

## Art and Illusion

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Gombrich was along with Popper an Viennese exile residing in London. They were roughly about the same age (09, 02 respectively), and they incidentally died at the same age (92), and they were friends (of sorts) , Gombrich at the Warburg Institute in London and Popper at the London School of Economics. Thus Gombrich's approach to art is rather scientific, and he refers to his friend Popper, repeatedly, almost as if he feels the senior partner looking over his shoulder, and he has to justify himself.

Art has a history as far as it concerns itself with the problem of faithful representation. This may in one sense be thought of as in principle trivial problem, once the principles of perspective, i.e. projections, are firmly understood. A process that with the invention of fixing the image was seemingly once and for all solved (making artists superfluous, or at least in the sense of computers making mathematicians redundant?). The thesis of Gombrich is that there is much more to the process than that, that the ultimate goal of imitating faultlessly nature is impossible, but nevertheless the search for it has provided artists with a quest and a problem to challenge their imagination and ingenuity, and a problem whose tentative solutions can to a large extent be objectively judged, and thus making art in search of mimesis, almost a science. In fact Dürer and da Vinci may very well have thought of themselves as scientists, and Constable, whom the author, along with his painting of Wivenhoe Park (1816), makes into a theme of his extended essay, explicitly thought of himself as such. The idea to achieve verisimilitude is not one which is entirely obvious in every artistic tradition, and children famously do not strive for it, but are more than content to let images be mere symbols, as a kind of hieroglyph, although whose meanings tend to be rather obvious. In the same way one should not think of the images of Egyptian art to be the result of ineptitude, it was the work of sophisticated adults after all and not children, but rather as an expression of other goals.

Central to the argument of Gombrich is that any kind of verisimilitude is the effect of the creation of an illusion, thus making the spectator come halfway, and hence also force the artist to accommodate himself as well to the expectations of the public. Our visual interpretations are not as immediate and direct as one may naively believe, although they tend to be remarkably very fast and sophisticated, which has fostered this illusion. Any visual data has to be interpreted, and to do so one has already to have at ones disposal a variety of schemata, which Gombrich thinks of as a visual vocabulary, which expands with age. One cannot sense anything without having an expectation, and here Gombrich shows himself a model student of Popper, and those expectations will normally be frustrated, forcing you to modify them. The problem with a 2-dimensional image is that it does not show depth, and thus, as Gombrich somewhat pedantically points out, there is an infinitude of objects 'out there' who will have the same projection on the canvas (and he even refers to a certain Ames who have arranged peepshows of three very different objects, which from one particular viewpoint make the identical appearances of a chair). In real

life, in addition to stereoscopic vision, you also have the option of moving around, and hence being able to test your expectations, through a multitude of viewpoints. This is not an option for a flat picture, and hence you have to make some strong assumptions, without which the reading of the picture would be impossible. In the same way the artist also in addition to a vocabulary of visual objects, also needs to possess a vocabulary of objects he can draw, without such a resource he would not even be able to draw from nature. And just as the viewer modifies his visual object in a given situation, an artist will have to modify his drawing to better fit the situation at hand. The pre-knowledge is both necessary as well as also being an hindrance, and Gombrich discusses and eventually dismisses the ideas of 19th century critics such as Ruskin that there is such a thing as an innocent eye, that it is not only impossible, but that it does not even make sense, to see and copy things as they 'really are'. Even if the principles of perspective may solve the problem of locating pieces of paint, and in fact it does not really do that completely, as we will discuss, we also have the problem of deciding what color of paint to be applied to give the desired effect<sup>1</sup>. Thus the artist is presented by a problem, and the problem is one of creating a desired solution. This can only in good Popperian manner, be achieved through piecemeal changes, necessitating a solid tradition, slightly modified by a process of patient trial and error, and whose possible advancement can be added to it, for others to exploit. As always it is far harder to come up with a solution, than to check it (which basically any viewer is capable of) or to employ it (which admittedly may require some non-ordinary skill). It is exactly because of this we can speak about Art having a history and that it manifests progress.

The development of the perspective, which ostensibly solves the problem of location on the canvas, but to whose shortcomings we will return, is basically a question of simple mathematics, and as such liable to have been invented independently in many artistic traditions, not only during the middle ages as in the Western tradition, to which we usually refer to it as. The Greeks certainly had the means of inventing it having a firm grip on basic optics. On the other hand not many flat canvases survive from that period, maybe they were not even made, and most of the flat art we are familiar with stems from the curved surfaces of vases, which although they display mastery of the foreshortenings of the human body, never produce the architectural panoramas with vanishing points, with which we normally associate a perspective drawing. In fact I know of no Greek painting of a building. The Greeks knew how to compensate for the foreshortenings in architecture in order to produce a pleasing view for the observer at a certain vantage point. And their sculptors knew how to distort their sculptures when having to be viewed from far below. Also in many traditions the need for perspective rendering was not pressing. The principles of perspective are very simple, being a matter of projection from a point. In geometrical terms we are looking at the rays from a point (the eye of the artist) to each point in the 3-

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<sup>1</sup> The computer picture, unavailable to Gombrich as he wrote the book, codifies a picture into small dots, each with its own color. This idea, although never realizable in practice until the advent of the electronic computer, was nevertheless inherent in the old idea, among others presented in a print by Dürer, of dividing the image into a grid, and concentrating on each one in succession, thus ostensibly objectifying the process of seeing (and copying) denuding it of any intrusion of meaning and fore-knowledge liable to distort it.

dimensional world behind a canvas, and their intersections with it (removing those points, which are occluded by intermediate objects). The viewer by putting his eye at the same point as the artist, will hence be able to recapture what the artist saw. Da Vinci thought of the canvas as a piece of glass, on which each intersection point should be fixed. Or, the situation slightly modified, a mirror on which you could actually touch the intersection points, and thus put the appropriate dab of color. But the canvas is flat, and our field of vision may convincingly be thought of as a sphere, as its metric is given by angular extension. Our actual field of vision is of course not the whole sphere, as we obviously have no eyes at the back of our heads, but actually larger than a hemisphere, although for most of the directions from which we can receive visual sense data, does not make sense visually. We can only scrutinize images which are directly in front of us, once more marginal we tend to move our heads. Thus the canvas on which we paint only make up a rather limited angular part of our sphere of vision, and the metrical distortions suffered through this gnomonic projection are rather limited.

Gombrich is confused by an item of elementary projection. Say if you look at a rectangular facade perpendicularly to your field of vision, then its edges to your left and right are further away than the height in front of you. Hence the line of the roof should taper away at either edge and hence be curved, although you sense it as being straight. The author tries to evade the issue by referring to your turning of your head. The whole thing has a very simple explanation. If you use standard projection onto a canvas parallel and in front of the rectangular facade, it will project it to a rectangle, with the width constant. Thus the lengths of the edges will not correspond to the angular extension you see them at. But if you stand with your eye at the projection center, those edges on the canvas will be further away from you than in the middle and hence appear shorter. So once again if you take care to stand at the projection center the image as predicted by perspective will be correct, the two distortions canceling each other out. If you are interested in the right metric, you should not project onto a flat canvas but to a sphere, the sphere of vision, centered at your eye. On the sphere the roof line will appear a straight line, in fact a great circle given by the intersection of the sphere with the plane spanned by the projection point and the roof line. The distances between the ground and the roof will diminish systematically on either side, this being spherical geometry after all. However, if we instead project onto the inner side of a cylinder, corresponding to Gombrich's turning of the head, and then unfold onto a flat canvas, straight lines will indeed become curved (see the appendix).

Thus it is important to view a picture from the right vantage point. If we look at the images of a standard small format camera, with the images 24x36 mm the normal lens with a focal length of 50 mm (the approximate length of the diagonal), a magnification of the print should be viewed at a distance roughly that of the length of the diagonal. If the lens involved would have a focal length of 200 mm, we should step four times as far back, or if a wide-angle of 25 mm, we should get closer to the image, only half of the diagonal away. We normally do not look at pictures that close, as we are then unable to properly take it all in, hence wide-angle shots appear a bit strange to us, but intriguingly so.

To achieve mimesis various tricks are needed to create the necessary solutions. Such tricks depend on shared conventions, i.e. a shared tradition, without which art as we know

it would be impossible. In other words we need to share a vocabulary. That the vocabulary seems to be more universal than the arbitrary signs of language should not hinder us from appreciating the presence of conventions. One may say that the artists and the public influence each other, with the artists educating the public (as well as fellow artists) of new ways of seeing, while the public puts on demands on the artists, demands which the latter can only ignore at their peril. Thus changes in art proceeds slowly, and a revolution in arts is liable to sow nothing but confusion.

It is not enough to know on what spot to put a paint on, you also need to know what particular color. This is made complicated by the fact that the way colors are perceived is subtle, it does not only depend on the colors themselves, but also on the colors surrounding it, as well as the colors expected by the viewer. This makes for experimentation and exploration, which presumably requires many preliminary studies before a finished oil-painting can be effected, the possibility of change and retraction being limited by the medium of oil on canvas. And as Gombrich repeatedly stresses it is exactly this transposition into a resistant medium that makes painting so difficult.

As noted an artist needs to have a vocabulary, a collection of templates for everything he needs to imitate on the canvas, because it is always much easier to modify something existing than to start from scratch. It also stimulates the imagination, because the latter will be challenged by constraints. Given the human penchant to find familiar forms in random ones, such as clouds, stains, inkblots, da Vinci and others advice artists to spill paint on a canvas and look for some recognizable hidden forms to be modified and elaborated, a process which is in particular useful for the painting of landscapes,

An artist needs to create illusions and as he develops he gets more and more skilled. When Rembrandt in his early career painted a piece of jewelry he painstakingly daubed all the necessary pigments to, within the limits of resolution, approximate the object, when he became older he realized that the same effect could be achieved by a few brushstrokes. As Gombrich refers to a representative of the Chinese tradition, the better the idea, the fewer brush strokes.

Finally there are more evanescent things to copy than those that appear directly in nature. The expression on a human face, whose visual cues we are seldom explicitly aware of. The Swiss artist Töppler, one of the first to draw comic strips, recommended that one experiments with a schematic face varying the positions of eyes, nose and mouth, until the desired effect is reached. Two points should be made. One. To express emotion, a schematic face may be as effective as a finished one. In fact, like in the case of the Chesire cat, one may be more interested in the smile than the cat. Two. One does not need to compare with nature, the important thing is the effect which is made on yourself, and presumably an effect which is fairly universal.

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