignly embrace all Europeans, but a discourse of superiority and inferiority lurks within its images. As Helleiner (in Fishman and Messina, 2006, p. 23) identifies, the sanctioned messages propagated by euro iconography are "transparency, represented by windows; and communication, cooperation, and a forward-looking spirit, represented by doors and bridges". But the architectural styles represented are unreal. According to the ECB (2014), the notes "feature architectural styles from different periods in Europe's history", a progressive march towards destiny with the accompanying suggestion that *all* Europe experienced the same neat path of development at the same time. The discourse communicated by these banknotes, through cartography and unreal iconography, is incapable of being understood using a purely Functional Approach. A Lexical understanding is needed.

The imagination of history invoked here is clearly fabricated: history is not a teleological, progressive march towards a pre-defined, Whiggish goal, and not all areas of Europe experienced this neat transition from one period to another – if any did at all. No map can change this essential fact, yet as euro banknotes demonstrate, the context in which a map appears is infinitely more significant than the mere lines and colours which form its content. Kaelberer (2004, p. 170) argues that the iconography "deliberately constructs a common European historical memory" by appealing to common

experiences in Europe's development from the decaying marble temples of Athens to the grim Khrushchevian apartment-blocks of the old Soviet sphere. But this is simply not true. It is quite a stretch to claim that Sweden or Latvia were part of the same Classical world as Greece and Rome, equally problematic to visually proclaim that the eras depicted were single, homogenous affairs. The Industrial Revolution, to cite but one example, was spatially complex and temporally varied across the British archipelago upon which it began, let alone across the entire European landmass. Yet the discourse remains – the proclamation that *all* Europe has experienced the same history, that *all* Europe is the same, that *all* Europe stands in contrast to those beyond the collective – the Russians, the Turks, the North Africans (Kaelberer, 2004) – who did not share in this censored, sanitised, whitewashed version of a communal continental history which never existed, but nevertheless is assembled and appropriated to give the illusion of unity. Entwined with the map, that icon of unity in diversity which is not to be questioned using Functional means, the discourse these notes suggest is powerful indeed. As such, an effective approach to teaching cartography *must* combine tropes and meta-tropes, and Lexical/Functional approaches.

10. Conclusions

The Rome Declaration on Geographical Education in Europe (2013) commences with the unequivocal statement that "Geographical education provides students with essential capabilities and competences needed to know and understand the world… all European citizens need to understand how to deal with it". It is hard to deny the continuing importance of geography in today's world, and the role of maps in communicating spatial events. Yet if the Rome Declaration is to be upheld, it is not enough to merely use maps as tools to illustrate concepts. The map itself is a means of communication. The map only works by distilling the world around us into an oversimplified and abstract representation which has the capacity to convey far more significant discourses than merely telling us *where things are*. A thorough appreciation of the seductive power of cartography can only be attained through combined Functional and Lexical methods. Some suggestions for teaching this include:

- introducing geography students to core texts in semiotics, and case studies to illustrate theory;
- encouraging students to consider the context of maps and their provenance. Where did the map in question come from? When was it made? Who made it? Who was it designed for? Where is it displayed? What other forms of language (writing, iconography, pictures, etc) appear alongside it? Some of these questions may be unanswerable, but they must be considered;
- ensuring that in courses or texts devoted to teaching cartography, and geography teaching in general, clear emphasis is given to the necessity of a comprehensive, catholic, Lexical Approach *in addition to* a Functionalist pedagogy.

We return at the end to Massimo d'Azeglio, penning his diary in a Milan study in 1864. A nation-state had been made. But how to make the nation?

Arguably one of the easiest mechanisms for this – especially so in Italy (Rossetto, 2013) – is the map. The map communicates its values through a sophisticated web of semiotic and symbological channels which, while capturing our attention with dazzling displays, we may not even realise exist. It is not the place of a teacher of geography to perform detective work or psychic investigations of why a mapmaker acted in a particular way. But it *is* the task of the geographer to teach students that maps cannot be understood as neutral illustrations, rather that they are socially-constructed texts whose *context* is far more significant than their *content*. Thus, the educator must make students aware of the fundamental necessity of semiological and semantic methods. With adjustment, the tools of semantics and semiotics, Functional and Lexical Approaches, and deconstruction, can be used to effectively teach how maps, far from being neutral illustrations of the world devoid of any aesthetic appeal, do not merely *reflect* reality – they *make* it.

Acknowledgements

The author wishes to thank Edoardo Boria of Sapienza University of Rome, for inviting the author to present an earlier version of this paper at the IV EUGEO Conference in Rome, September 2013. Gino De Vecchis of Sapienza University of Rome is to be thanked for transmuting the rough manuscript. The author also wishes to thank Hartmut Behr of Newcastle University for his suggestions on an earlier draft, and finally both Daniel Stroe and Thomas Uche Ogah for helping him maintain *mens sana in corpore sano* during the writing process.

References

1. Akerman J. (Ed.), *The Imperial Map: Cartography and the Mastery of Empire*, Chicago, University of Chicago Press, 2009.
2. Almeder R., *The Philosophy of Charles S. Peirce: A Critical Introduction*, Totowa, NJ, Rowman and Littlefield, 1980.
3. Anderson B., *Imagined Communities: reflections on the origins and spread of nationalism*, London, Verso, 1991.
4. Barber P. (Ed.), *The Map Book*, London, Weidenfeld and Nicolson, 2005.
5. Barnes T. and Duncan J., *Writing Worlds: discourse, text and metaphor in the representation of landscape*, London and New York, Routledge, 1992.
6. BBC News, "How to join the noteworthy", 7th November 2000, http://news.bbc.co.uk/1/hi/uk/1009901.stm.
7. Berger A., *Media Analysis Techniques*, London, Sage, 1991.
8. Berger A., *What Objects Mean: An Introduction to Material Culture*, Walnut Creek, CA, Left Coast Press, 2009.
9. Black J., *Maps and History: Con-structing Images of the Past*, New Haven and London, Yale University Press, 1997.
10. Cassirer E., *The Philosophy of Symbolic Forms*, vols. I-II, New Haven, Yale University Press, 1953.
11. Cosgrove D., *Mappings*, London, Reaktion, 1999.
12. Earnest D. and Fish J., "Visual Sociology in the Classroom: Using Imagery to Teach the Politics of Globalization", *Politics*, 34, 2, 2014, pp. 1-15.
13. EUGEO, *Rome Declaration on Geographical Education in Europe*, Rome, EUGEO, 2013, http://www.j-reading.org/download/news/declaration.pdf.
14. European Central Bank, "The Euro", 2014, http://ecb.eu.
15. Fishman R. and Messina A. (Eds.), *The Year of the Euro: The Cultural, Social, and Political Import of Europe's Common Currency*, Notre Dame, IN, University of Notre Dame Press, 2006.
16. Flowerdew R. and Martin D., *Methods in Human Geography: a guide for students doing a research project*, Harlow, Prentice Hall, 2005.
17. Fornäs J., *Signifying €urope*, Bristol, Intellect, 2012.
18. Foster R., "Tege Imperium! A defence of empire", *Global Discourse*, 1, 2, 2009, pp. 2-23.
19. Foster R., "Tabula Imperii Europae: a cartographic approach to the current debate on the European Union as empire", *Geopolitics*, 18, 2, 2013, pp. 371-402.
20. Foster R., "Between these two kinds of death", *Global Discourse*, 2, 3, 2014, pp. 1-11.
21. Foster R., *Tabulae Imperii Europaei: Mapping European Empire*, Abingdon, Routledge, 2015 [forthcoming].
22. Foster R., Edward M. and Johnson M. (Eds.), *The Crisis of the Twenty-First Century: Empire in the Age of Austerity*, London, Routledge, 2014.
23. Godlewska A. and Smith N. (Eds.), *Geography and Empire*, Oxford and Cambridge MA, Blackwell, 1994.
24. Gregory D., *Geographical Imaginations*, Cambridge, MA, Blackwell, 1994.
25. Grondin J., *The Philosophy of Gadamer [trans. Kathryn Plant]*, Paris, Les Editions du Cerf, 1999.
26. Harley JB., *The New Nature of Maps: Essays in the History of Cartography*, Baltimore, The Johns Hopkins University Press, 2001.
27. Heffernan M., "Geography, cartography and military intelligence: the Royal Geographical Society and the First World War",

Transactions of the Institute of British Geographers, 21, 1996, pp. 504-533.
28. Hodgkiss A., *Discovering Antique Maps*, Princes Risborough, Shire, 2007.
29. Howgego R., *The Book of Exploration*, Weidenfeld and Nicolson, London, 2009.
30. Hurni L. and Piatti B., "Mapping the Ontologically Unreal – Counterfactual Spaces in Literature and Cartography", *The Cartographic Journal*, 46, 4, 2009, pp. 333-342.
31. Hurni L. and Sell G., "Cartography and Architecture: Interplay between Reality and Fiction", *The Cartographic Journal*, 46, 4, 2009, pp. 323-332.
32. Johnston R.J. and Sidaway J.D., *Geography and Geographers: Anglo-American Human Geography since 1945*, London, Hodder-Arnold, 2004.
33. Kaelberer M., "The euro and European identity: symbols, power and the politics of the European monetary union", *Review of International Studies*, 30, 2004, pp. 161-178.
34. Kopp K., "Cartographic Claims: Colonial Mappings of Poland in German Territorial Revisionism", in Finney G. (Ed.), *Visual Culture in Twentieth-Century Germany: Text as Spectacle*, Bloomington, IN, Indiana University Press, 2006, pp. 199-213.
35. Kress G. and van Leeuwen T., *Reading Images: The Grammar of Visual Design*, London and New York, Routledge, 1996.
36. Limb M. and Dwyer C., *Qualitative Methodologies for Geographers*, London, Arnold, 2001.
37. MacEachren A., *How Maps Work: Representation, Visualization, and Design*, New York and London, Guilford Press, 1995.
38. Monmonier M., *Drawing the Line: Tales of Maps and Cartocontroversy*, New York, Henry Holt and Company, 1995.
39. Monmonier M., *How to Lie with Maps*, Chicago, University of Chicago Press, 1996.
40. Monmonier M., *Rhumb Lines and Map Wars: A Social History of the Mercator Projection*, Chicago, University of Chicago Press, 2004.
41. Muehrcke P. and Muehrcke J., *Map Use: Reading, Analysis, and Interpretation*, Madison, JP Publications, 1998.
42. Myers L. and Liben L., "The Role of Intentionality and Iconicity in Children's Developing Comprehension and Production of Cartographic Symbols", *Child Development*, 79, 3, 2008, pp. 668-684.
43. Perkins C., "Cartography: cultures of mapping, power in practice", *Progress in Human Geography*, 28, 3, 2004, pp. 1-11.
44. Perrie M. (Ed.), *The Cambridge History of Russia: Vol. I, From Early Rus' to 1689*, Cambridge, Cambridge University Press, 2006.
45. Riffenburgh B., *The Men Who Mapped the World: The Treasures of Cartography*, London, Carlton, 2011.
46. Robinson A., *Elements of Cartography*, New York, Wiley, 1995.
47. Rose G., *Visual Methodologies: An Introduction to the Interpretation of Visual Materials*, London, Sage, 2007.
48. Rossetto T., "Learning and teaching with outdoor cartographic displays: a visual approach", *Journal of Research and Didactics in Geography (J-READING)*, 2, 2, 2013, pp. 69-83.
49. Sanders C. (Ed.), *The Cambridge Companion to Saussure*, Cambridge, Cambridge University Press, 2004.
50. Suchan T. and Brewer C., "Qualitative Methods for Research on Mapmaking and Map Use", *Professional Geographer*, 52, 1, 2000, pp. 145-154.
51. Tollebeek J., "'Turn'd to Dust and Tears': Revisiting the Archive", *History and Theory*, 43, 2, 2004, pp. 237-248.
52. Tyner J., *Introduction to Thematic Cartography*, Englewood Cliffs, NJ, Prentice Hall, 1992.
53. Williams A., Jeffrey A., McConnell F., Megoran N., Askins K., Gill N., Nash C. and Pande R., "Interventions in teaching political geography: Reflections on practice", *Political Geography*, 34, 2013, pp. 24-34.
54. Wood D., *The Power of Maps*, London, Routledge, 1993.
55. Zanker P., *The Power of Images in the Age of Augustus [trans. Alan Shapiro]*, Ann Arbor, MI, University of Michigan Press, 1990.

