CHAPTER 9

The drawing lesson: preparation

Introductory

The purpose of this introductory is to set the scene for a drawing lesson that:

- *Prioritises the role of feeling in line production.*
- *Ensures "seeing in new ways"*
- *Helps all who wish to draw faster and more freely without loosing coherence.*
- *Enables anyone to achieve the highest levels of accuracy.*
- *Provides a sound basis for exaggeration, distortion and abstraction.*
- *Encourages creativity and personal expression.*

These desirable objectives are achieved by promoting the use of appropriate visual capacities and using them to bypass habitual ways of looking that hinder progress.

PROBLEMS AND OUR CAPACITY TO SOLVE THEM

Why all human beings find accurate visual measurement difficult

There is an enormous amount of evidence to support the claim that everybody is likely to have difficulty in making accurate measurements with their eyes.[1] It comes from four types of source.

- The widespread use by artists, including by the "*old masters*, at least since the Renaissance, of mechanical and other aids to accuracy (perspective frame, camera obscura, rules of anatomical proportions, etc.). Clearly, nobody was prepared to trust their unaided eyes.
- Controlled experiments testing the accuracy of people's efforts to copy

1 See *"What Scientists can Learn from Artist"*

unfamiliar groups of straight lines of varying length, orientation and position on the page. Even for this seemingly easiest of copying tasks, the average error for both skilled and unskilled adults was 5° for angles, and 10% for both relative lengths of lines and relative position of their end points. The fact that this was an average means that some errors were less and some greater. What the study found was that, when the lines being copied were close in position and similar in both length and orientation, the errors were much smaller (often approaching zero) but, when they were far apart and very different in orientation and length, angular errors of 10° and relative length errors of 20% were not uncommon.[2]

- Studies of visual perception which reveal that the visual experience of everyone is much influenced by distortions relating to ***receding surfaces*** and the ***constancies*** of length, orientation and shape, all of which regularly interfere with attempts at copying accuracy.
- Studies of different types of visual memory, which show that they are all fragile, and that this fragility regularly influences judgements of linear relationships.

In summary, these four types of evidence make it clear that all who wish to achieve accuracy in drawing-from-observation, will have to do so despite their having:

- Suspect capacities for making the visual measurements upon which doing so depends.
- A battery of visual systems that distort appearances in ways that make matters more difficult, and whose influence must be circumvented.

What we can do about it

The state of affairs just described may seem discouraging, but it need not be so. Both everyday experience and science-based findings support one another in providing evidence of two visual capacities that provide well authenticated reason for optimism. Thus everybody:

- Is good at judging whether two similar things (for example, mistakes and their model) are the same or different, and in which direction the difference lies (in other words, "*same/different judgements*").
- Is able to make extremely accurate visual measurements when perform-

2 *"What Scientists can Learn from Artists", Chapter 5.*

ing a wide range of everyday visually guided actions. The fact that these are mediated by the ***feel-system*** explains why this capacity, when used in line drawing, is well adapted both for underpinning expressions of feeling and for enabling faster line production speeds.

Skills have to be learnt

However, skills have be ***learnt***, including those required for making the measurements used in drawing-from-observation. The learning process is based on making ***comparisons*** and is fuelled by the ***feedback*** these provide. Certainly, appropriate use of comparison can explain two remarkable facts, namely:

- The high levels of accuracy achieved by numerous artists over the centuries despite being burdened by the poor capacities for visual measurement which they share with everyone else.
- That so many art teachers assert that, if properly taught, anybody can achieve high levels of accuracy.[3]

PRELIMINARIES

My *feeling-based drawing lesson* starts by explaining that my teaching, like that of Lecoq de Boisbaudran, places great emphasis on *accuracy*. This is not because I think that accuracy is desirable in its own right, which I do not, but because the *accuracy aspiration* is an essential ingredient of the best strategy I know both for helping people to see in *new ways* and, beyond that, to develop their *personal creativity*.

Two other aspects of my lesson which I share with Lecoq de Boisbaudran is the insistence on ***rigour*** and, if ever there are moments of discouragement, on ***perseverance***. Despite what many might feel to be the case, this combination enormously speeds up the process of learning. Although the rigorous insistence that students get all relationships spot on may slow progress in the first instance, very soon the reliable foundation that it creates pays handsome dividends. Lecoq de Boisbaudran is reported to have pounced on the slightest mistake because he knew that, if he allowed his students to get away with sloppiness, they would never progress to being able to draw a man who has been throw out of a sixth floor window before he hits the ground.

3 Unless they are suffering from a very severe handicap, such as blindness.

The lesson can vary in its detail, but it is fairly standard with respect to its main characteristics. Essentially the same lesson is given to complete beginners and seasoned professionals: The beginners need solid foundations and the professionals are asking for help because the method they have been using, though demonstrably effective up to a point, will not get them where they want to go (most often they ask for help with ***speed*** or ***expressiveness***). In this situation, despite their impressive skills, they need to find a new point of departure.

Preliminaries

Before getting down to the actual lesson, I give the students a short talk alerting them to matters outlined earlier in this chapter. First, I tell them about the research results which show that all people have poor capacities for making visual measurements of line lengths, orientations and curvatures. Second, I point out that the fact that all the great artists of history were similarly handicapped (indeed, a high proportion of them had additional visual problems)[4] shows that there is no reason why having them should prevent anyone from achieving the best levels of drawing skill. And, third, I give reasons why I am suspicious of anyone who says "*I simply draw what I see*". I tell the students that by the time they have completed the drawing lesson, their efforts will have taught them that the visual world is much more difficult to pin down and much more intriguing than most people suppose. By then, they will have been cured of all doubts about the deviousness of the ways of visual perception.

The first step in the drawing lesson is to choose something to draw. For the sake of illustration, I have chosen a particular tree on the esplanade at Castelnau de Montmiral (*Figure 1*). The second step is to ask the students to make a drawing of the two contours of the tree trunk, up as far as the first leaf-covered branch. I make a point of emphasising that this is to be a lesson about the depiction of *shape* and not of surface-form. Accordingly, no shading is required. The only specific instruction given is that the drawing should be "*as accurate as possible*". This first drawing, which is to be done in the students' "*own way*" and in their "*own time*", has three purposes. It provides me as their teacher with:

- A benchmark to be used as a guide to future progress.
- An appreciation of the students' level of attainment.
- An idea as to how they set about a drawing task.
- A starting point for discussion.

4 Patrick Trevor-Roper, 1997, *The World Through Blunted Sight*, Souvenir Press.

When they have completed their drawings, the students bring them to me in the studio. My first question is whether they used an easel and, if the answer is, "*No*", we get one ready to take with us. Also I make sure that students have a *drawing board, a reasonably large sheet of paper, clips* and an *eraser.* For my use, I bring a cheap school exercise book (for illustrating explanations), a pencil, a pencil-sharpener. Armed with this equipment and two folding stools for sitting on, we proceed to the esplanade and settle down in front of the chosen tree.

Figure 1 : A tree on the esplanade

I now check the accuracy of the student's preliminary drawing against the tree that it is supposed to represent. My experience over the years tells me that it will always be full of inaccuracies, even in the case of the professionals. If the student seems unaware of these, I point out a few of them just to establish the existence of a problem. Significantly, once a student's attention has been called to their errors, he or she finds them easy to see, a fact which shows that the problem is not with their capacity for same/difference judgements.

Setting up

Next, I set up the easel on which I place the drawing board, taking every care to see that it is:

- At a comfortable height for drawing upon.
- Perpendicular to the student's line of sight. For example, if students prefer to look at the tree to the side of the drawing board, it will need to be approximately *vertical*, whereas, if they decide to look over its top, it will have to slope slightly away from them: The fact they would have to look down at it, means that a strictly vertical drawing board would not be perpendicular to their line of vision.

Thus prepared, I start by warning students that the first lesson often consists of a great deal more talk than hands-on drawing activity. I then continue by explaining the advantages of the large piece of paper and the vertical (or near vertical) drawing board that I have just put in place.

The large paper (I use the standard 65 cm X 50 cm) is contrasted with the small pieces often preferred by amateurs, which tend to cramp freedom of movement. Since one of the aims of the lesson is to help the students develop a sense of their own personal *"feel-space"* and since this varies with each individual, it is prudent to leave plenty of room for manoeuvre. Also, since we are not interested in composition, it does not matter how much blank paper is left around the drawing.

There are several reasons why the orientation of the drawing board can influence performance. These add together to make a fairly compelling argument against placing it in the often preferred a horizontal or near horizontal position. Two of the most important concern the fragility of the memory of the image on the retina and a misplaced lack of confidence. They deserve a detour.

Fragility of the memory

A major stumbling block to the fruitful use of comparisons is the fragility of three of the four kinds of visual memory upon which the analytic looking depends when drawing from observation. The full list of the four is,*"iconic", "short term"* and *"working"* and *"long-term"*.[5]

The most fragile of these is the ***iconic memory***. The information it stores is derived directly from the ceaselessly changing patterns of light that are striking retina.[6] Its duration is determined by the time taken for the receptor cells to integrate the information residing in the current input and pass it on to the next level of processing. The creation of each new iconic memory destroys the entire contents of the previous one,[7] except in locations where no change has taken place. Accordingly the only two bits of information that can be extracted are that which is the "*same*" about the compared inputs and that which is "*different*". Not much to go on, you might think, but you would be wrong. The reason why is that:

- What is the *same* provides the building blocks from which we construct the experience we describe a "*seeing*".
- What is *different* enables the eye/brain systems to makes the links between these building blocks that join them together into coherent percepts.

However, it is worth stressing that, although all primary visual experience depends on the operation of the *iconic memory*, its activity is of no direct use to artists when drawing from observation. This is not, as might be thought, because of its extreme briefness but because the retinal processing it requires occurs at a preconscious level.

The second most fragile form of visual memory involves consciousness. It is known simply as "***short-term visual memory***", It is necessary for making the comparisons, which involve the use of *consciousness*, and which are the basis of *analytic-looking*. Accordingly, it is of key relevance to drawing from observation. What it does is to store information that has been structured in the retina and sent, via the optic nerve, to the visual area of the brain, where it is held at the ready for use by the analytic-looking system. This means it is not employed until after instructions, found in *long term memory*, have been given as to where to look next. Since the information captured in the course of making each comparisons

5 More on these in *"What Scientists can Learn from Artists"*.

6 These stimulate the patterns of activity in the retinal receptor cells, which are sometimes called the "*retinal image*".

7 The iconic memory only stores information for a few milliseconds.

is disrupted by making the next one, the length of time that each newly delivered packet of information remains in *short-term visual memory* is determined by the time that elapses between acts of looking. Although these can be purposive,[8] they can also be due to unpredictable events occurring in the environment.[9]

As with the *iconic memory*, there are two bits of information provided by the *short-term visual memo*ry that are of use to artists drawing from observation: That which is *the same* and that which is *different* between compared inputs. Also as with the *iconic memory,* what is the *"same*" provides the *building blocks* used in the construction of our visual experience and what is "*different*" provides the *links* that enable both the construction process and the extension of awareness. For the artist drawing from observation, it is the differences that are of critical importance, for it is to them that our conscious attention is drawn. This is vital for learning and creativity because the differences:

- Either the call attention to something that has previously been overlooked and, thereby, expand *awareness* and *knowledge*.
- Or, indicates an *error* and in doing so provide the *feedback* necessary for honing skills.

The two bits of good news for all who want to learn to draw from observation are that expanded awareness provides positive feelings and that the errors can be corrected.

The third kind of memory listed above is the "*working memory"*. This is necessary for the creation of *action instructions* that guide the line production and the analytic-looking used in drawing from observation. The process of creating this memory-store involves the gathering and coordination of relevant information, something that cannot be done without holding the constituent elements in memory during the gathering process. Since each new action depends on building new instructions, using new task-related content, the efficient use of the working memory also requires the destruction of existing content. For this reason, it too is fragile.

The crucially important difference between *short-term visual memory* and *working memory* is that the former is created in the primary visual cortex before *recognition* takes place, while the latter is put together after *recognition* has performed its function of linking visual input to knowledge in *long-term mem-*

8 Generated by instructions coming from memory.

9 See also, the flow diagram of the analytic-looking cycle, *Figure 1* in the *Glossary*.

ory. What it finds there is information relating to previously developed *action-instructions*, used in similar circumstances. A key feature of these is that they will always relate to past experience, whether of drawing *objects*, *object parts*, or *abstract relations*. Whichever is the case, they make it possible for people to carry on drawing without engaging in the looking behaviour that would enable them to find out about unique aspects of appearances. Despite this, they will be under the impression that they are "*simply drawing what they see.*" In effect, even when attempting to reproduce abstract relations involving *visual primitives*, they are acting in an *"intellectually realistic*" way.[10] In order to approach a more accurate representation of unique features, it is necessary to use *same/difference judgements* as a tactic for seeking out unpredictable differences between:

- Model and copy
- Two closely related, but different views of the same thing (for example, ones produced by small head movements).[11]

What these do is to trigger a rerun of the analytic-looking cycle. This time round, it is characteristics of the unique attention-feature that are *recognised* and which determine the *action instructions* coming fr*om long-term memory.* These will decide the manner in which the *working memory* is used to guide and coordinate:

- The next phase of analytic-looking behaviour.
- The organisation of the next round of line-output activity.

Back to the drawing board

In order to explain the connection between the fragility of *short-term visual memory* and my recommendation to use a drawing board that is perpendicular to your line of sight, it is necessary to emphasise the importance of the part played by *error-correction* in drawing-from-observation. Basically comparisons are required for making judgements of relativities between model and copy and, therefore, for discovering *mistakes*. As each new pattern arrives it supplants and destroys all aspects of its predecessor except those where no change has taken place. Accordingly the only two bits of information that can be extracted are that which is the "*same*" about the compared patterns of input and that which is "*different*".

But this is precisely the information required by artists when making comparison between models and copies of them. Although meant to be similar, human error will always creep, with the result that model and copy will never be quite the same. Moreover, the probability of errors being made will be the greater because making comparisons between a natural scene and a line-drawing of it will always mean comparing two very different things (a rich array of shapes, colours and textures and a number of lines on an otherwise blank piece of paper).

10 "*Drawing what you know rather than what you see*". See *Chapter 6* and the *Glossary*

11 Explaining why head movements can be such a useful aid to accurate *analytic-looking*.

Obviously we need to make full use of this opportunity, for it is difficult to see how we could make progress should we squander it. Yet this is just what happens to all who choose to work with a horizontal drawing board. As just indicted, the *short term visual memory* can only be used to find unique features if a direct comparison is made between two similar but different things. It will be seriously disrupted by the act of (a) looking down at the drawing board and (b) locating the emerging drawing on it, since both tasks require the intervention of *working memory*. Once this has occurred, the artist is left with nothing to guide line production, other than information residing in *long-term memory* with its necessarily generalised knowledge; based on previously perceived objects or features.

In summary, other than in exceptional circumstances, the best position for the drawing board is one in which the eyes can move without interruption between model and copy. This means a vertical or near vertical drawing board situated so that a minimum of *eye-movement* is required when switching attention between the object and the emerging drawing of it.

A misplaced lack of confidence

The second advantage of using a vertical drawing board is that it bypasses a widespread problem associated with the use of a horizontal one. This concerns the question of confidence. If students are asked to explain why they have chosen to work on a horizontal surface, they regularly give two reasons. The first of these is *convenience*: They regard lugging an easel around as a chore. The second and more serious one is a mistrust of their manual control skills. They say such things as, "*If I were to try to draw from the shoulder, I couldn't produce a smoothly drawn line to save my life*". They are convinced that supporting the hand on a horizontal surface offers the only way that they will be able to control line output. This may be true in terms of their past way of doing things, but if they are to profit from the lesson that follows, they will have to do away with this prop. Their arm must be free to move in all directions with equal facility. Luckily, whether they know it or not, they have well honed skills that can be adapted to the situation.

A reminder

Before leaving the subject of the position of the drawing board, it is worth taking the opportunity to repeat and to re-emphasise (as I will be doing at various points in this text) that the approach to drawing I am advocating is only one of the many possible ways. Though the reasons for using an upright drawing board are very strong, they hardly amount to proofs of its *necessity*. It would be dishonest to make such a claim when I am aware of the existence of a photograph that shows an artist of the calibre of Rodin drawing horizontally on his knees (*Figure 3*). Indeed, it would be hypocritical for me to do so when I have an early study of myself holding my pad horizontally *(Figure 4)*.

Figure 2 : Rodin at work on one of his famous Cambodian dancer series.

However, it is worth pointing out that the use of the horizontal drawing board by Rodin can be reconciled with the arguments presented in this book, since it would be plausible to suggest that, by the time the photo was taken, Rodin had already had over fifty years to develop his feel-system. Accordingly, he

would no longer have been so much at the mercy of the difficulties and speed restrictions inherent in more pedestrian approaches. Anyone who assiduously follows the lesson in the next chapters would set themselves on a path that should be able to achieve a like independence.

Figure 3 : Myself when learning

A background history of obsessively making large quantities of rigorous studies could also explain the virtues of my drawing. Be that as it may, the im-

portant point to be underlined is that the purpose of the lesson is not to provide a unique method of learning to draw but to acquaint students with as many as possible of the factors involved in the drawing process so that they can better deal with problems that arise in their own way.

Confidence in motor control skills

To help those that lack confidence in their *motor-control skills*, I am likely to step back a couple of paces, take the pencil sharpener from my pocket and throw it towards the student and, as I do so, call out, "*Catch this*". Almost all my charges are able to obey my instruction with little difficulty. I now cup my hands in front of me and ask for the missile to be thrown back into them. Usually, though by no means always, the first effort is a little wayward and I have to move my hands a little this way or that in order to gather in the pencil sharpener. However, there are very few students who are not dropping it right on target after a couple of attempts.

The value of this throwing and catching game is that it provides a demonstration of what can justifiably be described as the miracle of hand/eye coordination. To explain why such seemingly ordinary actions are so remarkable, the concept of *ballistic movement* is introduced. Once a bullet has left the muzzle of a gun, or the pencil-sharpener has left the students' hands, there is no way that its trajectory can be altered. It follows that, if it is to arrive at its target, the whole action must be planned in advance by the eye/brain of the marksman's or of the pencil sharpener throwing student. In the case of throwing the pencil sharpener into my hands, this means that the student's eye/brain systems must:

- Judge the distance to my hands (no simple task).
- Coordinate the muscle groups that underpin the arm and body movements that are required for ensuring that (a) the hand releasing the pencil-sharpener provides the necessary force, that (b) it does so in precisely the right direction, and that (c) it releases its grasp, at exactly the right moment (a mind boggling complexity of interactions between a large number of muscle groups).

The whole process is miraculous indeed.

Continuing in the same vein, I point out that throwing pencil sharpeners into hands is not the only evidence of remarkable powers of eye/hand coordination.

For example, the everyday act of reaching out to pick up a cup by its handle and lifting it to the mouth smoothly and without hesitation is a *tour de force* of controlled ballistic movements. Or, take the case of the almost invisibly small screws of the sort found inside old fashioned watches. No matter how good our eyesight or small our screwdriver, the task of unscrewing one of these without help for our eyes would reduce the best of us to being "*all fingers and thumbs*". However, if given a watchmaker's magnifying glass, the task becomes easily possible for everyone. Just think what this means in terms of fine control of action!

To develop the argument relating to confidence further, the case (mentioned earlier) of children learning to ride bicycles is introduced. Very few of them fail in this task. Why is this so? The answer has at least two parts. One of these is that virtually all of them, over their lifetime, have developed the eye, arm, hand, leg and body coordination capacities that give them the possibility of succeeding. The other is that they succeed because they expect to do so. Not having been told by anyone that "*cyclists are born not made*", they are not discouraged by the fact that, upon first mounting the bicycle, after the briefest of wobbles, they fall off. They just get back on and have another go. They take setbacks in their stride because they know full well that it is perfectly normal to wobble and to fall off many times before the wobbles come under control and the falling off becomes a thing of the past. They probably do not think of what is happening in terms of the wobbles providing the feedback which enables learning, but that is what is happening. They are learning from their mistakes.

In short, a little reflection makes clear that everybody can achieve the most amazing feats of eye/arm/hand/leg and body control, so long as the required muscle systems are both in place and given the right instructions. This should be reassuring for those who lack confidence in their line-production control when drawing from,observation. They can be confident that if properly taught, high levels of performance are within their grasp.

This being the case, there is no longer a mystery as to why people, when first learning to draw, find difficulty in controlling the output of lines? The reason is that what we describe as *"incompetence*" is an inevitable feature of undeveloped skills. The eye/body/hand coordination needed for drawing requires the same kind of learning sequence as is necessary for learning to walk, to drink from a cup, to ride a bicycle, to toss a pancake, to knit a pullover, to use a plasterer's trowel, to type a letter, to play tennis and, indeed, to master every single one of the entire repertory of skills requiring eye/body coordination. When learning any

of these skills, everybody starts with the equivalent of wobbling about all over the place. It needs a period of perseverance in the face of negative feedback, if the clumsiness is to become a thing of the past.

The only reason why long periods may be needed for skill development is that the relevant context of limb control and balance has to be developed first. This is why the repertory of actions of young children takes time to develop.

In contrast, adults, unless they have some special handicap (for example, relevant brain damage or loss of arms), can have confidence that they already possess the necessary basis of muscle control and sense of spatial relations. They have been using both for other tasks on a daily basis ever since they reached the stage of being well coordinated children. The need is not to overcome shortcomings in the muscle control side of eye/hand coordination. Rather, it is to find ways of adapting existing skills for use in line production and, thereby, gain the confidence that having done so provides.

Accordingly, if drawing students are properly taught, it is not long before line-production awkwardness ceases to be an issue. I cannot remember any student who had not achieved a reasonable proficiency by the end of the drawing lesson being described in the next two chapters, though, of course, the tendency to wobble never disappears without trace, and a good thing too. Minimal wobble gives lines that are produced free-hand a different and more interesting look than mechanically generated ones.

With the passage of time, as they gain confidence, the students will find that they are able to cite their own achievement as support of the claim made by the sculptor Antoine Bourdelle (1861 – 1929: a student of Rodin and a teacher of Matisse) that "*the hand is never clumsy when the thought is precise… and the spirit is not hesitant*."

It should come as no surprise that this quotation comes from a student of Rodin, for it encapsulates an important strand in the method advocated by his teacher, Horace Lecoq de Boisbaudran, who also placed precise thought at the centre of his teaching philosophy. For myself I am convinced by its message because:

- It fits in with my university research findings.
- It is supported up to the hilt by an ever-increasing number of anecdotal examples provided by my students, over nearly thirty years.

Establishing a viewpoint

Before finally setting up the easel and the drawing board, it is important to specify precisely the viewpoint from which the tree should be drawn. Without this step, the drawing lesson risks being a complete waste of time, since changes in viewpoint will change all the relationships between features in the scene being drawn. The viewpoint can be established by aligning one of the contours of the tree with a feature in the background. For the scene in *Figure 1*, a position has been chosen from which the corner of the house can be seen on the right hand side of the tree trunk and the window shutters on the left hand side. A more precise option would be to align the top right hand corner of the shutter with the left hand edge of the tree. To do so the viewpoint would have to be displaced slightly to the right. The result would be an arrangement along the lines indicated in the contour drawing reproduced in *Figure 1* of the next chapter. As you can see, in this drawing, alternative alignment references are produced by the juxtaposition of the contour of the tree trunk with:

- The top of the right hand edge of the shutter.
- The point of the angle between the roof top and the gutter.

This method is both very accurate and very reliable. Artists using it will be able to check that their viewpoint has not shifted no matter how long they spend working on a particular drawing. Indeed, it will also enable them to relocate their position if ever, for any reason, they change their viewpoint, no matter how far away they go or for how long (for example, they might stand back to look at their drawing from a distance, take a lunch break or, even, go on holiday).

Ensuring a stable viewpoint is not the only advantage of finding a viewpoint in this way, for doing so gives artists the freedom to move their heads from side to side or up and down. As we shall see later, this is important because extremely useful information can be extracted by:

- Making comparisons between contour profiles produced by marginal differences in viewpoint.[12]
- Observing the ongoing changes in contour profiles and relationships that can be generated by means of controlled head movement.[13]

Either of the alternatives can be selected according to the needs of the moment. However, almost always, a combination of both is the best policy.

12 "*What Scientists can Learn from Artists": Chapter 11*
13 "*What Scientists can Learn from Artists" : Chapter 5.*

Closing an eye

When the students declare themselves satisfied with the viewpoint which they have established, I ask them to double check it by looking at the chosen point of alignment, first, with one eye and, then, with the other. If any discrepancies between the two images are revealed, I suggest closing one of their eyes. This step is always a good idea and can very often be crucially important. Firstly, looking *monocularly* will make the process of aligning both easier and more accurate. It will also bring another advantage of potentially much greater importance. Restricting vision to one eye inhibits *stereopsis*, one of the eye/brain's most potent ways of separating out objects from their backgrounds.[14] With stereopsis in action, trying to make use of relationships between features of any one particular object and those of other objects that are found either *in front* or *behind* it, is very much more difficult than when it is prevented from operating by closing one eye. Since analysis in terms of *in front/behind relationships* is one of the most effective ways of dealing with two of the most basic problems facing anyone wanting to learn to draw, it follows that keeping both eyes open can be a very bad tactic indeed.

And what are the two problems that analysis in terms in front/behind relations can help us to overcome? They are:

- The ubiquitous influence on appearances of the constancies of orientation, size and shape.[15]
- The tendency of eye/brain systems to take in information as globally as possible with the result that nuances of appearances are overlooked.

Implications

Many students, as soon as they find a subject that interests them, launch immediately into drawing the first line, leaving little or no time for forethought, despite the considerable advantages that can be gained from it. In this chapter, time has been taken to think about the nature of the task that confronts them and some of the problems that they may face. In particular, emphasis has been placed on the importance of:

- *Acquiring an informed appreciation of the role played by the eye/brain*

14 For more about stereopsis see "*What Scientists can Learn from Artists": Chapter 17*

15 .For more on the relevant constancies see "*What Scientists can Learn from Artists": Chapters 13-15.*

in enabling drawing skills.

- *Awareness that knowledge of certain aspects of eye/brain function can provide a source of confidence for everyone.*
- *Using accuracy as a tool for learning, rather than as an objective in itself. Unless some kind of criteria is in use, learning cannot occur. For example, if we are to be able to learn from our mistakes, we will have to accept the criteria accuracy "good" and "inaccuracy" bad.*
- *Grasping the potential the feel-system with respect to drawing more directly, more accurately, with greater speed and with more expression.*
- *Understanding how the constancies of length, orientation and shape provide challenges for artists when they are drawing from observation.*