CHAPTER 19

History of anatomy for artists

Introductory

On each of the next five pages is a reproduction of a diagram from a traditional anatomy book.[1] Like many other such books, this provides excellent information: Aside from cutting up a corpse, you will not get much better. Certainly there is no need for me to retrace the well trodden paths it describes.

As well as providing pictures, a good book on anatomy will give you the name of each muscle and information on where it attaches to the two bones it joins and acts upon. Many teachers consider it to be unnecessary and even undesirable to clutter the mind with such detail. For myself, although I am in no doubt that very good drawings can be made without ever referring to a single diagram of this kind, I am much less convinced that anatomical knowledge cannot be put to very good use. We should never forget the enormous lengths to which artists like Leonardo da Vinci, Michelangelo, Degas and Rodin went to inform themselves of the layout and function of muscle systems. Clearly they believed that it was worth the effort and it certainly didn't hurt the expressiveness of their drawings. Here in PART 3 of this book, I will argue that the knowledge that these and other artists[2] acquired from their studies provided two different kinds of help. Thus knowledge of anatomy can act as a guide: (1) to drawing, when there is no model to look at, and (2) to visual analysis, when working from observation. Here we are primarily concerned with the second of these possibilities (although anyone interested in the first may well find what follows to be useful). As in the chapters on linear perspective, the approach taken is importantly influenced by little known scientific studies relating to the looking strategies used by artists.[3] Accordingly, it will be different to that of any other book on the subject. So don't let the familiar diagrams put you off. They are just a reminder of something that will hardly be talked about in my book.

1 Fritz Schider, 1947, *An atlas of Anatomy for Artists*, Dover.

2 Including followers of Lecoq de Boisbaudran : see *"Drawing with Feeling", Chapter 5*.

3 *"What Scientists can Learn from Artists", Chapters 8 & 9.*

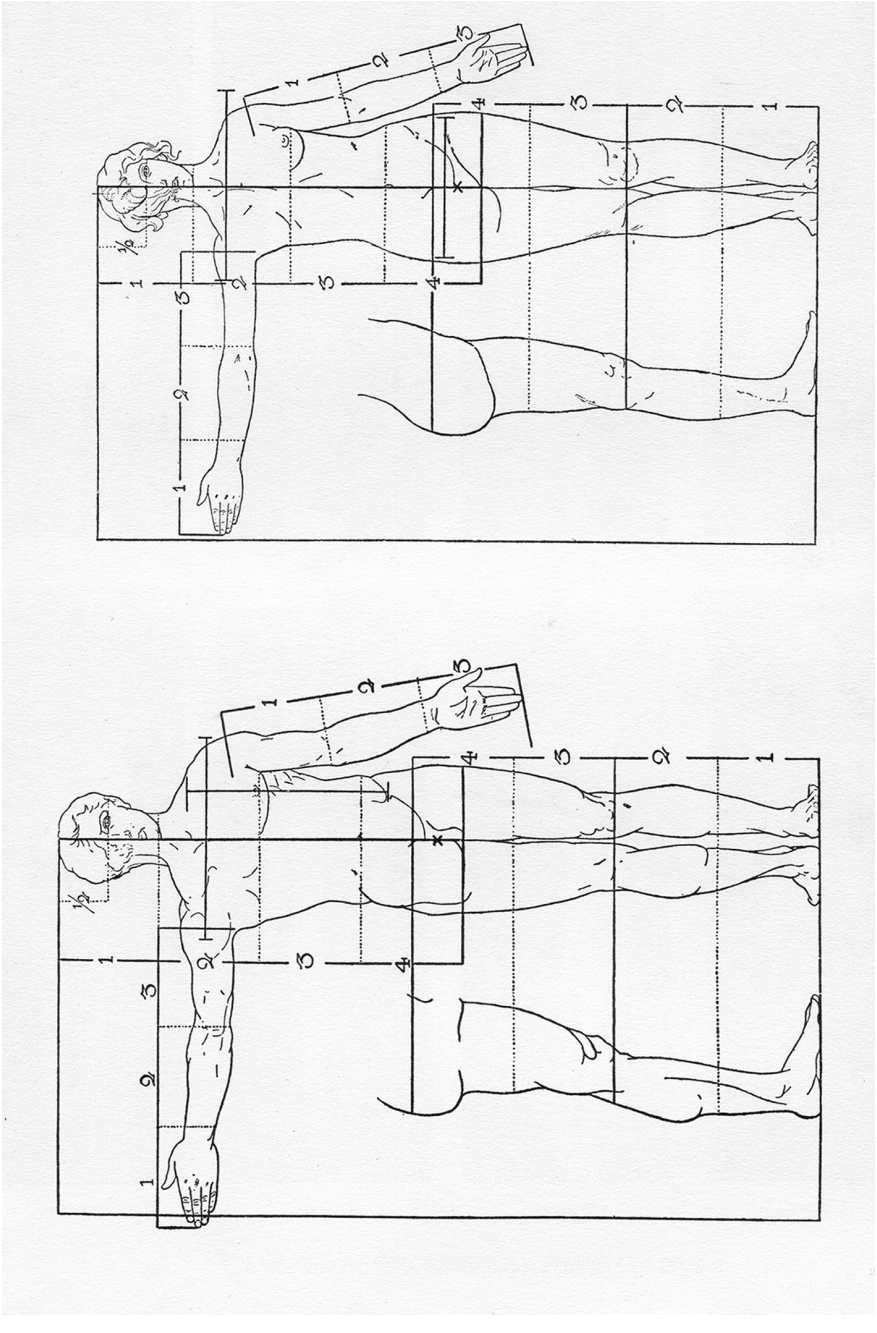

Figure 1 : Proportions of the human figure after Richer 1890. These suggest significant differences between men and women, but they are silent on the issue of individual variations. For example some people have a longer back and shorter legs relative to others.

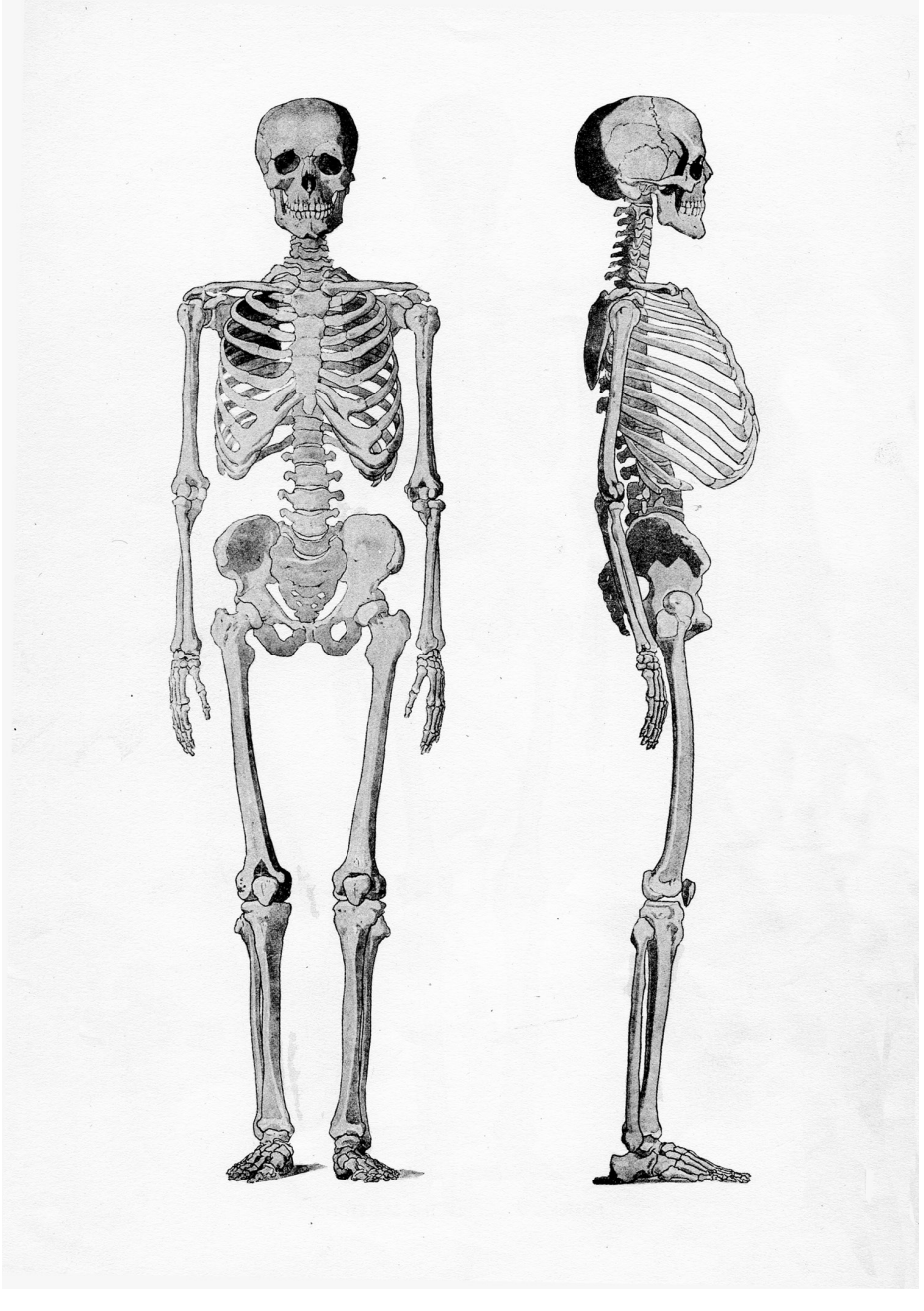

Figure 2 : Front and side view of a skeleton.

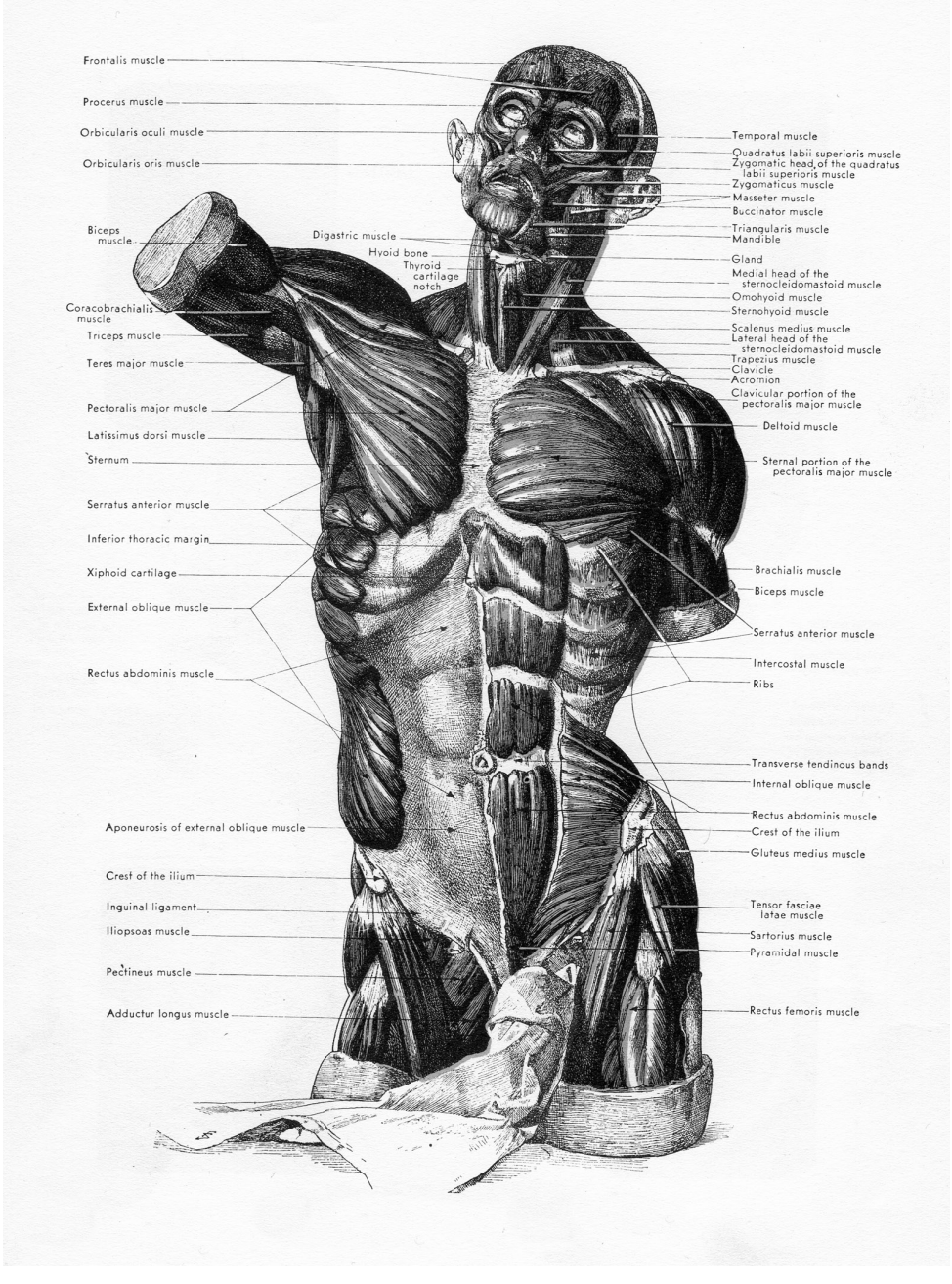

Figure 3 : Muscles of the head and trunk front view with names.

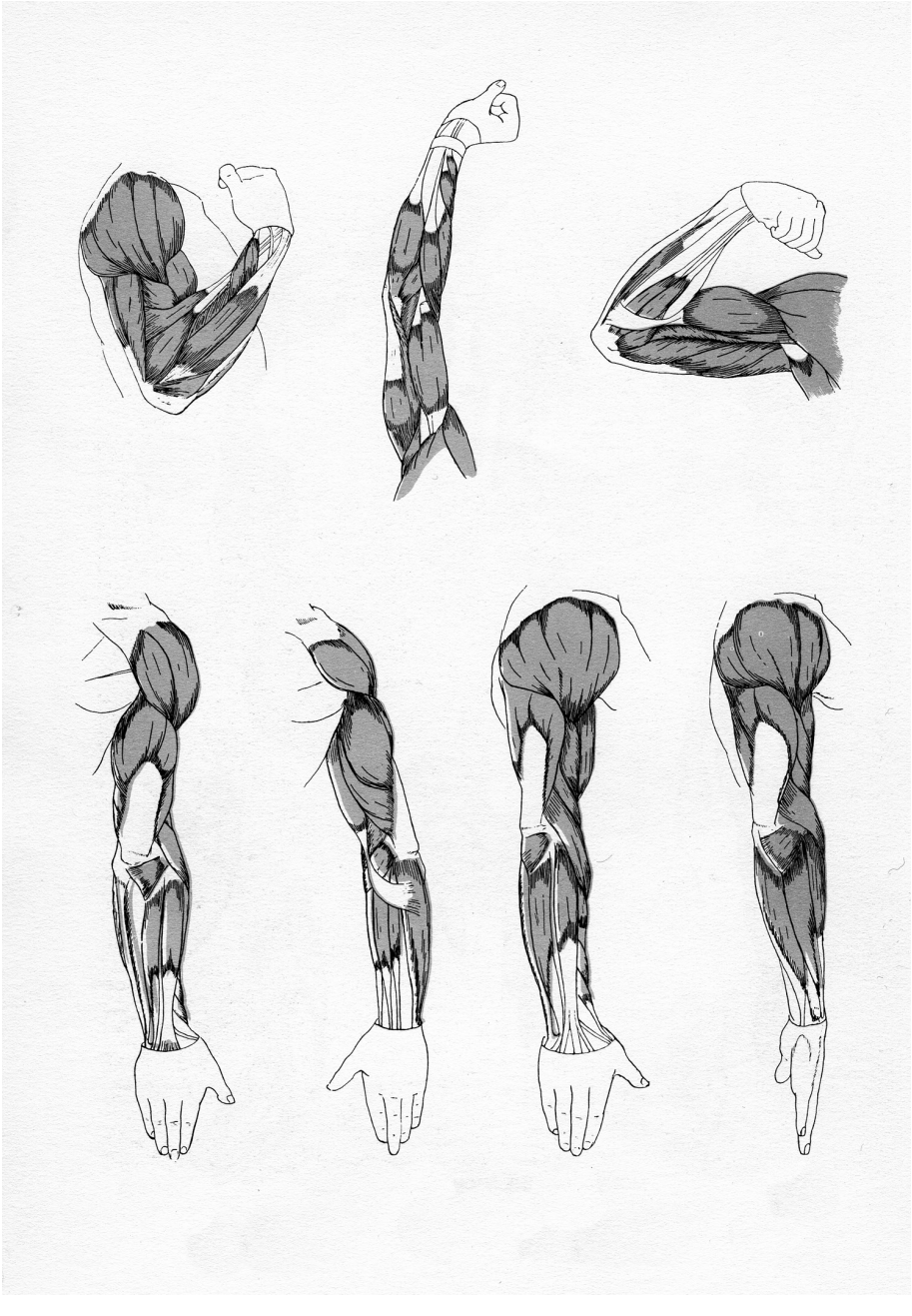

Figure 4 : Muscles of the arm in various positions.

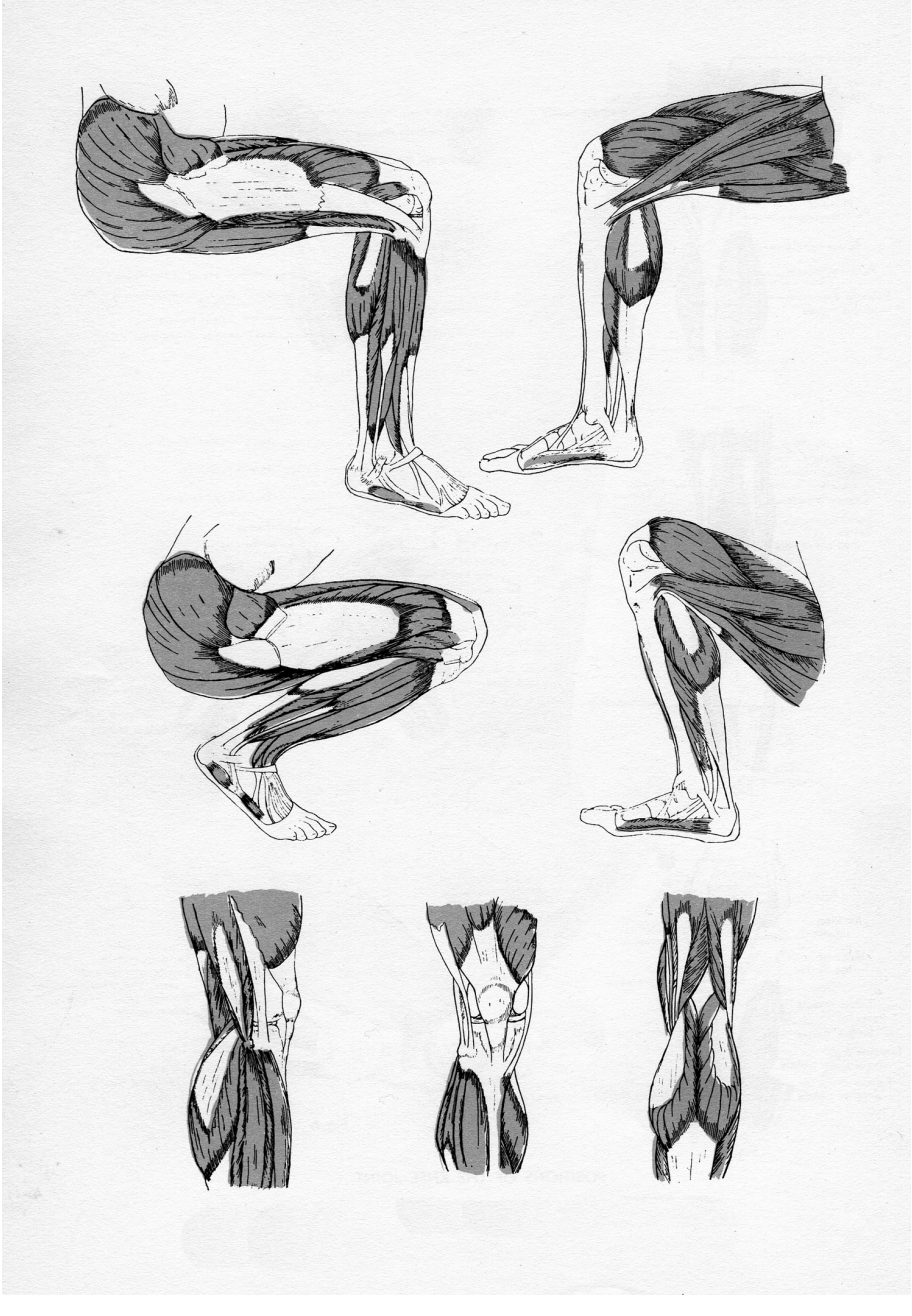

Figure 5 : Muscles of the leg in various positions.

The rules

As is well known, the Impressionists were in revolt against the "*rules*" of the Academies and even questioned the idea of there being any natural laws that could be of use to serious artists. However, in their attempt to prove their lack of importance, they came up with a rule of their own, which they rightly claimed to be inviolable. This stated that no natural object or form is ever perceived as being quite the same as any other. Renoir described this state of affairs as the principle of "*irregularity*". In other words he was proposing a rule that asserts there to be no rules. He regarded this rule of no rules as so fundamentally important that, when he sought to form a group of like-minded artists, he called it the "*Société des Irrégularistes*".[4] Layer, I was to learn a colour oriented version of it from my teacher, Marian Bohusz-Szyszko, as the rule of non-repetition of colours in nature.

The reason why Renoir and his Impressionist contemporaries gave so much importance to irregularities was that in their opinion it is these that gave every natural object its unique character. In other words, it is these that makes them worth painting. It followed that rules that blurred over this universal uniqueness should be ignored. Clearly, in coming to this conclusion, they were setting their face not only against traditions within painting but also against the basis of scientific theory as a whole, which depends on finding regularities within the phenomena that it investigates.

Nor was it only the artists who came to this conclusion. William Wordsworth's poem takes forceful exception to rules of both science and art. He also suggests what to do instead of following them, a solution picked up by the Impressionists:

"Away with Science and with Art
Close up those barren leaves
Come forth and bring with you a heart
That watches and receives."

This leaves us with the question as to whether we should take the poet's advice? Not necessarily so. Before leaping to such a conclusion, we should remember that it is not only science that depends on finding regularities within natural phenomena. It is also the human brain. Without finding similarities between the

4 Robert L. Herbert, 2000, *"Nature's Workshop : Renoir's writings on the Decorative Arts"*, Yale University Press.

things that are never quite the same as one another and are often extraordinarily dissimilar, this powerhouse of all our capacities and centre of all our experience would be unable to do anything at all. Most pertinently, it would be unable to follow the advice that is a recurring theme within this series of books, namely to make use of knowledge of regularities to find the irregularities which were so dear to the Early Modernist painters. In my view, we have no choice but to use knowledge to go beyond knowledge into the only place where new knowledge can exist. Knowledge of anatomy is a well tried starting point for a journey of exploring the expressive possibilities of drawing or painting from life.

In earlier chapters we discovered how the rules of linear perspective although never corresponding exactly to appearances, can be used as tools for guiding artists attention to the deviations that the rules cannot describe. The purpose of this chapter is to explain how the knowledge of anatomy can be used in a similar way. In summary, in both cases, looking strategies based upon knowledge of structural regularities not only reveal what is the same in any scene being analysed, but also draw attention to what is different.

Significant relations

In view of the factors outlined above and throughout this series of books, it is not surprising that inexperienced adult artists produce many errors when attempting to represent other human beings. Nor, if their productions have to depend on a store of knowledge that can only contain information about generalities of appearance, can it be wondered at that many error-types happen over and over again. Most prevalent are either those that can be associated with one of three of the *constancies* of appearance (namely those of size, shape and orientation) or with the practice of filling in overlooked parts on the basis of existing knowledge ("*Intellectual realism*"[5]). Thus, for example, the following errors are extremely likely to occur in the figure drawing class:

- The head, eyes and mouth will be both too big (size constancy) and too *square-on* (shape constancy).
- The head and nose will be *too vertical* (orientation constancy).
- The eyes and mouth will be *too horizontal* (orientation constancy).
- The nose will be *too long* (size constancy).

5 *Chapter 5* and "*Drawing from Knowledge", Chapter 4* and *"What Scientists can Learn from Artists", Chapter 8.*

- The chin will be above the level of the shoulders, even when visually below it (knowledge-based drawing).
- The two shoulders will be *too horizontal* (orientation constancy).
- The two shoulders will be *too symmetrical* with respect to both length and angle (knowledge-based drawing).
- The two shoulders will incorrectly cut the neck at the same level (knowledge-based drawing).
- The trunk will be too long, relative to the legs, which will be correspondingly too short (size constancy).

The list could go on and on…

In the drawings of beginners, errors of these kinds can be large and even the most experienced of artists have to be continuously on their guard against every one of the tendencies listed. All can be attributed at least in part to the *shifting sands of appearance*, introduced in many parts of *"What Scientists can learn from artists"* and illustrated in the previous chapters. As explained in those places, the roots of this instability lie in the fact that visual analysis has to start with each and every object of attention being*:*

- Separated from its context,
- Given a vertical or horizontal axis of symmetry.
- Expanded or contracted to fill the same space in the visual-processing part of the brain.[6]

All this can be summed up in a simple message: whenever either the parts of the body or the abstract features and relations which describe them are looked at separately, they will be influence by some combination of *orientation, size* and *shape constancy*.

A specific example can be given to explain how of the effect of *size-constancy* can account for heads being drawn as being too large relative to other parts of the body. Thus, if the relatively small head and the correspondingly large trunk of a model are analysed independently, the brain, having isolated each of them from their context, will treat them as inhabiting an equivalent visual space. Since the head will actually be much smaller than the trunk, this process will be result in it being drawn as bigger than it should be relative to the trunk.

6 *"What Scientists can Learn from Artists", Chapter 9* and *Chapters 19-21.*

Another example explains the tendency for sloping mouths to be drawn as horizontal. Thus, as always with analytic looking, the slightly sloping mouth will be taken out of context and its near-horizontal axis will be aligned with the horizontal axis in the visual-analytic region within the eye/brain. It will be this *internal framework of reference* that will guide line-output instructions causing the mouth to be drawn as more horizontal than it should be.

A second category of mistake appears if the model is analysed in terms of abstract relations (as they must be if the resulting drawing is to represent the particularities of appearance). Because of the *constancies*, all the visual measurements of *angles*, the *relative lengths* or the *complex curvatures* should be treated with considerable caution. For example, if any two lengths of contour are analysed separately, the phenomenon of size constancy will mean that they will be perceived as being nearer the same than length than they really are. Errors due to this cause are common. Even though they might seem insignificant on occasion, there will be times when they will be far from being so.

The difficulties due to the constancies are almost certainly a contributing factor to the poor capacities for making visual measurements mentioned earlier and dealt with in detail in *"What Scientists can Learn from Artists", Chapter 8* .[7] As reiterated throughout this series of books, these are part of the inheritance of every human being.[8]

A third category of mistake may only be identified by those with a good knowledge of anatomy. As this subject has been exhaustively dealt with in an enormous number of publications, there is no point in trying to compete with these. My treatment of it (which comes in the next chapter) will therefore be restricted to a few general points which both I and my students have found particularly useful. I owe most of them to published sources and, in particular, to Vernon Blake in his still unsurpassed book, *The Art and Craft of Drawing*.[9] Any originality in the presentation of these lies in the attempt to place this familiar material in the context of the *general theory of drawing* being developed in these pages.

7 The Experiments at the *University of Stirling* indicated average errors of more than 5° for angles and 10% for relative lengths and positions on the page.

8 The Experimental basis for the assertion is presented in "*What Scientists can Learn from Artists", Chapter 8.* Particularly worth recalling is the result of the "*Deliberate Mistakes experiment"* showing that 30% of the errors went unnoticed, despite the fact that they were in the order of 5° for angles and 10% for relative length.

9 Vernon Blake, 1995, The Art and Craft of Drawing, Dover. Originally published by OUP in 1927.

Implications

In this short chapter three main points have been made. All of them parallel the conclusions reached relating to linear perspective:

- *The Renaissance artists who made such a thorough job of finding out about human anatomy did so with a view to using the knowledge that they acquired as a tool for helping them paint images from imagination.*
- *Knowledge of anatomy, like knowledge of linear perspective cannot help directly with the analysis of the particularities of appearance that give uniqueness to each and every individual and each and every pose.*
- *Knowledge of anatomy can help artists to look out for aspects of appearance that they might otherwise overlook. In particular it can guide them in their search for significant relations.*

The next chapters list some of the significant relations.