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Coloration replacing formalisation.

For the meeting with Gerstner on March 31.

In Western tradition "form" is taken to mean a container ("morphé"), and that container is supposed to be empty. On the other hand, the world of appearances is taken to be shapeless, ("a-morphous"), and to somehow flow from the past toward the future. Human understanding is taken to be the act of pouring appearances into forms. By this filling the forms with appearances it is supposed that the forms acquire contents, (meanings), and the appearances acquire an order which may be manipulated. This act of filling forms with appearances is called "formulation", "formalisation", and the result is called "information". To use an image: The forms are taken to be spoons (which are either "eternally given" or somehow produced by ourselves), and those spoons are dipped into the amorphous soup of appearances, for us to be able to understand and manipulate the world.

Originally, the forms were seen with an inner eye ("theory") as clear, distinct and color-less figures: mostly as circles and triangles, and (in three dimensions) as spheres, cones and pyramids. To "formalize" meant to fill those basic forms with appearances, like one fills canals with water. In fact: the whole idea is probably due to irrigation. As the Nile and the Euphrates were being canalized to irrigate fields, people drew lines on the surfaces of tablets to permit an overall vision of the canals to be dug out, and those "geometricians" were probably the first formalizers, the first to formulate their ideas clearly. Much later it became possible to transcode those geometrical figures into numbers ("analytical geometry"), and thus to elaborate "formulae", arithmetical expressions, algorithms. Thus, to "formalize" now mostly means to formulate appearances as algorithms. And "formal thinking" now means mostly numerical thinking. This is the very basis of modern scientific and technical thinking.

This is a powerful strategy to understand and manipulate the world, and the Industrial Revolution is here to prove this. However, it is becoming obvious that there is a fundamental error inbedded in this whole tradition. We do not, in fact, see colorless forms (not even with that curious inner eye called "theory" in the tradition). What we do see is colors in various shapes, and what we call "form" is the passage between individual colors. We do not see empty containers, (not even in the "abstract"), but only contents which usually overlap but sometimes may be distinghished. This has been shown by people coming from very different horizons, adn lately very convincingly by Gerstner. Now of course it may be held that this fundamental error does not invalidate the powerful strategy of numerical formalisation. The whole thing is a "strategy", which means a kind of war game in our struggle against the world. There is however the following objection: it appears that scientific and technological progress are up against a double challenge. On the side of "understanding" they seem to be losing hold of the world and to lead us toward a numerical swarm of particles without any consistence. And on the side of "manipulation" they seem to be losing hold of concrete human needs and desires, and to lead us toward a functional (numerical) alienation. Quite possibly that fundamental error of formalisation (instead of coloration) is beginning to surface. It is beginning to prove that the progress of science and technology is standing on a false ground.

In the face of this, the obvious thing to do seems to be to start thinking in colors instead of thinking in forms. And thus to re-establish contact with concrete experience, with what might be called the "real". However this would be an impossible enterprise, because it would amount to the task of re-thinking the whole of science. This is neither possible, nor is it desirable, for the following reasons: It is impossible, because not only do we swim wi..in scientific tradition, but the very idea to substitute color for form is a result of that tradition. And it is undesirable, because we cannot live without science and technology, even if we wanted to (as some say they do). Thus there can be no question of abandoning formal thinking for color thinking. But what we can try to do is to link color thinking to formal thinking. Colors to numbers. This may sound inocuous, but it is a formidable challenge. Here is the reason why this is so:

Color thinking was of course never abandoned. Even after people began to draw lines on the surface of tablets, they continued to paint color pictures. Geometry did not do away with painting. But the two expressions of thought were quite distinct the one from the other. The one was "epistemological", the other was "esthetic". No doubt: both geomteric drawings and color paintings were models for behavior "political" models. But geometrical drawings were models for quite another type of behavior than were paintings. That is not to deny that secondary links were established beween those two types of expression. Attempts were made to color geometrical drawings to render them more accessible to concrete experience, to render them more "esthtic". And similarly, geometrical drawings(like the perspective) were introduced into paintings to render them more conceptual, more accessible to "reason". Still: even in colored models of conceptual thought (like for instance in drawings of atomic structures), and even in numerically conceived synthetic color images (like computer-generated ones), the two types of expressions remained basically different: the one was an expression of knowàge (science), the other an expression of experience (artistic). To establish a true link between color thinking and formal thinking implies that we abandon the difference between art and science.

It is feasable to establish such a fundamental (not accesscry) link by an adequation between the universe of numbers and the universe of colors. If we have those two universes overlap the one with the other. Ever since Descartes we possess a model for the universe of numbers (although that model may have suffered profound modifications in the course of mathematical refinements). As for the universe of colors, we dispose of several models (althou none of them approaches the perfection of the number model). The most adequate seems to be Wyszecki's Uniform color space model. Gerstner is attempting to build such a model in three dimensions on a large scale. The following will be an attempt to link that model to a specific process. To use the model for coloration of a process, like the numerical model is used to formalize a process. In the hope that such a coloration may be linked to its formalisation. The following will thus be a mental experimentation (in the Galilean sense of "sperimentazione mentale"). The process here proposed will be fed into Gerstner's model like water into the drawings of canals by the original geometricians. It is not important whether this experimentation is correct, only whether it "works".

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Let us consider the history of the Roman empire to be a process that may be visualized in colors. As if it were a film during which various colors spread, and mingle, and overlap, and shrink, become paler and more brilliant, without ever assuming shapes which might be identified with "things" as they are perceived in the world. Such an "abstract" color film of the Roman empire would be the product of "pure" color thinging, like mathematical formulae are products of "pure" numerical thinking. (The Roman empire is taken here for an experiment of color thinking, because it is sufficiently important for the understanding of our cultural and existential situation, and because it is sufficiently complex. Any other equally important and equally complex process might serve for an experiment as well as this.)

The film will cover a period between approximately 700 BC to approximately 400 AC, but those will be quite fortuitous data. In fact: it may be shown within the film that the colors which constitute the empire are as if sucked into the point of departure from a vast and indeterminate past, and that they spread and become ever paler long after the point of termination, and that they invade the present. Still: there is some justification for having the film begin at a specific pdnt in space and time, because this point permits color codification. Let us start with two basi colors: yellow and red, and let us codify them quite fortuitously. Let us call yellow the color of the "private space" (res privata), and red the color of the "public space (res publica). (Why thos colors were chosen is besides the point, but no doub will have to be analysed after the experimentation).

At the beginning of the film we will have seven small yellow spots surrounding a bigger red one (the seven hills surrounding the forum). But several threads will be seen to connect the yellow spots with the red one, and within them red and yellow will be seen to mingle. But very soon it will be found that this simple palette is insufficient to visualize that initial situation. It will prove to be necessary to widen the vision (even if, of course, simplification is the aim, as it is in humerical formalisation). The red-and-yellow scene will have to be inserted into a grey surroundings, from which various indetermined colors seep in and dillute the original codification. (Later on, this may be refined in chosing for instance specific colors for "Etruscan" and "Italic" influences, but at this stage confusions ought to be avoided).

As the experiment goes on, a further color will be needed. There is a third space within the situation which needs codification, namely the "sacred" one (templum), and let us chose blue to mean it. But this blue will not constitute a spot, although it will tend to concentrate on a point called "Capitol"; it will instead permeate the whole picture: A bluish light will illuminate the entire situation. A very complex mingling of the three basic colors will be set in motion, but will be seen, very soon, to result in rather clear distinctions. The links between the central red spot and the permating blueness will take definite shapes called "magisterium" and "ministerium", both neatly colored red and blue, but each in different proportions. And the yellow spots will be seen to be linked through yellow-

red strains to the bluish background. This web of threads wherein the three colors go side by side without intermingling will envolve the scene, at it will mean Roman law without having to be espicifically codified in that sense: the meaning will have arisen spontaneously.

As the film unrolls, those spontanous meanings will emerge with increasing frequency (if the program is correctly worked out). However, it will be found that ever new coding interventions will be required as the initial scene spreads and invades the grey surroundings. For instance: a special color (green for instance) will have to be chosen to mean "Greek influence", and this color will then be seen to dominate over the blue, to mingle with the yellow, but to leave the red almost untouched. Another example: a further color (for instance violet) will have to mean "Jewish influence", and as it spreads, it will combine with the red and yellow to form a blend which will spontaneously mean "C hristian". This color blend will have to be refined as the film goes on, green will have to be mixed therein; and a color meaning "Germanic" will have to be added to this.

Near the end of the film the color mixture meaning "Christian" will be seen to permeate the scene, covering all other elements and corroding the structure of the web which sustains the image. Simultaneously, new threads will begin to appear in the background. The film will end when the original three colors red, yellow and blue will have lost their original meaning through mixtures and overlappings. The Roman empire will be seen to disappear because its primitive elements will have lost their codified significations.

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The spectacle just outlined is of course only a rough sketch of a program. The important point is that such a program would have somehow to be fed into the model of the color universe as it is being elaborated by Gerstner. The problem is both a technical one, and one of conception. Technically it will require that the colors and shapes contained within the program appear within the color universe (for instance like diagonal cuts through its structure), and that the rest of that universe be left in darkness. Conceptually it will require that the program be adapted to the structure of the model. This implies that Gerstner and myself are incompetent to execute this by ourselves: a team composed at least of a historian of the Roman empire, of an electronic engeneer and of an optician will be needed to work with us.

Should these initial problems be solved, the program will be in need of progressive refinements. Ever new parameters of the process "Roman empire" will have to be fed into it, the palette will have to be scaled and quantified ever more carefully, and the whole process will have to be manipulated ever more in accordance with the color universe structure. Which means that the virtualities of the model (the numerous diaginal and other cuts possible there within the limits of white and black) will have to come into the play ever more clearly. Obviously this implies that as the spectacle goes it it will become increasingly possible to quantify each of its colors, to trancode them into numbers. If the experiment should succeed, we will have achieved both an esthetic (color) and a numerical understand-

standing of the process "Roman empire", and also the possibility to analyse that process at every desired stage, simply by stopping its progress.

The mental experiment just proposed is meant to show the way toward a future thinking in colors. Namely that it will have to submit to strict rules of codification and structure, comparable to the strict rules to which numerical thinking must adhere. Which means that it will be a thinking based on a theory, and that it will somehow press processes into theoretical categories of understanding (the process "Roman empire" into the categories of the color universe model). It will be a "scientific" thinking, although it will go on within the domain of the esthetic. It will aim just as much at "truth" as at "beauty". If, instead of "Roman empire" another process (such as for instance the original formation of life on Earth) had been chosen for the experiment, the epistemological parametre of that color thinking would have become even more patent.

As is always the case, the technical and conceptual problems involved in the project are much more difficult then is the general idea. But those problems are also much more fascinating. In fact the challenge is to take one process after the other, codify it in simple colors, feed this into the color universe model; refine it ever more carefully, adapt it to the model structure, and thus gain an ever deeper understanding of the world and of ourselves within it. And to simultaneously transcode progressively that understanding into numbers. Which implies that scientific knowledge and technical methods will be enriched by a new esthetic parametre and thus become more concrete (more accessible to experience and values).

It thus appears that the project here proposed will demand a prolonged, sustained and costly effort to be understaken by teams of specialists coming from every branch of research. What Gerstner and myself can do is only to help the project to be launched on its way, over which nobody can have control, because it will branch out and multiply as it progreesses. Which is preciesly what makes it such an adventure.