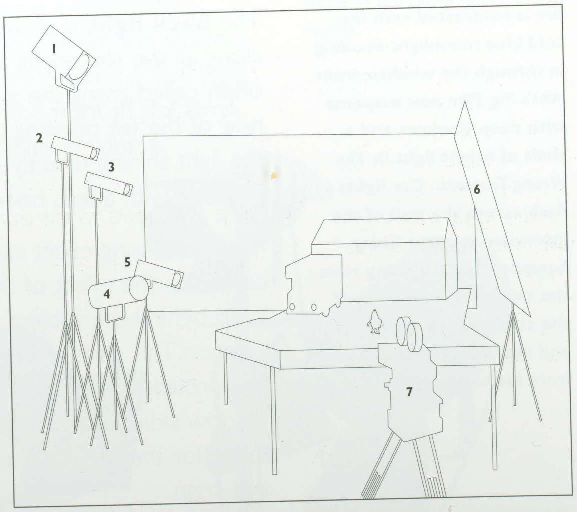
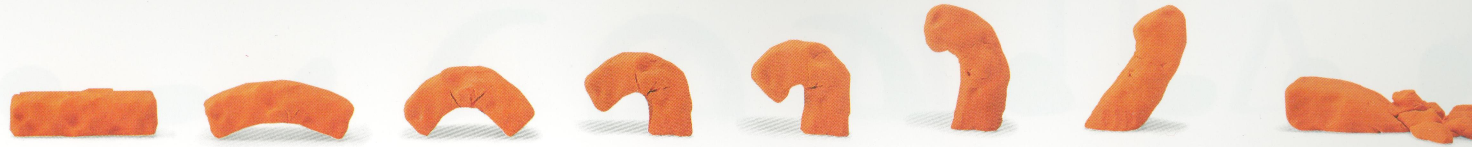
The lighting set-up for an outdoor shot in *A Close Shave*. For this shot the key light (1) assumes the sun position. The shadows are filled by 'bouncing' a narrow-beamed lamp (4) off the large white fill board (6). Three back lights (2,3,5) are used to give emphasis to certain parts of the set, such as the cabin of the truck and details on the rooftop. When positioning these, care is needed not to create secondary shadows from the camera's viewpoint (7).

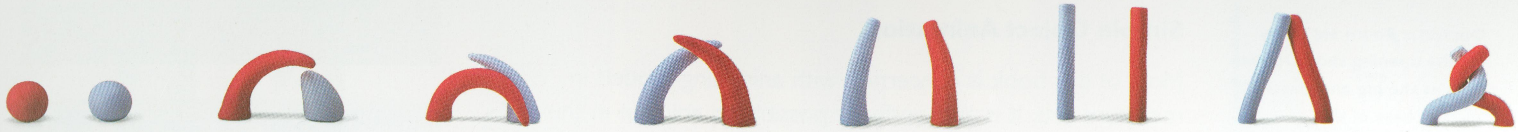


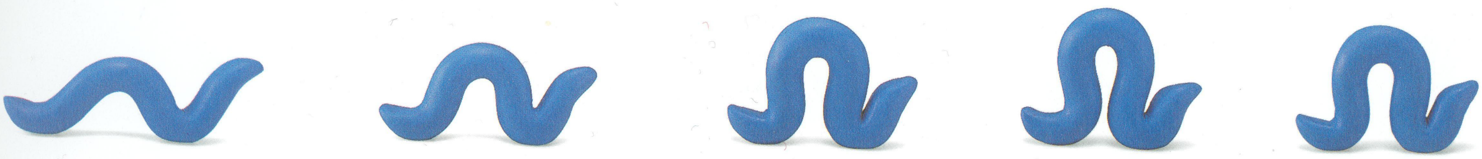


Top: A simple bar of clay

Try to relax and not be too ambitious at first. Although you could go directly to

Above: From a blob to a

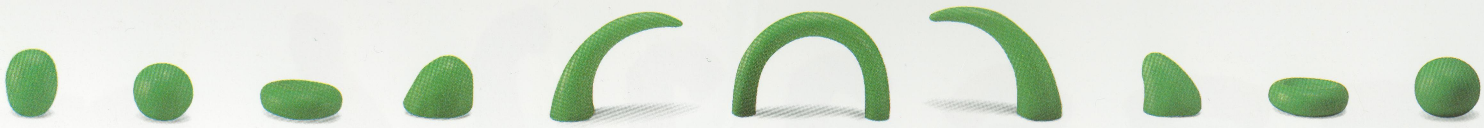


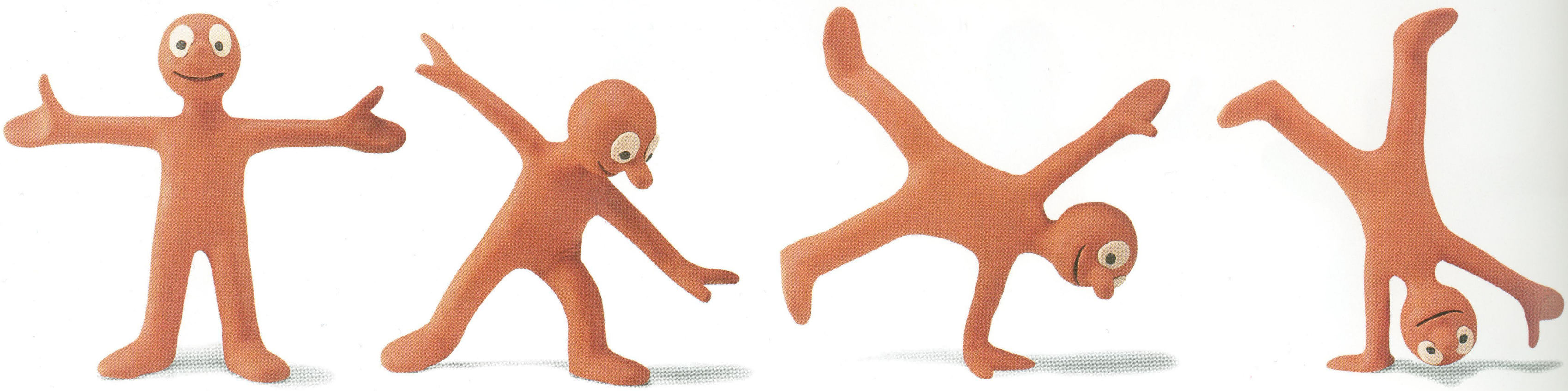


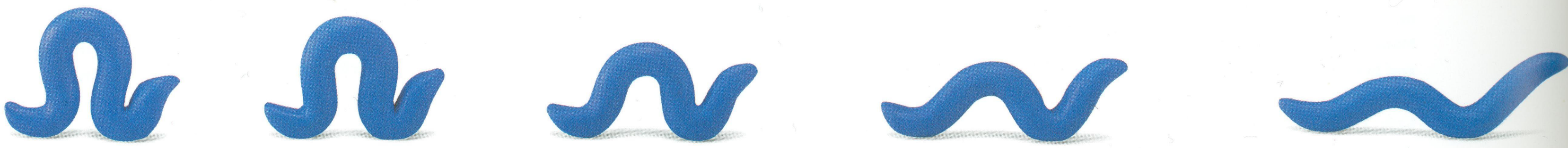
Top: Squeeze out two shapes that rise up, cross over and land in each other's places. Then they form columns, lean inward and intertwine.

Centre (both pages): Cartwheeling Morph. When a clay model is off-balance, support it with fine (invisible) fishing wire suspended out of shot from a rig.

★ Before you animate, use your own body to rehearse the movements and secure a smooth flow from one phase to the next. We call this 'acting through the puppet'.







Top: Make an elongated ball and squash it down. Then squeeze it out longer into a horn shape and let it spring over in an arc and revert to its original form.

When this sequence is projected, it will appear that the ball has actually flown through the air.

Above (both pages): Make a smooth sausage shape and bend to make an undulating caterpillar. See how its back arches up to power its movement forward.

In between shots, clean your hands with baby wipes and rub over the table surface to remove any bits of clay that would show up on your film.

Basic Principles

Morph has always been hand-made. To check that we always used the same amount of clay, we weighed him on these old scales.

You have got your storyboard, at least in outline, and perhaps a few sketches of the character you want to make. Now is the time to think in some detail about the nature of the model and what you want it to do. Think about its size, shape, weight, and the kind of movements you need it to perform.

How big should you build it? If it is too small, there will not be room to accommodate the mechanical skeleton, known as an armature, which allows the model to be posed and to hold its position. The advantage of a larger model is that you can give it plenty of detail. On the other hand, the larger the model the larger the set has to be, and that can present its own problems. For many of our films we make the human-shaped characters about 8-10in (20-25cm) tall, and construct everything else to fit round this scale.

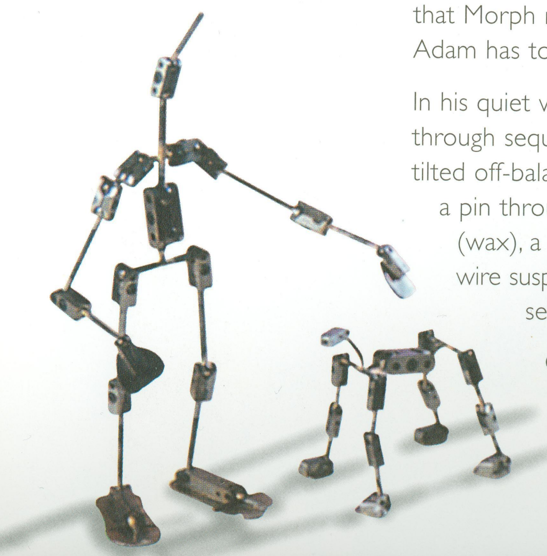
Weight, too, can be a problem. Say you have a character with a big head. Even if you use a hollow head, it will still need special support. How much support? Will a simple wire skeleton be enough, or will it need a tougher rod-and-joint armature? As ever, it is a balancing act between the artistic requirements of how big the head must be, and the practical question of how you can make that shape work.

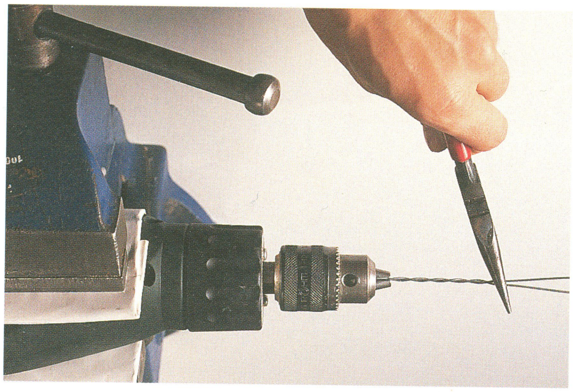
Outwardly, Morph and Adam may look very similar. Both are human-shaped figures made of clay. In construction, though, they are quite different. While Morph is fairly earthbound, moving about over a horizontal surface, Adam has to be far more athletic, able to stand on one leg and bring off other balancing feats that Morph normally never has to. Morph can thus be made of solid clay, but Adam has to have ball-and-socket joints in the legs so he can keep his balance.

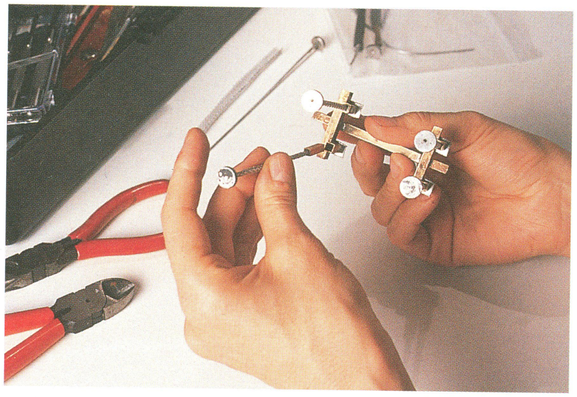
In his quiet way, Morph also has his moments, as demonstrated in the flick-through sequence at bottom right on pages 7-61. When a clay model has to be tilted off-balance, there are lots of cunning ways to stop him falling over - with a pin through the foot, magnets, a carefully disguised blob of stickyback (wax), a rod in the back which the camera cannot see, or very fine fishing wire suspended from a rig above the model. For further tips, look at the sequences on pages 78-81, and see also page 98.

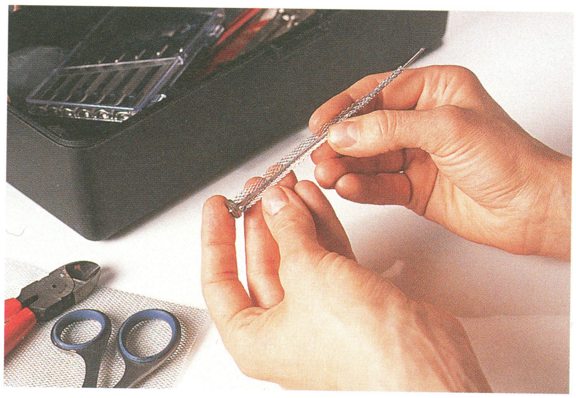
One of the early traps is to think, 'I am a beginner, so I should use basic, clay-only models.' That may be fine for the very early days, but most people will then want to broaden out, and rightly so. You need to test the other options. Quite soon you will also

Armatures for Wallace and Gromit. These mechanical skeletons are precisely designed and built from detailed drawings of the character (see page 99). You can make them yourself, though most amateur animators get theirs from specialist suppliers.









Left-hand column: Legs are made from lengths of twisted aluminium wire.

The feet are steel discs with holes for the leg and for a pin in case the leg needs extra support.

The leg is covered in mesh which is cut to size and squeezed round the aluminium wire.

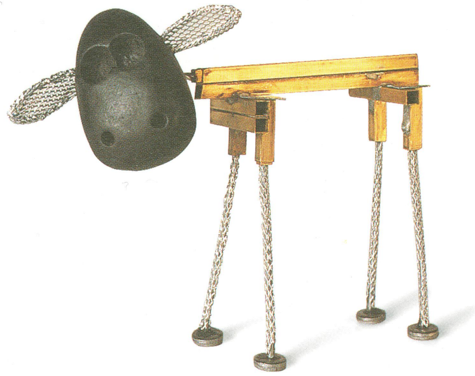
The head is made of fast-cast resin. Once out of the mould, the holes and slots for eyes and ears are drilled to shape with an electric drill.

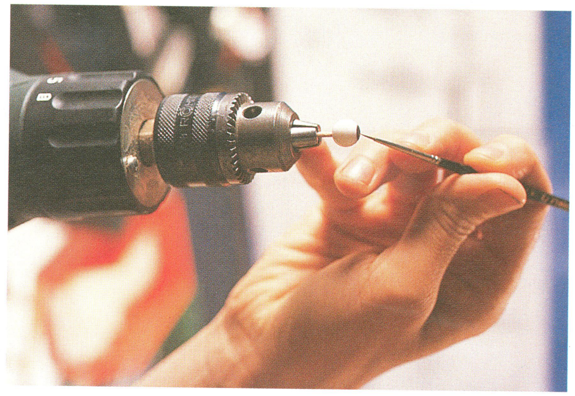
Right-hand column: The first stage completed, with pieces of K&S square-section tubing added last to join the legs to the body.

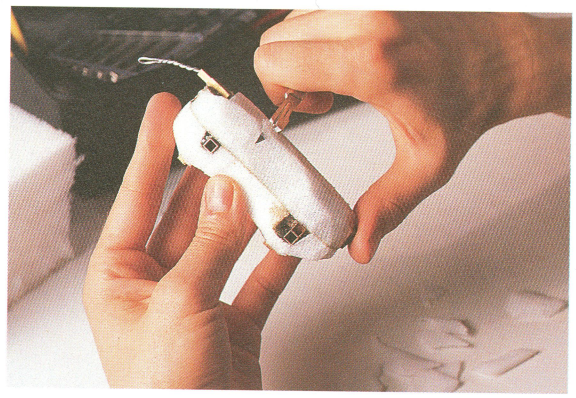
The eyes are white glass beads with pupils painted on using a paint brush and enamel paint. First, the glass bead is placed on a cocktail stick, then put in a drill and clamped with a vice. The drill is turned on to run slowly while the pupil is painted.

A covering of Plastazote - a hard, foam-like material - is put over the metal armature and trimmed with a scalpel, leaving the various holes clear for fitting the legs, neck and tail.

The ears are made of aluminium wire which is twisted to leave a loop at one end. Over the loop goes a piece of mesh, and over this goes the outer covering of maxi-plast rubber, which is sculpted and baked in an oven to retain its shape.





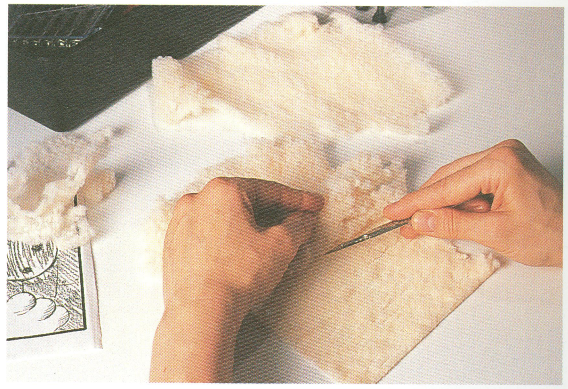


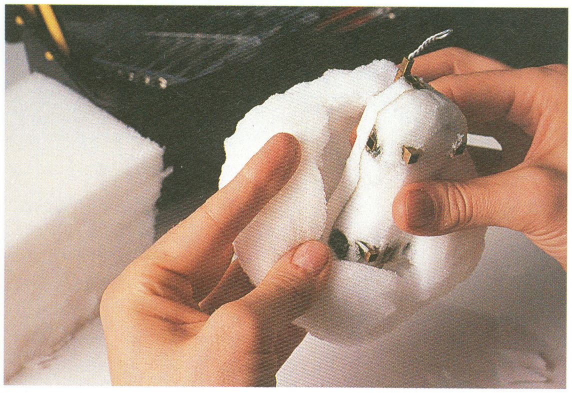
Left-hand column: The second stage completed, with Plastazote body and legs made of maxi-plast rubber which has been sculpted and baked.

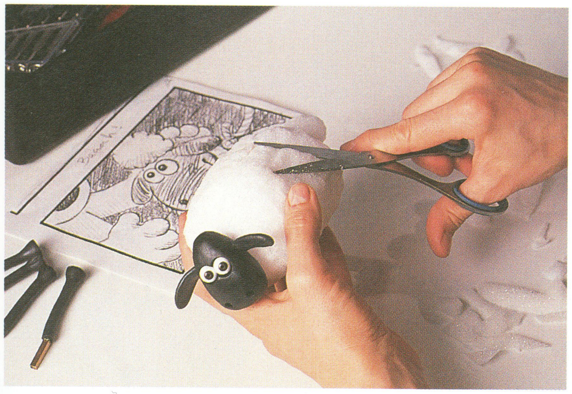
Next, the body and tail are covered with a square of foam, which is trimmed to shape with scissors.

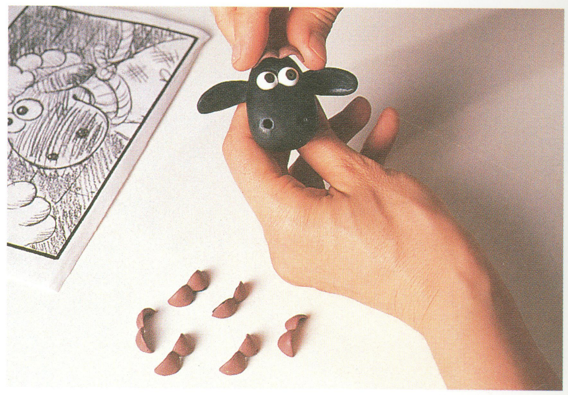
Right-hand column: Fur fabric, the final covering, is starched to make it lie down properly and avoid flickering on film. It is then trimmed from its backing, top, and glued over the foam layer, as shown in the next picture.

Eyelids are cast in coloured resin and then trimmed to shape. When the head is finally assembled, the ears and neck are glued into the head with epoxy-resin glue. The eyes, however, are bedded into a type of sticky wax which holds them in place but allows movement.

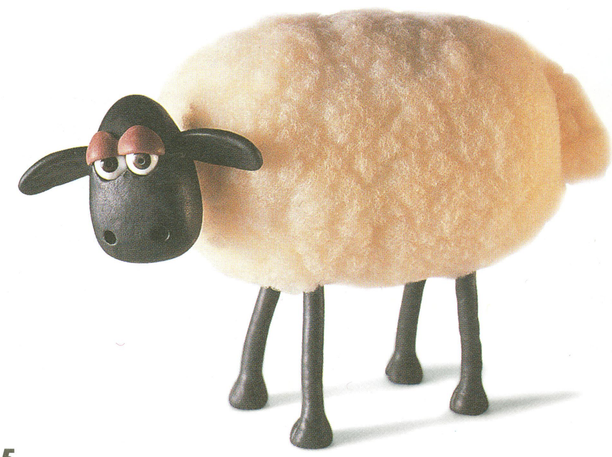






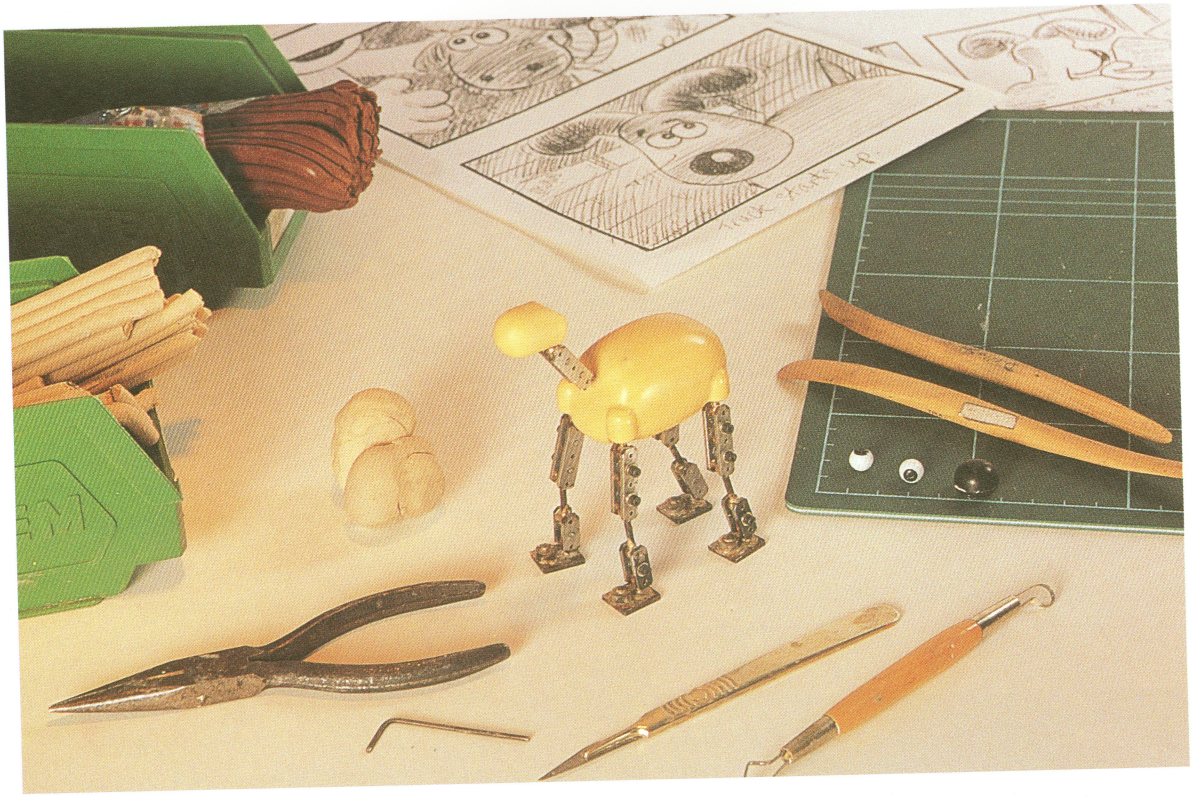


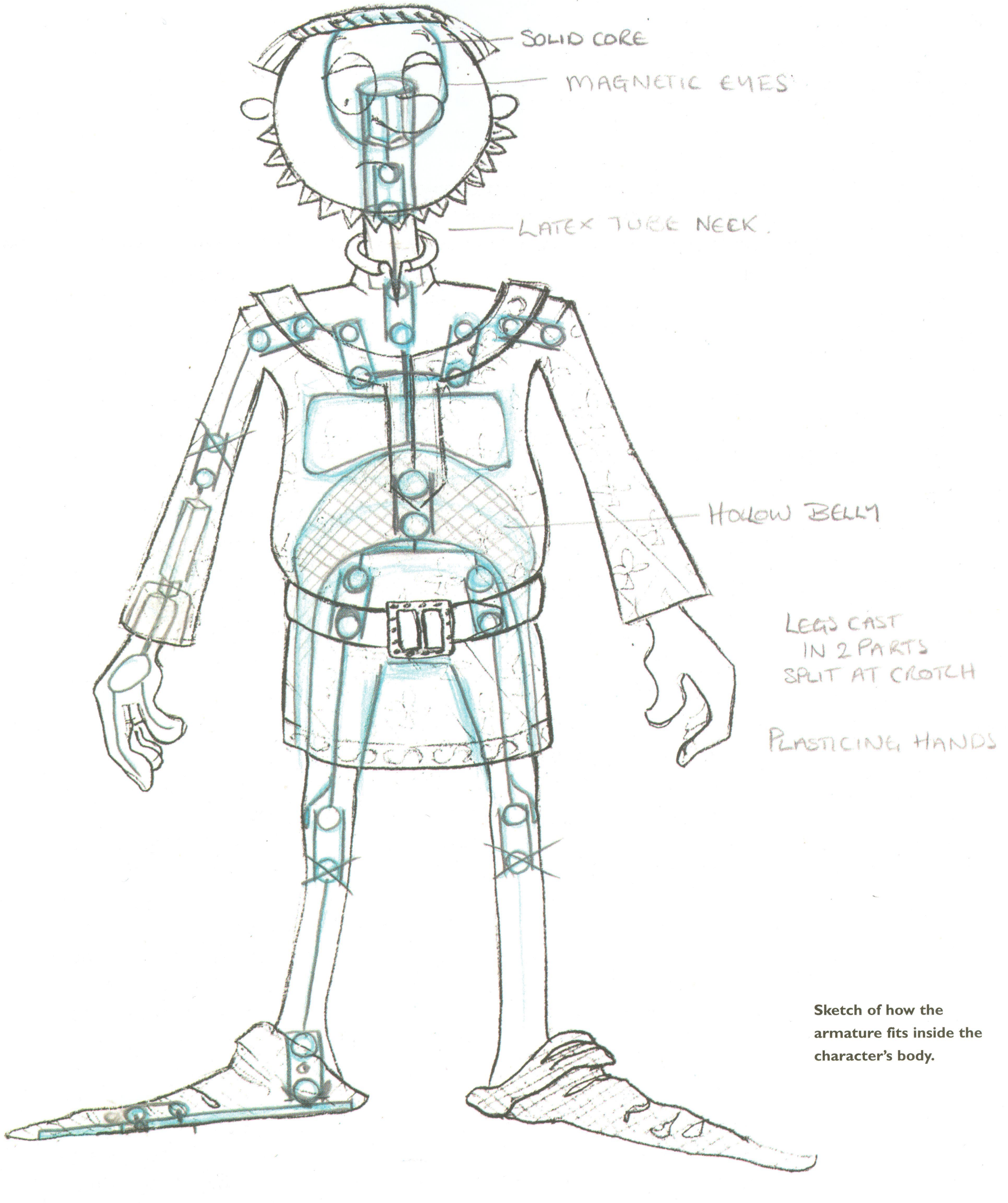
Wear a mask when you handle epoxy-resin glue.



Starting with the armature and fast-cast resin parts for the head and body, the Gromit shape is blocked out in clay and gradually smoothed down with a modelling tool. Then the final details can be added - the eyes, nose, ears and tail.

The eyes, like those of the sheep (see previous pages) are glass beads with painted-on pupils. The noses were mass-produced for something else, but when we saw they were just right for Gromit, we bought a bagful. The ears and tail are made from a wire twist. This can be coated with cotton, string or pipe-cleaners to help key on the clay, which is then added and smoothed into shape.



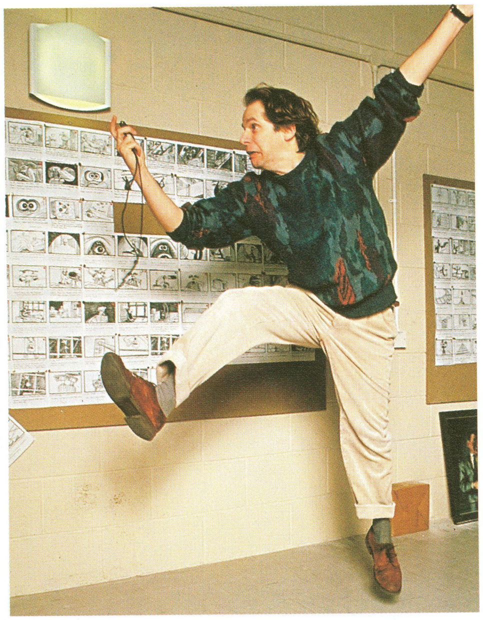


Sketch of how the armature fits inside the character's body.

Movement

Like actors, animators communicate through the language of movement. We create characters, convey emotions and make people laugh through the movements, gestures and facial expressions of our puppets.

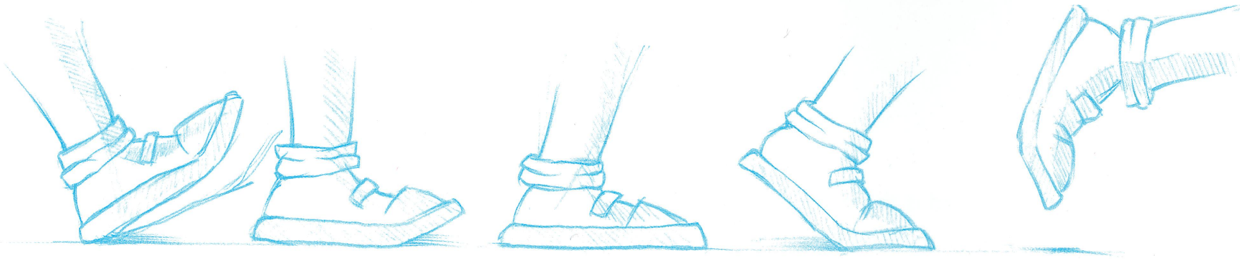
People often say that our work is naturalistic, which I think is meant as a compliment because the best model animation is regularly praised for its smooth and 'natural' movement. But in fact our work is not realistic at all. It is - and it should be - exaggerated. All the animated movements that we do, however understated or natural they may appear, are bigger, bolder and simpler than 'real life'. Real movement, the sort of thing you would see if you analysed film of a live actor, always looks weak and bland when it is closely imitated in an animated version. Some animators use previously shot live-action footage as reference material, or even copy it slavishly frame by frame to create their own animated performance. At Aardman we rarely do this. We prefer to act out the animation ourselves, so that we really understand it, then add our own degree of caricature and stylisation. The important thing is that the audience should be able to understand what the puppet character is doing and thinking, no matter how broad or subtle the style of animation. What we love doing is producing *performances* with our puppets that feel 'natural' because in some way they feel true. By simplifying and exaggerating gestures, we try to distil the essence of a particular movement or sequence of movements. This is far more important than copying from real life. When we get this right, it gives the audience a great sense of recognition. They think, 'Yes, that's exactly how people react or behave,' and they believe that what they have seen is uncannily natural.



Nick Park, stopwatch in hand, uses his own body to work through the jerky, exaggerated movements of the Wrong Trousers (seen right in action). Once he knows exactly how long it takes to get from A to B in a particular phase, he can plan how to animate the model within this timespan.

Posing the Character Obviously, animation is about movement. But few really expressive sequences are carried out through *continuous* movement. One of the classic symptoms of our earliest work is that the characters shift about constantly and restlesslessly, never daring to be still. Later we realised that the time between movements, when the puppet is still, often conveys far more character than the same number of seconds of elaborate animation.

We talk of 'poses' and 'holds'. A pose is pretty obvious - a still position that conveys a lot of information about

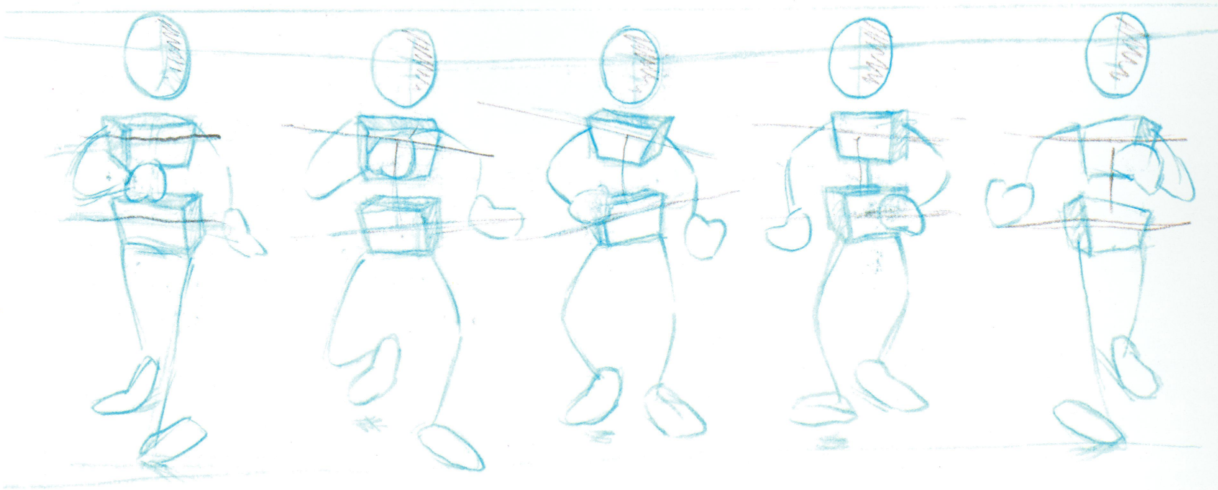


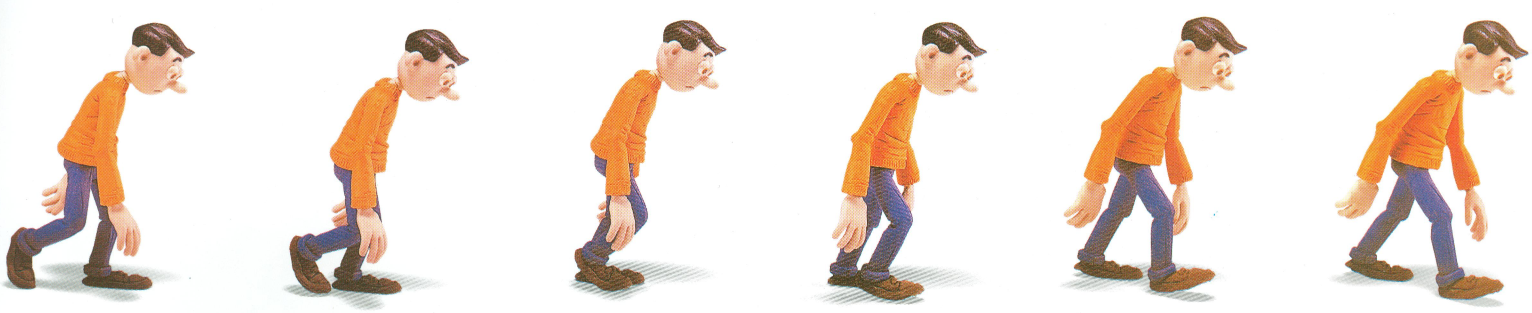
When a hand or a foot - or a bottom or a nose - comes into contact with the ground, make it look as if it is firmly set. Make it lie flat and contact the ground at all points, so that no line of light is visible underneath. This makes the puppet feel larger and heavier.

Remember that your puppet has a centre of gravity, and needs to stay well balanced. Standing with his weight equally on both feet, you want him to step forward on to his right foot. To do this, he must first shift his body weight over his supporting foot, the left. The best demonstration is to try it yourself. Start with your feet very close together, and step forward on to your right foot. As you start, you move very slightly to the left. Starting with your feet a metre apart, you are forced to move a long way to the left before you can go forward. Now try moving off without shifting left and see how unnatural it feels.

Right: Everything about this puppet is downcast. His feet barely leave the ground, his head bounces slowly as if he has not got the strength to hold it up, and his arms swing heavily in small arcs.

Every step we take starts at the hip joint. Your puppet should do the same. When he prepares to move off, the supporting hip drops down as the body's weight is transferred on to it. The pelvis swivels and the stepping foot is released.





Most of the principles that make up good animation have something to do with the transference of weight and the animator's ability to make it believable.

Characters in animation are not bound by the Laws of Gravity. If you want to, you can make an elephant flit around as weightlessly as a butterfly. However, in nearly all our animation, we work hard to create the illusion that our puppets are earthbound. I often think that Plasticine lends itself best to creating solid, heavy-looking characters.

Making Movement Believable

Anticipation Before an animated figure starts moving in one direction, we usually anticipate the action by moving it the opposite way. This is not so strange when you think about it. If you want to jump up in the air, you first crouch down; if you want to throw a ball forward, the first thing your arm does is go back. Anticipation is 'realistic', and it also works well in film because the moment of anticipation prepares the audience for the action which is going to follow. This is why, in cartoon films, the anticipation is often stronger than the action itself.

Weight We make our characters more believable by making them look heavy. The weightlifter, above, nicely demonstrates this as he struggles to lift a barbell which only weighs a couple of ounces. The animator plans and rehearses the movement, miming it to understand how it works. Then he tries to make the puppet do the hard work. In stage 3 for example, he has just started to lift by pushing his legs and back straight, and stretching his arms. At stage 4, he has hauled the barbell as high as he can, it hangs in the air for a moment before it

Above: Think about the weightlifter's speed thro the lift. Most of the actio quite slow, but at stage 4 suddenly snatches up th weight, and at 5 he quic gets his hands and arms below the barbell.

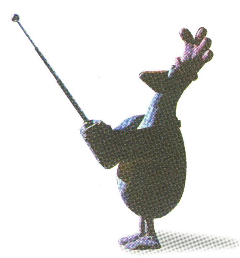
Top: Wallace walks across the museum ceiling in *The Wrong Trousers*, his leg movements controlled by Feathers McGraw from outside the window. The way he moves reflects both the character and his plight. The Penguin, mindful of the risks he is taking, moves the Trousers with exaggerated care. The knees come up high and the feet are planted with great caution, to make sure they stick. Inside the Trousers, Wallace moves to a linked but different pattern.

falls, and in that time he quickly gets his hands and body underneath it. When he finally holds the weight aloft in triumph, see how his arms and legs are locked straight. If they were not, the audience would not believe he could support a heavy weight.

Momentum Remember that, like the barbell, your head, body and limbs are also heavy. Because of this, they should not stop moving too quickly once they start. Try sprinting as fast as you can, then stopping. When your feet finally stop, thanks to friction, your head and body will want to carry on, tipping you forward. In animation, we often exaggerate this natural effect.

Acceleration and Deceleration Except in extreme cases, objects and people do not suddenly start or stop moving at full speed. They normally accelerate and decelerate. This is pretty obvious in the case of a sprinter running from the starting blocks, but it applies equally to small actions such as lifting your hand to scratch your ear. Remember that your hand and arm have weight, and have to be brought up to speed.

See how his arms swing like a pendulum, but always behind the movement of the feet. When a foot is forward, the arms swing helplessly back, then swing forward again as the next stride begins.



Very little human movement happens in straight lines. It can usually be broken down into a series of arcs. If you trace the path of the batter's foot, hand or hip, you should see a pattern of overlapping curves.

Putting it all together

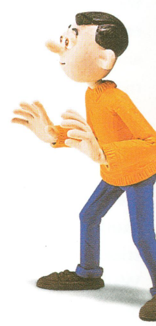
The sequences here show a mix of all the animation principles mentioned in the previous pages. Swinging a baseball bat is a good example because the whole process is about storing up and using energy.

Stage 1 shows the batter poised to receive the ball. In 2 and 3 he moves back, anticipating the main action which will be forward. His shoulders rotate, storing energy, and his weight is entirely on the back foot, allowing him to raise the left

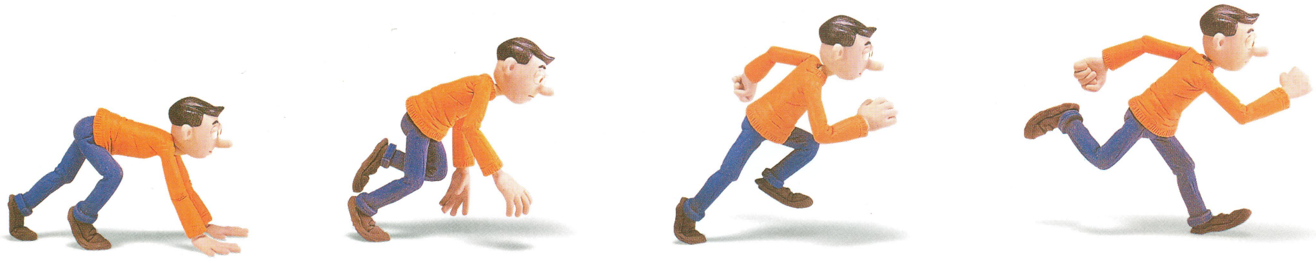
foot. He steps forward on to his front foot, and by 5 has started to unwind his shoulders. As he accelerates, the bat moves a greater distance in each frame.

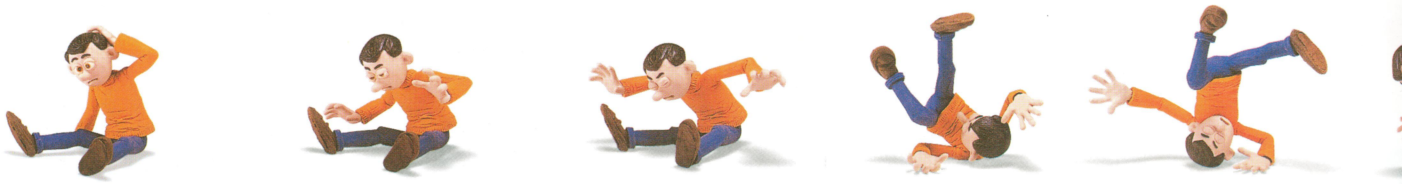
The bat has weight and is swinging in a big arc, so in 6 and 7 it is moving farther than anything else. All his weight is pushing on to the front foot, and his whole body is unwinding so that maximum force and speed are brought to bear on the ball at stage 7. At 8, the power which started in the hips and shoulders has now been transferred to the bat which is almost pulling him round in his follow-through. In a more 'cartoony' version, his bat would carry on and get wrapped round behind his head.

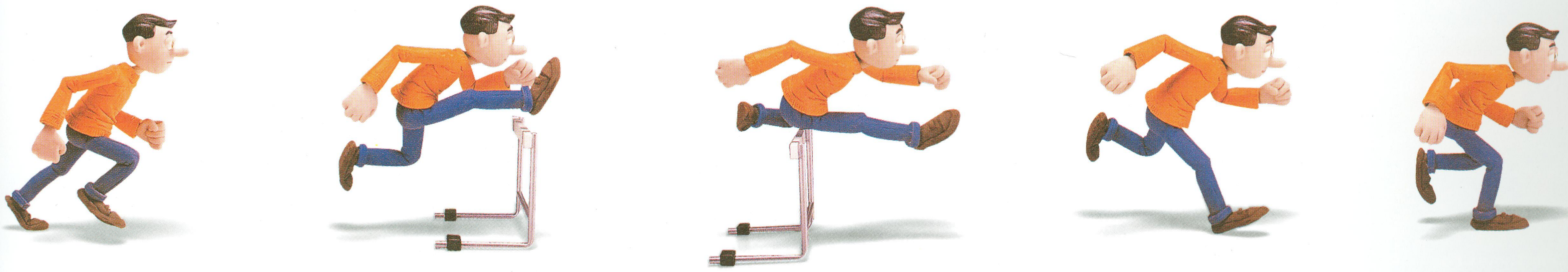
All the sequences on these pages demonstrate how movement flows through a gesture. I think of it as a wave that runs through the body from the first thing that moves to the last. Swinging the bat starts when the foot steps forward, followed by the knee, hip, chest, shoulder, elbow, hand and finally the bat.



Right: The force of the flying ball catches the man's hand and pulls him along in a sequence that runs from his hand down to his feet.

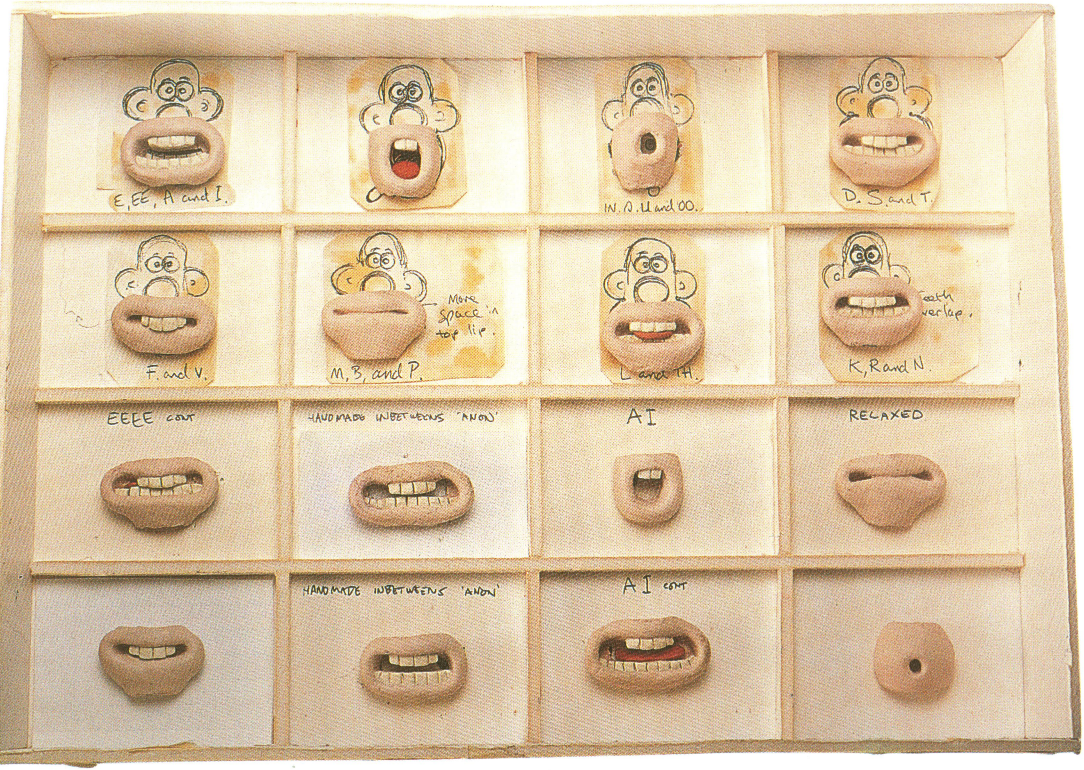






Running is notoriously difficult in model animation. Because the movement is fast, the gaps between frames are large. This means that although the effect is energetic, it is seldom smooth.

Left: The tumbling character demonstrates the effect of momentum. When he trips, his feet stop moving but his head keeps going forward (4). In turn, his tumbling body pulls his feet after him (6). When his head contacts the ground, the feet - still full of energy - carry on past (7) until they finally settle on the ground (8). If he was running faster, he would carry on tumbling longer.



Talking Heads