Electronic collage

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1. Old tools under a new light.

A painting is always a potential form of collage. The discovery made by Braque and Picasso (1a, 1B) was already implied in the carefully-done executions of tapestries backgrounds and mural decorating of all the Italian and Flemish paintings which started to be produced since Giotto's, where the represented and the presented were mixed up (2a). And also, in a more pedantic way, in a famous painting of Courbet "L'Atelier du Peintre, allégorie réelle" (1885) (2b). In this work, the artist is shown sitting in front of his work, grasping a brush with his right hand while holding a palette, which is at the centre of the composition, in his left hand. There are some figures surrounding the master, some nearer, others further away, in the corners of the atelier one can still see silhouettes which we don't really know whether they belong to real characters or to painted ones on the master's canvases. This ambiguity brings us back to the foreground, to this central palette where the colours, distributed in heaps are, simultaneously, concretion and representation, real matter and figurative matter.

This powerful ambivalence which one finds between concretion and representation, when we use a method capable of generating a wide scope of colours and textures; an ambiguity which is reduplicated by the generic ambivalence between production and reproduction, constitutes the meaning and the main reason for our activity as professors of architectural graphic expression, in the last ten years, in the second year of studies at the ETSAB, and it has allowed us to endure the critics and the praises (sometimes even more dangerous than the critics) provoked by a series of results qualified as brilliant by some and as anachronistic by others. There is no doubt that these images (3a, 3b) can be directly related, for good or for had, to those which come from the Beaux Arts (4a, 4b) from the illustrations produced by students who either worked in Paris or in Rome by the end of the XIXth century. Images which, seemingly, seem to forget that we are at the end of the XXth century, the century of the abstraction, of Bauhaus, of the triumph of modernity and the overcoming of the ingenuous figurativism in every field of art.

The medium used to explore this fertile ambiguity has been, as in the Beaux Arts, the watercolour. The reason why this medium has been chosen, a medium which we have considered, without a shadow of doubt, the most suitable all along this period., can be summarised in a paradox: it is the medium which incorporates, simultaneously, more capacity of Simulation and more capacity of Abstraction. More capacity of simulation because of its richness in its chromatic range and, also, because of the variety of textures and methods of resolution which it is capable of generating in expert hands. (5a, 5b) More capacity of Abstraction because it is a transparent medium, which gives the best of itself in direct applications, "a la prima", on paper, as a super-posed coat on the drawing which shows us clearly the whole linear skeleton, the formal interpretation, the abstraction, in short, on which it stands.
The works produced by our students during these last years, have come up in an extraordinary fragile and unstable field. On the one hand, the one which separates tradition from modernity and, on the other hand, the one which separates the education characteristic of a workshop from the education given at the university. This fragility has produced quite a number of problems because, no one can doubt that the anxiety for novelties and the ever-lasting faith in progress drive things in another direction. However, the use of computers in our personal style of work, should not be understood as an abandonment of this fragile field but, on the contrary, as a reinforcement of its defences. The main obstacle we have found, however, is the lack of participants. Certainly, and this is relevant and must be a motive for reflection: it is difficult to find somebody who is, at the same time fond of working with watercolours as well as with computers (or has time for both things, besides being an architect).

2. New tools under an old light.

In any case we believe that, the experimental works we have realized, not in the last years but in the last months, have been useful to establish a link between a way of doing that some people may qualify as "anachronistic" and a way of doing that the same would qualify as "modern". We have to say that we are indifferent to these classifications. The main concepts we use: Colour, Image, Form and Meaning are invariable. The rest are tools.

However, as everybody knows, a Tool incorporates some conditions of possibility: there are certain things which can be done with it and some others which cannot. The first task to do is, then, to investigate the scope of possibilities of a new tool. And the first thing to be done is to eliminate any misunderstanding about its possibilities.

When the alternative of extending our work with watercolours, to a type of work with graphic tools provided by a computer appear and, also, when the possibility of incorporating these new tools to educational programmes was proposed, we set some initial conditions which are not always taken into consideration in other similar works we have considered.

Firstable, it had to be an available instrument for the majority of students. This restricted the choice to commercial programmes which worked well with personal computers (PC or MAC). Neither then nor now did we think about the possibility of developing our own programme because we considered this as a highly dangerous choice if the relations which have to be established with firms capable of promoting them are not very well established. The programmes we tried during the first year of work were very simple ones such as: Paintbrush, Splash, Dr. Halo, Designer, CorelDraw and Deluxe Paint. With this last programme and with a PC286 (20 Mb of HD and 1 Mb of RAM) Ernest Redondo created images (6a, 6b) (7a, 7b) which illustrate his doctoral thesis "Els camins de Ronda a la Costa Brava" (qualified as "cum laude" in June 1992) and which were, even though the restrictions of this medium, the first serious applications of this tool to a particular work, in this case, one related with landscape and environmental impact.

However, the last conclusion of this first approximation to the theme was basically negative from the point of view of its incorporation to the educational field: there was not, for the moment, any commercial programme which provided the minimum level of quality we asked for, as teachers who were accustomed to use a medium so refined as the watercolour is. There were only two exceptions, two programmes not yet mentioned: Lumena, and Photoshop. Both presented, however, serious disadvantages. Lumena is a programme
restricted to a particular kind of platform; in fact there are only two versions: one which requires the
graphic board Targa and another which requires the Atvista graphic board. This meant a triple restriction;
the first one was the cost: these items are ten times more expensive than a common graphic card (a
SVGA 1024 x 768 with 16 bits); the second one was the incompatibility with other programmes which
will not have such a platform; and the third one were the physical working conditions. Due to the low
frequency of these cards, which are conditioned by its direct relationship with the video work, it was
necessary, either to lower the resolution or to work exclusively with monitors of high phosphorus
persistence" something which restricts the option even more, or to work in unacceptable physical
conditions for the users (refreshing frequencies lower than 40 Hz).

The Photoshop programme was in fact, the only one which fulfilled the minimum requirements we had
planned to achieve. Put it in another way: it was the first programme we got to know that had enough
technical power to incorporate image processing algorithms. The disadvantage now was of internal order. Our
department, as well as our school, were equipped mainly with PCs, an option chosen basically for
economic reasons, also related to the option, which we think is unquestionable, of depending mainly on
AutoCAD for working in 2D and 3D. The alternative was: either to change the working platform, with
all the inconveniences it meant from the point of view of the internal coordination, or to wait until an
equivalent product appeared in the PCs world. Our option was to give a six-month-term for this second
possibility to take ground, as it seemed quite likely to us that it could happen so. This proved to be the
right choice as a few months later we heard something about a litigation of authorship, which seemed to
be solved with the purchase or promotion of the Photostyler programme by Aldus. The Photostyler is
nowadays the equivalent version of the Adobe Photoshop in the personal computers’ world. Aldus
distributors were quite surprised when we made an order before the programme was even commercialised
but we ended up being, probably, the first users of this programme in Spain (8a, 8b) (9a, 9b).

However, the programme still requires a 24-bit-card to work at its best, something which is still easier
to find in a MAC than in a PC, but for most of the applications, 16 bits are enough. It also requires a
higher power of computation than the normal average-, it prefers a 16 Mb of RAM to an 8 Mb and it is
practically useless with a 4 Mb for tasks which have a minimum of difficulty. The records generated,
they quickly surpass and double the limit of a common floppy-disk of 1,4 Mb, and the common
computer speed is rather short. These limitations justify the scarce presence, up till now, of these kind
of programmes in classrooms and studies. But we can hope that this situation will radically change in
the following two years.

A programme such as this one or, another which could appear in the near future with similar
characteristics, presents itself, for obvious reasons, as a tool capable of doing everything any other tool
could do plus some other things which no tool is capable of doing. It is important to clarify: a) what it
cannot do although their promoters tell us it can, b) what it can do but in a wrong way, c) what it really
does which is new. This does not imply a critical revision of this programme in particular, but a
revision of all the programmes with the same characteristics which exist at the time being, and it is
presumable, that will exist at the architects' and designers' disposal in the near future. It also implies the
assumption that we have to rely on commercial programmes and make a continuous and renovated critic
of them.
3. Paragon

What an electronic painting programme cannot do is to produce a range of colours and finishing touches comparable to those of a material painting (10a, 10b). The phosphorus, electronically excited, can produce lighter images than those produced by other means but, its chromatic rank is lower than that of any pictorial means which uses good quality pigments. This is something which will be even more appreciated as soon as the ghost of novelty disappears. The famous 16,7 millions of colours are necessary, for technical reasons, to produce continuous mergings not altered by fringes, an inevitable fault which can be immediately appreciated just when showing an illuminated sphere in any programme of rendering which uses a 16-bit or less, graphic board. From the point of view of visual perception, more than 95% of these 16,7 millions are indistinguishable, this is: the physical result is perceptually identical for different RGB codifications. And the 15% left, incorporates a poorer scope than that of a traditional means. Another very simple fact, not always correctly explained either.

This inconvenient worsens as soon as we try to obtain a permanent reproduction (hardcopy) by using any of the four more common means which are, in order from less to more quality and from less to more cost: a) direct screen photography; b) impression with a matrix colour printer (such as an HP Paintjet XL of 300 dpi); c) impression by means of a colour printer with an adapter (such as a Cannon CLC500 connected to a PC at 400 dpi), d) filming with a digitizer camera (such as an AGFA or Polaroid filming at 4000 lines).

What an electronic brush cannot do either, is to compete with an instrument as the one shown at the image on the left (11a). It is a sophisticated tool capable of producing lines with a variable thickness, by millimeter fractions, all along a rank which would go from less than 0,1 mm to something more than 200 mm. The variation of thickness is instantaneous and it is controlled by finger pressure, without having to look for the parameter in a submenu or in the keyboard. The diversity of shapes it can take is unlimited. The name of this sophisticated instrument is "brush" and its main inconvenient is that it is so old (more than 5000 years old) that we have become insensitive to its possibilities. Its electronic imitation does what it can: it changes shape, thickness and flow intensity by using a menu of limited possibilities (11b) but it has an important advantage: it has been among us only for a few years and it fascinates us as a three-year-old child can fascinate us when expressing himself with complete sentences, up to the point that it makes us forget that actually, one could not really say that he speaks properly.

There are other things an electronic brush does, but quite badly. The main lack the programmes of image treatment capable of working on a PC have, from the point of the view of architecture, has to do with the restrictions related to geometric drawing. This limitation is intrinsic; the programmes for image treatment work with bitmaps in a specific dimension given in integers, scarcely compatible with the precision required in any elementary geometric operation with a basis on real numbers. The generate working System of a programme such as this one is, as we already know, completely different from a 2D or 3D drawing programme.

This limitation can be sorted out, somehow, with transformations in both senses, but this eliminates the possibility of a real interaction. It is foreseeable that new developments will appear which will moderate this deficiency but, until this comes, it will be necessary to work for a long time with a chain of independent modules with transitional problems among
themselves. In these conditions, and that is what we want to underline, it may be better, in some circumstances, to forget the geometric precision and to give more importance to the suggestive power of a fixed image, as it has been done all along the history of architecture although trying to use the new possibilities at their best.

Because what it does which is really new, and it is what we are quite interested in, is, precisely, what gives the title to this paper. The image processing programmes allow the fusion of some images with other images, eliminating any trace of this fusion, due as much for the particular nature of the medium as for the possibility of using a very wide range of filters. This can be done, in addition, with agility and in many different ways. It is possible to merge singular images as well as generic ones: textures, models, colours or different superficial qualities which can be either directly applied with a "clone" brush or removed and replaced from one side to the other in the same or in a different image. It is also possible to modulate the interaction of light on a surface, with a precision and a facility unthinkable till now. In these possibilities lies the difference, the radical novelty educational programmes and professional offices should get, assimilate and include in their working plans.

If we had to summarise in only one aspect the main difference, we would say that it appears as a new and unthinkable leading role of the materials in the conception and inspiration of the creating procedures of architectural forms. It is, consequently, a rediscovered capacity to introduce in the conception of new architectural spaces, sensorial values, qualitative values given by the colour and the complexity of figures and textures which would never be taken into consideration in a conventional level, not even in a carefully done colour illustration.

4. Fixed image versus animation.

From the point of view of the intuitive apprehension of form, the animation recreates a natural procedure: we touch an object with the tip of our fingers if it is small or we walk around it, if it is big, to get acquainted to it. However, the natural procedures tend not to have anything in common with the artistic ones. The history of architecture, as the history of sculpture, supplies us with an overwhelming profusion of examples which clearly show how the composing strategies of architects and sculptors are the complement of the composing, strategies of painters. The first ones have tried with a universal constancy to grant a privilege to certain points of view, to push the spectator to certain positions from where the form acquires the static power of a symbol. The second ones, have known how to choose fixed images which seemed to imprision, to suspend in a universal moment, the route around the form.

If the fixed image turns out to be as expressive, or even more, than the direct vision of the real form, it is because of its condensation capacity: it is satisfying to have a complex form that can be summarised in only one vision and it is even more satisfying to invite the imagination to complete the picture. But, without having to explain complex motivations, more or less subjective, it is obvious that the image has a potentiality and efficacy similar to that of the word or the symbol. On the one hand, they are capable of condensing infinite facets of what is visible. On the other hand, they give a judgement, they compromise themselves with a chosen position against another one-, they give us a clue to understand a form or a space.
If the animation, by computerized means, is so attractive, it is because of its surprising novelty as well as for its communicative capacity. A good proof which would save us from boring arguments would be the “return proof”. It is difficult to believe there is someone as interested in observing attentively a computerized animation as he would observe a well-chosen image of the same topic. This is as well, an argument which may seem provisional but we would risk to defend it as a definitive one; not a single animation can incorporate the level of definition and quality of a fixed image. And we think that this is so (for the time being) as much for technical reasons as (always) for essential reasons: we do not perceive the movement as a continuous succession of sensations but, rather, as a discontinuous sensation of recognitions.

The fixed image offers, due to the new informatic recourses, a surprisingly widened and strengthened field of exploration. If there haven’t been until now any significant works in this field, it is because, in our opinion, of the decline of a culture of vision linked to the abandonment of education in drawing and painting in the architecture schools. And also, because of a restrictive and deviant concept of the idea of "modernity" in architecture and urban development.

5. Summary of recent experiences.

Starting from this point, that is, with the intention of exploring a possibility, which we believe is still assimilated in a deficient way, some of the works showed in these pictures (12a, 12b) (13a, 13b) (14a, 14b) have been realized.

Its possible interest should be seen then, from the perspective of a double tradition: the departmental practice focused on rescuing the sense of a tradition which closely relates painting and architecture, and which we consider of great value and in a serious danger of weakening, and on the other hand, the desire of integrating new tools into this tradition. This requires a double and not at all frequent type of education: the knowledge and the ability to use both painting and computers.

The majority of works have been realized in a perfectly adapted area to integrate this double aspect. The proposals of modifications or reforms of natural landscape. The first works in this field were, as we have mentioned before, Ernest Redondo's doctoral thesis where various options were given to recuperate through very enclosed landscape interventions, degraded areas of the landscape in la Costa Brava.

This first works have developed into a series of studies for the "Diputació de Barcelona" with the idea of analysing the possibility of realising a sort of "micro-urban-planning"; modest interventions with restricted budget and dimensions, focused on connecting a political activity of little interventions that will start to introduce the habit of correcting landscape degradations through political actions of persuasion directed both to local authorities and social groups.

It is obvious that this study, based in real requests, could expand to similar studies done in urban settings as it is shown in these images, the last of them also showing the different stages of modification since the original image. (15a, 15b) (16a, 16b).
However, what we want to emphasize is how this could be done in a "natural" way, with a simple equipment and how if it is not done., it is because of lack of interest or sensitivity towards this field, taken refuge in the logic of programmatic planning and completely forgetting about the visual experience and the sensitive perception of the environment. With these new methods, all these parallel ways of approaching the project seem to be possible both a prior and a posteriori, implied in a process of trial and error, of moving forwards and backwards, a process which we consider quite interesting and, from our point of view, indispensable for an effective control of visual values in this kind of interventions.

6. Conclusions. Essential values and contingent values.

The direct work with images recuperates and amplifies the value of direct interaction with materials proper to every type of art, this is a particular characteristic of plastic arts but it is rather elusive as far as architecture is concerned. Traditionally, painting, architecture and sculpture have been considered as sisters, as "Fine Arts", "Plastic Arts", Visual Arts" and so on. Its "own" sense is that of the sense of vision and the sense of touch, and it is this what makes the difference, what separates them conventionally from other arts like music or poetry. These distinctions should be taken cautiously but, they set out a reference to an unavoidable starting point which could be summarised as follows: the proper material of the first ones, is Light whereas the proper material of the second ones is Sound. Light (chromatic or non-chromatic hues) is "what acts" in one way or the other in the first case. And, Sound (melodic or harmonious tones) "what acts" in the other case; a deep knowledge of the kind of responses allows the elaboration of various control strategies to create the form.

The form is in both cases, the result which is found or searched for, what-is-given-as-a-response. However, the Form we refer to in our case is the Perceptible Volume or the Visual Image. The Form, materially given through light and colour as the perceptible volume and as visual image, is the architectural answer to a series of interrelated requirements which constitute "a programme". Therefore, to design is to give a formal response to a programme. This is quite a general definition but one that takes some distances with others which have been given during these last years in the CAAD world and which we regrettably do not share.

The Form, understood as Perceptible Volume or Visual Image can be apprehended starting by one of these ends, by both of them at the same time or by a pulsation between them. The works which have been shown try to clarify and propose both ways as well as to establish links between them (on this point review the report "From Barcelona. Chronicle and evaluation of a new course..." also presented in this Congress).

From the point of view of the investigation and development of our work with computers, this is exactly situated in the limit between the user's position and the investigator's. We are neither common users (our level of demand and our critical attitude are stricter) nor computer researchers (there are no means nor interest to study this field seriously). However, this position is, in our opinion, the most realistic one for an architect and a university teacher who must know and value and consequently put in order hierarchically, new physical or conceptual instruments in order to integrate them in the architectural knowledge. Especially, if there is a possibility of establishing a fruitful relationship with teams capable of developing a complementary programme, this has already started to be done with some results which we hope to be able to develop in the following years, together.
with other departments from our own university and from other European universities which share this position. A position which, deliberately, seeks to be placed in this unstable borderland which nevertheless must be considered, in our opinion, the proper architectural territory.

List of slides.

1a Picasso, 1b Braquetie - 2a Giotto, 2b Courbet –
3a Beaux Arts student, c. 1870, 3b id.
4a ETSAB, DII, 2nd year student, c. 1980, 4b id. - 5a id. 5b id.
6a Ernest's thesis Black & White, 6b id. - 7a Ernest's thesis colour, 7b id.
8a PhPs examples, 8b PhPs examples - 9a id., 9b id.
10a CIE colour, 10b Monitor and printer colour
11a Rembrandt brush, 11b PhPs brush
12a, 12b to 20a, 20b Recent work examples,