

CARLES CARRERAS , SERGI MARTINEZ-RIGOL , SERGIO MORENO

## MAPPING AT A SMALL SCALE. GENERAL REFLECTIONS ON A PARTICULAR EXPERIENCE.

*Abstract* - This paper addresses the problem of maps reduction in the work published by geographers in general. Nevertheless this occurs at the time that is available in larger volumes digital information and perform better means of computer assisted Cartography. From the rich experience of publishing many thematic atlas at different scales, both world and urban atlases authors discuss the making of the atlas and complexity in the management of information to improve its representation. It emphasizes the importance of design and the use of color to enhance communication. The conclusion highlights the double value of maps as a result and as a document, and encourages to try to cartographically represent any type of information, especially the qualitative one.

*1. Introduction.* - In the age of the image and information, geographers seem to gradually lose the ability to work with maps, one of the most powerful languages and the most important in the history of Geography, for its ability to provide information in a concise and viewable way. This statement, which can also appear excessive, is based on the observation that there are much fewer and fewer maps in the work and publications of geographers - although it was never as simple as today produce and play maps (1). At the same time it is also a subject of some theoretical considerations the interest with which the other social sciences and society in general are taking over the Geographic Information Systems (Buzai , 1999; Boira , 2010).

Compared to these considerations, the publication of some atlases, but especially of the *Atles de la Diversitat* (2) (Carreras, 2004) meant to take place, thanks to the cartographic experience of the authors, that it is possible to map all, bearing in mind that the mapping

is a tool rather than an end in itself and, therefore, it is essential to support a geographic knowledge representation and you need to recognize the limits of language mapping, although this does not deny its validity.

It is possible mapping everything, but the elaboration process of the various atlases has also highlighted the need to take due account of the transversality of the different approaches that currently guide the cartographic production. Currently it could be argued that cartography is dominated by geometric and technical guidelines, which seek resolution metrics more effectively, with the support of technology that increasingly dominates the process of map production. In this way they could be neglected other aspects, such as artistic or those related to the presentation and communication necessary because the role is not only to transmit ideas and images of the world, but also generate new stimuli and further reflections on those who read it.

The limits of cartographic language and maps can be derived from their own definition. It must be recalled that the paper does not constitute a faithful reproduction of reality and objective, but that this plane representation, deformed, reduced and conventional of all or part of the Earth's surface represents the subjective look, influenced by ideologies and prejudices that the cartographer and the society in general have on Earth. The maps are not neutral, as demonstrated among others by Mark Monnomier (1991) or John Brian Harley (1989). However, it is necessary to recognize that the cartographic language is a powerful language: unlike the one spoken or written, that is sequential, the cartographic language is presented as a whole in which to look for the elements that allows a subjectively differentiated interpretation from a language that expresses the spatial relationships of the elements it represents.

2. *The organizational complexity of an atlas.* - The starting point of the process of elaboration of thematic maps of an atlas is marked by the selection of content to represent and the definition of the objective. For *Atlas de la Diversitat*, the desire to represent the diversity on a global scale has resulted in the selection of a range of issues and in their articulation, highlighted in an earlier paper on the conceptual structure of the Atlas mentioned, which was built as a web that shows the interrelationships between the various elements (Carreras, 2004, p. 20) (Figure 1).

On this base begins the very selection process: first of the specialists which entrust the implementation of the maps and, therefore, the map projections, that to be used in most of the figures, as well as those required for more detailed representation in order to better communicate the message you intended to convey. It is also essential to identify variables useful for the representation of each of the themes, and finally choose the forms of representation and their design.

The choice of projection is not a trivial matter because the sizes and shapes of the contents may represent different images of the world. It is worth mentioning, in this regard, the controversy aroused by the Peters projection, alternative to the traditional Eurocentrism of the Mercator projection, generally accepted as the true picture of the world ( 3). Since, thanks to the programs of automatic cartography and Geographical Information Systems, it is now technically possible to use any projection, the selection process, provided that is adapted to specific needs, becomes mostly a matter of aesthetics. Thus, in most of our maps has been used modified projections. For example, in the *Atles de la Diversitat* was mainly used the projection of Robinson ( in 197 of 250 maps total (4) , in order to make comparable the cards, to facilitate the study and give a certain visual homogeneity. As is well known, through this type of projection offers sharp image of the world in which there is a balance between the distortion of distances, angles , shapes and areas. In the case of the first edition of the *Atles Universal* ( Miranda and others , 1999) , was used for the most part the Mollweide's projection, while in the second it has been used that of Robinson . The exceptions to the use of these two projections are represented by anamorphic maps - 7 in the *Atles de la Diversitat* and 3 in the *Atles Universal* - used to treat topics that could have major relationships with the issue of distribution of the population than with the territory, as in the case of the distribution of languages and religions (5). An exception is also made from the time management map (Carreras, 2004, p. 88), in which were represented the time zones. The Robinson projection has been not used even in the city plans and in the continental and State maps.

The selection of variables to represent, in most cases, was carried out with the author of the text, a specialist in the topic discussed; it is necessary to take into account that the *Atles de la Diversitat* is the result of the work of 92 different authors. For all the variables you need an specific area for its cartographic representation. In some cases it is very simple, such as for quantitative data on socio- economic or demographic topics, ranked by States and derived from official sources. In other cases it is more difficult, such as for

cultural maps, like those of traditional dresses, folk arts or housing typologies, for which the lack of systematized information and, above all, georeferenced made it more complicate.

Parallel to the selection of the variables, you have to research on the available sources of information, detailed at a later time. Once you have found the data to be used, they must be defined their formal characteristics, namely whether it is data point, line, surface or volume, but also their organizational structure and, finally, the level of scale (qualitative, quantitative or ordinal) that should be driving the representation. From here, together with the team of design, is the choice of the variables to be used in relation to their visual perceptual properties. So you draw the symbols and begin processing the map. In the specific case of the *Atles de la Diversitat* was structured as a set in which each map is part of a whole and in which each section is complementary to the other. Using the same projection for the majority of the topics and a range of colors more or less homogeneous facilitate comparison and complementarity between all the maps. In addition, the grouping of cartographic sheets in thematic blocks draws a continuity from beginning to end, allowing each person to follow a more or less homogeneous and facilitating a cross-reading of the themes. Instead, in the *Atles Universal Planeta* (Lara et al, 2007), map and design have been designed separately and in relation to the variables that represent the colors . On the other hand, there exists a wide range of projections, which allows an extensive comparison between the various maps.

3. *The information process.* - The information needed for the development of small-scale world thematic mapping has a set of requirements. On the one hand, it should be as comprehensive and complete as possible, that is to say that the information related to a concrete phenomenon must collect the largest number of possible cases and, at the same time, it must have the widest territorial coverage. On the other hand, it should be ensured the uniformity in the definition of the variables and data, so that all the data collected in the different parts could be comparable (6). For what concerns the completeness and coverage, it is clear that when you want to represent , for example, the distribution of population in the world, you need data that give account of the total population according to the administrative units that are used and that all or most of these units contain this information. The comprehensiveness and coverage are guaranteed in relation to certain

types of information, such as the general economic or demographic data, provided by international organizations. In other cases, however, it is less easy; especially in some cases this lack of precision or coverage may also be a brake to attempt to represent cartographically some rather unusual topics. An example in this sense may be some of the maps of the *Atles de la Diversitat* such as that on homosexuality, tourism or cultural conflicts resolution in which, among other things, are used unusual sources of information, which are not exhaustive, but they can give an account of the phenomenon and to communicate the intended message (Carreras, 2004, p. 170 , 214, 338) . Finally, although there is the need of the maximum coverage, it should be remarked that often there are significant information gaps. The scarcity of information recorded in some areas may be attributed to the fact that they have not sufficiently developed system of data collection or the need to conceal certain aspects of the statistical evidence , or even because the phenomenon in question is not georeferenced. Reference is still the *Atles de la Diversitat*, on the case of the representation of classical music (ibid., p. 280), in which the variable to represent the number of inhabitants was for orchestra (along with the city with music schools, theaters or auditoriums) and for which the voids in Africa, Asia and parts of Latin America highlight the increased presence of this musical tradition in European or Western culture.

The homogeneity of the data is usually ensured by the source that collects them. Much of the information on social, economic and demographic aspects is therefore directly issued by the statistical departments or organizations of the United Nations (whose base is always the data provided by its Members), other international official organizations (World Bank , International Monetary Fund) or from sources that reproduce this information, or even create them (*World Resources Institute, the Population Reference Bureau* and various yearbooks, like the fundamental *Calendario Atlante De Agostini*, published annually since 1904 by the Institute of Geography of the same name in Novara). Thus, for example, in the case of tourism, the World Tourism Organization is responsible for defining who is a tourist through state statistics and count the tourists across the world. In this way we enhance the official sources state that collect information and give the appropriate information to complete the collection of data in the same states.

The fact that much of the information available, especially of an official nature, is organized as a function of the states, requires a certain way to use this geographical basis. Hence the fact that a large number of maps of the three atlases from us (on the other

hand like so many others) contain the representation of the state borders, specifically 196 of 249, nearly 80% of the *Atles de la Diversitat*, 51 of 56 in the *Atles Universal* (91 %) and 8 of 17 in the *Atles Universal Planeta* (47 %). An important part of these maps is represented by a choropleth technic, in which you can have the combination with proportional or pictorial symbols. In other cases, they are used exclusively proportional symbols to represent statistical information related to the states. Finally, other maps use the state border not for the quantitative representation of information but only as a locational reference.

On the one hand, this is a contribution to the 'naturalization' of the state border. The map of the world, with a collection of nation-states in different colors, which corresponds to an equal division of cultures and peoples, does not raise discussion or criticism. And so the distinction between societies, nations and cultures is based on a seemingly unproblematic division of space, the fact that they occupy spaces naturally discontinuous (Guptae and Ferguson, 2000, p. 32). Therefore, the cultural contact, conflict and contradiction between cultures and societies do not fit this vision of the world configured by discontinuous spaces, where borders can be imagined as deep ravines that separate the state space. This may contradict one of the fundamental objectives of the *Atles de la Diversitat*, which was the definition of some new social units able of replace the states, which represent divisions somewhat unstable and that does not give an account of its internal diversity.

It should be remembered that in such Atlas you can show, on some occasions, this difference between states and peoples or nations. It's the case, no doubt, of the map devoted to the latter (Carreras, 2004, p. 310), in which a first approach to the mosaic of peoples and nations of the world are superimposed on the state border, showing that non-coincidence. It is also the case in the map of the European peoples (ibid., p. 44), in which there is an overlap between traditional peoples, cultural groups and state borders. On the other hand, it should be noted, in favor of the use of states as the basis for the representation, that these become points of reference from which it is possible to locate any phenomenon in the world. So it is not trivial to consider the use of state borders in the non-statistic maps, since these allow a better reading on the space. States become a kind of grid from which almost everyone is able to situate the phenomena that are meant to represent. In addition, it is also undeniable that the state borders have today, in spite of the globalization process, a very significant importance and validity on people's lives,

especially as regards the entry and exit of individuals and, although not at the same level of goods, and for this reason, their representation is not trivial. Nevertheless peoples are historical product, the result of mobility and exchange, so that the fixing of borders and the concept that is based on the use of the Member remains, without doubt, a contradiction. For this reason, maps like those of the process of appropriation of the world, traditional or new forced migrations, and the collection of maps dedicated to the origin of plants and animals, to the idea of movement, contact and mixing that fee, are a good counterpoint to the rigors of the state greed.

It should also be stressed the use data other than the State in the representation of statistical information. An attempt to create new units appear in the map on quality of life in the *Atles de la Diversitat*, in which they were created some statistical units according to a regular number of inhabitants, which differ by the States and also by intra- state divisions (ibid., p. 228). In this case the world is divided into statistical units of approximately 25 million people , so that countries like India or China were necessarily fragmented. Even the map on the management of life, in the same atlas, could represent a further example, but in this case the divisions are supranational in nature, that is the result of the sum of the states concerned (ibid., p. 90), as in the map of agriculture in the world, in this case in the *Atles Universal* (Miranda et al, 2009, pp. 18-19) .

4. *The design of the forms of representation and their significance.* - The thematic cartography meant to improve, in the preparation of maps, the relationship between the form - for the use it makes of the projection, the symbols and colors - and the content to which reference must be made. Finding a good design in the forms of representation helps to make sure that the thematic mapping better send the message, at the same time, which can transmit several messages together, more than the title of the map indicates.

In this regard it ought to make a great effort to be sure that, in addition to the reference to homogeneity before analyzed, each map contains an original and expressive design, in order to facilitate the reading and understanding of the meaning. The symbols and colors are usually carriers, in addition to visibility, even of text messages, which in some cases can be understood locally and others on a global scale, as would happen with the most well-known trademarks. What you try to do, therefore, is to use this conceptual and symbolic shapes and colors of meaning more or less universal. Therefore, all the maps

must groped to combine this feature, you could define aesthetics, with the necessary cartographic rigor and quality.

An important detail in this regard is that almost always the fold of the book cuts the maps in the Atlantic Ocean, so that the information is never visually cut on continents. The analysis of the relationship between form and content in any map allows highlighting some of the symbols and colors that are used more regularly and for certain content, while for others it is not maintained - or has not been able to find - a similar regularity.

The projection, as has been said, must be the same for almost all of the maps. For example, in regard to the *Atlas de la Diversitat*, the use of Robinson's projection, not excessively deforming areas, allows to better observe the surface differences between the territories (7). Among the maps that are not in this projection, there are those developed through the technique of anamorphosis, used for subjects with respect to which the population is the main indicator or where you want to point out the differences between the actual characteristics of the population (figure 2). A change that will work in some cases on the Robinson projection is to change its center, a technique used in the maps that represent the distribution of Asiatic religions (Carreras, 2004, p. 110 and 112; Miranda and others, 2009, pp. 4-5), but also in those of India and China (8).

Colors are a very strategic resource (Bertin, 1967; MacEachren, 1995; Harrower & Brewer, 2003). The choice of choropleth is the most used to show the diversity of the various contents. The reasons for opting for this choice are different. First, the colors have certain meanings generally known, and secondly, much of the information is derived from the state statistic, as has already been said, which allows you to quickly view the differences between areas, provided that they have too many colors and that they are quite different from each other, and thirdly, because the choropleth does not prevent that you can stack other forms of representation with point symbols or graphics, without covering the basic information. One of the most interesting use of color is the association that you can do with a meaning. In our case, the most commonly used colors were red, yellow, lilac and green.



Source: *Atlas de la Diversitat* (Carreras, 2004, pp. 90-91)

Red is the predominant color, associated with one of the many meanings it has heat, blood, and danger warning signal, negativity, prohibition. So the content in which it was used that color are those in which it is intended to indicate some of these features: among the maps in which the red expresses an alert signal or danger, blood, death or negative indications, there are those referring to the wars, policies in their prohibitive sense, social or natural risk, mortality or malnutrition. The red color as an expression of the heat and the high temperature is only used in the maps of natural diversity, to report the tropical zone. The shade of red and yellow maps instead sought to population and urbanization (human settlements, population density, total population, population growth, life expectancy, adult population and in all the papers of the multicultural cities).

The yellow was used in most cases together with the red in the ranges of colors or even with other like green, lilac and brown, but always to indicate the minimum values, as in the case of conservationism. The main use of yellow is the one associated to drought or aridity, as in the case of the representation of the natural diversity (Carreras , 2004, p. 30; Miranda and others, 2009, pp. 4-5) or in that of biodiversity, in relation to the use made in the maps of the population and urbanization (Carreras, 2004, p. 34) and also , for the map of ecumene, in which the yellow is used to indicate spaces empty of human presence (ibid., p . 38).

Lilac and green were also used in the gradations of color. For its meaning, the lilac has a considerable presence in issues related to women. The other major use of this color has been used to report cold regions. Green has been used as a representation of the areas of

vegetation and humidity, or as a symbol of hope and positive meanings. The most interesting cases are those in which the green denotes permissiveness or rule of law, as opposed to the red color indicating the prohibition or illegality, a relationship that occurs, for example, in the already quoted map on homosexuality or that of migration policies (ibid., p. 322).

Finally the blue, which is easily associated with water, is used in all of the maps in which it is the object of study, as in the one destined to the supply of water resources (ibid., p. 196) or more generally for the ports, or in the transport infrastructure (ibid., p. 200). Another meaning which has been associated the blue color is peace, as in the symbol of the United Nations.

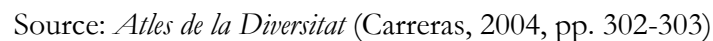
A further use of the colors that has been done in atlases, especially in the *Atlas de la Diversitat*, is directly related to the association between a color and a region, a continent, a culture, a civilization, or some of their characteristics. Although this intention underlies many of the sheets of the work, it has not been possible to succeed in all cases. This correspondence was simpler, in fact, for those subjects with respect to which the objects already have a relationship with traditional colors and symbols, as in the case of religions. So the purple was used to represent Christianity and its divisions, the green has been associated with the Islamic world, the orange to Buddhism, while the gray was used to represent Taoism and Confucianism and, finally, the yellow Hinduism, although the latter correlation is not maintained uniformly in all the maps. The same colors are used, however, in related themes, such as lilac for the European continent, the green to the Tropics and the American continent, orange and reddish colors to represent the Asian continent and the Middle East, sometimes together with the yellow, also used on the African continent, as in the maps of international trade, of indigenous peoples and that of values. Finally, the colors are also used as elements of differentiation of the times or epochs, in the way of the map of the Basilica of the Holy Sepulcher in Jerusalem. A more original color was rather that of the mixture used to make an idea of the diversity and liveliness (ibid, p. 298), as in the map of the popular festivals, in order to create the image of fireworks or the map of peoples and nations (ibid., p. 310), to reinforce the idea of the mosaic. The changes and innovations in the forms of representation and symbols allow presenting the information in a different way from the traditional or even offering information normally not mapped.

Thus, only a few sheets, you can find the characters of the cartographic tradition, as in the map of mineral resources, which uses the conventional symbology to identify minerals, or are given the letters that identify the elements in the periodic table of Mendeleev. In addition to the typical bar charts, graphs, symbols or portions of more conventional, we used a wide range of resources. The map of the life management is an example of using these traditional forms expressing quantities, which have four sources of information easily comparable to the extension of each bar and in which, moreover, the circular shape of the diagram expresses the life cycle. Another example of this kind is the values map, where the graph is a bar graph that facilitates the display of levels of each value and the comparison between large regions .

The introduction of new forms is very dependent on the existence of a symbology related to these topics. So, we used both the symbols that already have an established tradition - such as the red string of the fight against AIDS, those of the most well-known religions or theater masks - both new symbols that it was necessary to create.

In the map of Languages we used labels, one of the tools which makes it easier to read and avoids, in many cases, that information overload from contaminating the map and its meaning. There are, however, very imaginative examples in the maps for Migration (Carreras, 2004, p.174 , 176, 178, Miranda and others, 2009, p . 17), in which we follow the tradition of representing the movement with arrows indicating flows, while the labels cut the line and put in the foreground the place of origin or destination. Other examples of labels are those of the maps on more abstract things, like urban religious centers or the fine arts, music, dance, theater, schools of architecture or language.

Sometimes you need to draw representative elements of a theme in order to communicate a specific message or because the topic itself had never been accounted for. Among the cases in which the image is more evocative and has succeeded in achieving the objective of interrelate color and shape, there is the map of wars, in which the continents are in red to represent the blood of the dead, while the points are indicated by means of a human figure from Picasso's *Guernica*, by definition an antiwar symbol (figure 2). Another example in this regard is that of human settlements, in which the symbol is a skyscraper in different sizes and colors, in this map also the perspective projection changes to give greater emphasis to the third dimension of urban landscapes. Other new images are the syringe in the map of infant mortality or the human figure undernourished in the food supply; the homosexuality map however the cities seem to form a rainbow based on the



The maps that represent topics connected with the folk traditions have generally been difficult to develop, as they often do not have a precise location -related events or concrete delimitation, both in space and time. The most obvious examples of this problem are those of the house and the popular arts, which proposes a drawing from photographs superimposed on the maps in order to create the feeling of a direct relationship, not entirely realistic, with the territories. In the first case, the photographs are used to give the impression that there is a transition from one point to another of the world and that above it is the modern architecture that abandons the traditions of a few plans to build in height. In the second case, some concrete examples, very fortuitous, were chosen.

5. *The dual value of the map.* - The map is an illustration and at the same time a document. Illustration is primarily the result of a research work; a search for information, especially, but also a search and a choice of the scale, of the projection, the symbology and colors, as seen. The choice of projection in a work of thematic cartography- is less relevant than in other cases, and is intertwined with the issues of legitimacy and aesthetics rather than those related to accuracy. The choice of symbols and colors however is mainly the result of a research in relation to the design and communication, although it has already given an account of the meaning that covers each of these elements. It is rather the choice of the scale to take on greater importance, since it is precisely this option that determines the outcome of any study.

Obviously, in a universal atlas, the scales used are generally very small, as it is represented around the world in a single chart sheet, when the sheet is representing several world maps, the scale is even smaller. This results into the need for generalization and simplification of information and in the representation of one or a very few variables in each map; this obliges to consider the atlases as a whole in order to capture the diversity that you want to represent. It should be remembered that however there are cases in which were also used larger scales: continental in some maps, in order to represent the ethnic diversity of the world, according to the anthropological tradition (9), in the maps of some large states for extension and for the population, in order to show the cultural complexity of the contemporary world and its tendency to mobility and hybridization. The larger scale has been used for certain maps of different cities on cultural issues, so as to highlight the importance of the urban in contemporary society.

In the previous experience of drafting the *Atles Comercial de Barcelona*, which is an urban atlas (Carreras, 2003), were used maps at a very different scales (10). Despite the predominance of the municipal maps or the urban grid of the city, included maps on a smaller scale (region and metropolitan area, the autonomous community of Catalonia, Spain, even some world maps) and higher (from a single shop to the shopping streets) (Figure 4 ), as a function of process variables and the detail of the information offered. The same thing can be said with respect to the most recent *Atles de Barcelona* (Serra, Carreras and Martinez, 2011)

So the map is the result of various selections and decisions, and that of the scale is not the minor (Harvey , 1968; Watson 1971; Meentemeyer, 1989; Castro, 1995; Goodchild & Proctor, 1997; Marston, 2000), because is the result of a query to represent the reality that

wants to help interpretation, it provides an illustration in full color, which it shares with other illustrations - graphics or photographs - the intention to communicate one or more messages relating to the interpretation that you intend to offer. The maps of all the atlases produced by the authors are the result of the work of many researchers, and other accredited specialist. On some occasions it was verified that, starting from their own disciplinary methods (often disinclined to cartography) they elaborated new prospects or representation of the phenomena reflected in a new, more territorial and geographic themes of their specializations. It 's the case, for example , of the maps of the international diplomacy or architecture (11), where each of the main maps sends a message, an interpretation of the theme that is analyzed, and all together they convey a more general one: that of the importance of the regional diversity of the world, too often oversimplified.

The summary of all the maps, especially that of the *Atlas de la Diversitat*, with its web of interrelationships among the maps, is intended to represent the dialogue that the topics maintain among them, despite the separation of chapters and pages and highlighting therefore the homogeneity of the whole. The photographs are used instead to represent one or several significant examples of the main message delivered by each map. It is not to be considered as photo ornament, although in general they are very fine (12 ). It is rather illustrations in the sense that light, give light to an issue or a problem that is presented in more detail, on a much larger scale. For those people who do not read the text, they quickly give a concrete idea of what the map wants to show. The graphs, symbols when they are not integrated into the map, as we have seen have the same function as the expansion of information and photographs. These maps however are few and always have the goal of replacing the statistical tables (even less) in order to provide greater clarity.

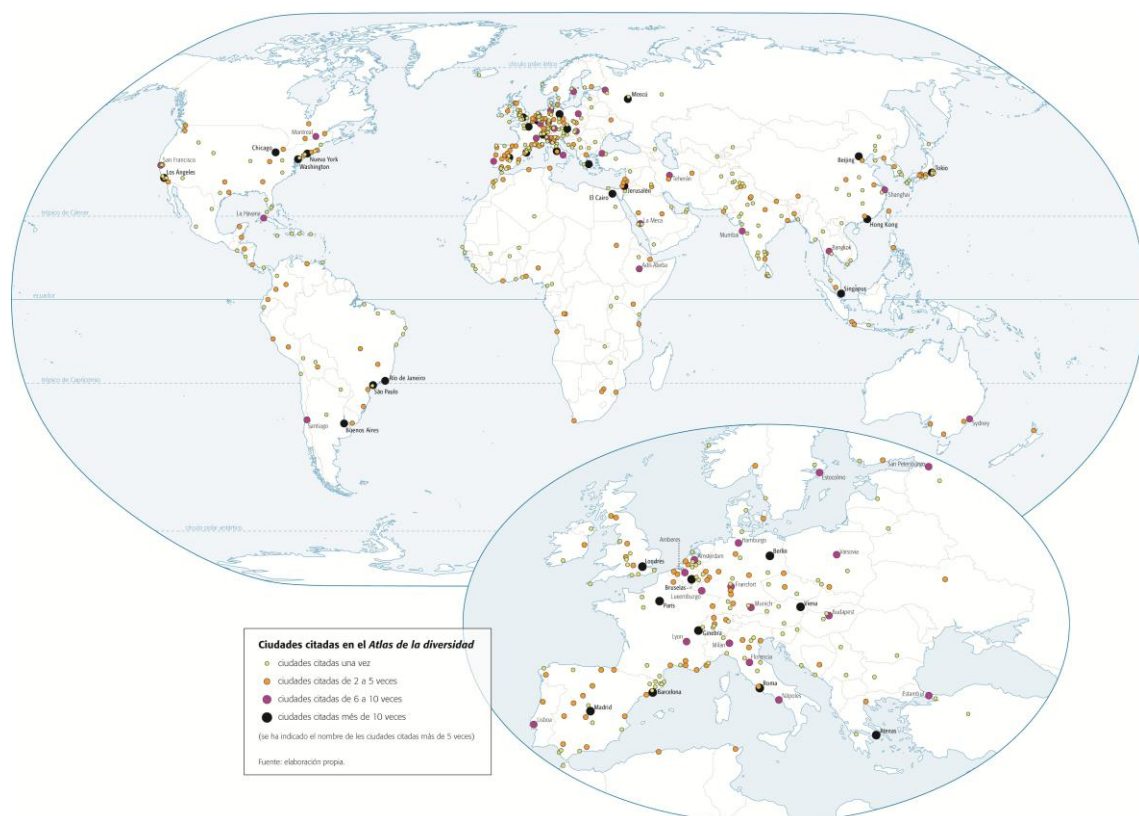


Source: *Atles comercial de Barcelona* (Carreras, 2003, pp. 174-175)

help, allowing among other things, to analyze the Eurocentrism that becomes almost irreducible.

*Conclusions.* - The first conclusions of the authors on the experience gained in the practice of thematic maps are part of a finding previously mentioned, that somehow seems surprising: even though we live in the era of the image, contemporary geographers use fewer maps than previously in their studies, or at least in their publications. To counter this finding we must react and atlases are just an attempt to make cartography, plenty of cartography, and spread it.

The current technological framework allows, on the one hand, a great facility in cartographic production (and in this respect must be very clear about the fundamentals of thematic maps) and, second, it allows access and dissemination of information broader than ever.



Source: *Atlas de la Diversitat* (Carreras, 2004, pp. 348-349)

The overweight of technology, however, can not lead to the separation of Cartography and Geography, and still less, to diminish the role of critical thinking needed to

understand and explain the world and all of its parts. The role of tools in fact can not ever justify the lack of explanation and research. The new technological references, moreover, must not only be an asset to the official sources, but they also enrich the mapping of new information and different possibilities of use, in order to contribute to the understanding of a world ever more diverse and complex. The qualitative approach allows for greater depth of analysis, that statistics can hide and it is for this reason that the colors and symbols of the thematic maps are absolutely qualitative.

The use of this small-scale thematic mapping, as has been already reported (Carreras, Martinez, Moreno and Ariño, 2005; Carreras, Martínez and Moreno, 2009), allows us to combine the precision required in all the maps in the interpretation scale of the social, cultural, economic or political problems. The small scale privileges geopolitical analysis and the experience developed by the authors has allowed to significantly improve the previous local publications (Vicens, 1940, Carreras, 2010; Martínez and Moreno, 2010).

The map allows disseminating the work, results and documentation of specialists, and such disclosure is essential. The different atlases published by us up to now represent a stimulus and encouragement to the disclosure of quality, to provide citizens of smart tools to understand and change our world. In conclusion, we should also return on the finding that it is possible mapping all or, at least, groped to represent. The atlases contain many examples cited in this direction, with the contribution of authors who had never had this experience. The map index in the *Altes de la Diversitat*, which allows evaluating the territorial point of view of the same Atlas, is a good example. The design helps - and much - to communicate concepts and ideas from the use of images. The use of this feature in the map opens up a new area of collaboration with professionals in the field, in order to highlight aspects of thematic maps that are scarcely observed in the formation and geographical tradition. The map, thus, has the potential to give birth or awaken new ideas. The design is able to incorporate a lot of imagination, with the great possibilities offered by the relationship between form and content, but be careful to the risk of ambiguity.

The thematic mapping can indeed offer other forms of description (15), but can not be separated either from the scientific rigor or quality. Somehow it would provide some of the uncertainties of rigor of traditional info- graphics of the best journalism (16). Atlases, developed by the group are works in which the design has an important role, are consistent works, in which each map is a part of the whole and each part is

complementary to the other. They also offer a view of the world from Catalonia and Barcelona, you might say a Catalan vision of the world, from the consciousness of the contradictions between local and global that occur every day, such as those of a people without a state. The information available determines, in large part, the image of the world that you can offer, as we have seen in the case of information in the field of demography, economic and social, organized in large part a function of the states, but the will is to get to establish and to suggest other levels of analysis for the future.

In conclusion, the thematic mapping, in general, must be indicated among geographers and social scientists as a great tool for research, allowing you to find some order in complexity. For this reason, it is still a vital tool in the teaching of Geography and dissemination of all issues concerning the relations between society and territory.

#### REFERENCES

- ALEGRE P., *Critica a l'Atles de la Diversitat*, in «Societat Catalana de Geografia», 2007 (<http://scg.iec.cat/Scg9/Scg91/S9102611.htm>).
- ANDERSON K., *Handbook of Cultural Geography*, Londra, Sage, 2003.
- BERTIN J., *Semiologie graphique*, Parigi, Gauthier Villars, 1967.
- BORIA E., *Cartografia e potere*, Torino, UTET, 2007.
- BORIA E., *Geografi e carte: qualcosa non va*, in «Bollettino della Societa Geografica Italiana», 2010, 4, pp. 921-924.
- BUZAI J., *Geografia Global. El paradigma geotecnologico y el espacio interdisciplinario en la interpretacion del mundo del siglo XXI*, Buenos Aires, Lugar, 1999.
- CARRERAS C. (a cura di), *Atles Comercial de Barcelona*, Barcellona, Ajuntament de Barcelona, Cambra de Comerc de Barcelona e Universitat de Barcelona, 2003.
- CARRERAS C. (a cura di), *Atles de la Diversitat*, Barcellona, Enciclopedia Catalana, 2004.
- CARRERAS C., *Jaume Vicens Vives y la Geopolitica*, in «Boletin de la Real Sociedad Geografica», 2010, CXLVI, pp. 55-70.
- CARRERAS C., S. MARTINEZ e S. MORENO, *La cartografia tematica a petita escala. Unes llicons de l'Atles de la Diversitat*, in «Treballs de la Societat Catalana de Geografia», 2009, 65, pp. 183-193.
- CARRERAS C., S. MARTINEZ, S. MORENO e A. ARINO, *Precision y cambio de escala en la cartografia tematica*, in «Mapping», 2005, 100, pp. 14-23.

- GARCIA BALLESTEROS A. e F. HERNANDO, *Resena bibliografica sobre el Atlas de la Diversidad*, in «Investigaciones Geograficas», 2005, 57, pp. 133-136.
- GOODCHILD M.F. e J. PROCTOR, *Scale in a Digital Geographic Work*, in «Geographic and Environmental Modelling», 1997, 1, 1, pp. 5-23.
- GUPTAE A. e J. FERGUSON, *Mais alem de «cultura»: espaço, identidade e politica de diferenca*, in A. ARANTES (a cura di), *O espaço da diferenca*, Campinas, Papirus, 2000, pp. 30-49.
- HARLEY J.B., *Deconstructing the Map*, in «Cartographica», 1989, 26, 2, pp. 1-20.
- HARLEY J.B., *Cartography, Ethics and Social Theory*, in «Cartographica», 1990, 27, 1, pp. 1-23.
- HARROWER M. e C.A. BREWER, *ColorBrewer.org: An Online Tool for Selecting Colour Schemes for Maps*, in «The Cartographic Journal», 2003, 40, 1, pp. 27-37.
- HARVEY D., *Processes, Patterns and Scale Problems in Geographical Research*, in «Transactions of the Institute of British Geographers», 1968, 45, pp. 75-78.
- LARA J.M. e altri, *Atlas Universal Planeta*, Barcellona, Editorial Planeta e Institut Cartografic de Catalunya, 2007.
- MACEACHREN A.M., *How Maps work: Representation, Visualization, and Design*, New York, Guilford, 1995.
- MARSTON S.A., *The Social Construction of Scale*, in «Progress in Human Geography», 2000, 24, 2, pp. 219-242.
- MARTINEZ S. e S. MORENO, *La cartografía geopolítica de Jaume Vicens Vives, similitudes y diferencias con los Coremas*, in «Boletín de la Real Sociedad Geográfica», 2010, CXLVI, pp. 71-86.
- MEENTEMEYER V., *Geographical Perspectives of Space, Time and Scale*, in «Landscape Ecology», 1989, 3, pp. 163-173.
- MIRANDA J. e altri, *Atlas Universal*, Barcellona, Enciclopedia Catalana e Institut Cartografic de Catalunya, 2009 (I edizione, 1999).
- MONMONIER M., *How to lie with Maps*, Chicago, University of Chicago Press, 1991.
- SERRA J., C. CARRERAS e S. MARTINEZ, *Atlas de Barcelona*, Barcellona, Ajuntament de Barcelona, 2011.
- TREMOLS M.A., *El mapa a la premsa: possibilitats i funcions de la cartografia periodística*, tesi di dottorato inedita, Barcellona, Departament de Geografia Humana, Universitat de Barcelona, 1999.

VICENS J., *Espana: geopolitica del estado y del imperio*, Barcellona, Editorial Yunke, 1940.

WATSON M.K., *The Scale Problem in Human Geography*, in «Geografyska Annaler», 1978, 67, pp. 83-88.

## NOTES

(1) A reference very clear in this regard is provided by manuals such as the Handbook of Cultural Geography, edited by Kay Anderson in 2003 in collaboration with several authors.

(2) Carles Carreras is the director of the work, Sergi Martínez-Rigol was responsible for mapping, while Sergio Moreno has worked on. The same team has developed the thematic mapping of the two editions of the *Atlas Universal*, published by the Institut de Catalunya Cartogràfic and Encyclopedia Catalana (Miranda and others, 1999 and 2009), and through further collaborations, he also produced the thematic maps of the *Atlas Universal Planeta*, published by the Institut Cartogràfic de Catalunya and editorial Planeta (Lara et al, 2007).

(3) Arno Peters projection reworked in 1967 that had built the Scotsman James Gall for the Scottish Magazine.

(4) Without counting maps or diagrams included in the Atlas two sheets: one dedicated to the interior space of the city, in which he shows a schematic structure of six types of cities, and one dedicated to the different maps of the world (in which, through 6 different projections, show different views of the world itself).

(5) In the drawing maps through the technique of anamorphosis you attempts to preserve, through the position of the states and of their forms, a similarity with the forms that result from the use of the Robinson projection. For ease of interpretation, these maps are always accompanied by a political map (Carreras, 2004).

(6) At present, the tendency to achieve this uniformity is also demonstrated through the creation of ISO 3166, establishing a code of states in a standardized way to make compatible the information in the world [www.iso.org /iso/country\\_codes.htm](http://www.iso.org/iso/country_codes.htm).

(7) The sheet that has greater relationship with this theme is dedicated to the different maps of the world in which we have projections, guidance and also centers of different projections.

(8) What is innovative is to change the center of the map according to the theme and not , as in the last sheet of the *Atles*, depending on the geographical location of people developing world maps, which come to change also the orientation.

(9) It ' interesting that Human Geography and Cultural Anthropology were born at the same time with the work of Friedrich Ratzel, *Anthropogeographie*, 1882.

(10) The three authors have collaborated, along with other authors, also in the preparation of this Atlas. The scale is a little greater, but can be considered small.

(11) When you are not able to find a specialist who would or could make the effort of territorial representation of some subject, was the geographer to try it from another perspective, this was the case, especially, of the map of values.

(12) in Spanish edition, published the same year, the *Atles de la Diversitat* has added some double pages with large photos to mark the beginning of the chapters, trying to combine the interests of scientific work with the legitimate commercial interests.

(13) The texts are the real basis of the map, in which specialists non-geographers have felt more at ease in their explanation. A few additional texts analyze cases while a detailed bibliography, and a list of websites, complete the information for those who wish to moreinvestigate the issue.

(14) It is significant , in this respect , that some of the authors were not geographers, with no experience in the field of cartographic representation, once taken note of the outcome of the work, have asked for permission to use the maps in their academic activities and research .

(15) See in this respect Carreras, Martinez, Moreno and Ariño, 2005.

(16) See Trèmols, 1999.

Universitat de Barcelona, Dipartamento de Geografia Humana  
ccarreras@ub.edu smartinezrigol@ub.edu

Universidade Estadual de Sao Paulo, Campus Presidente Prudente, Gruppo di Ricerca  
GASPERR smredon@yahoo.es