

DON GRAHAM NOTES

"Animation of FORCES vs. Animation of FORMS"

Disney set up drawing classes for his animators at the Chouinard Art Institute in Los Angeles under Instructor Don Graham. When the classes were started, most of the animators were drawing using the old cartoon formula of standardized shapes, sizes, actions and gestures, with little or no reference to nature. Out of these classes grew a way of drawing moving human figures and animals. The students studied models in motion as well as live action film, playing certain actions over and over. The analysis of action became important to the development of animation. This is a transcript from one of Don Graham action analysis classes from 1937.

Don also wrote a book on animation called The Art of Animation, unpublished. If anyone has a copy or can get their hands on a copy – please forward it to info@thinkinganimation.com and we will get it into a .pdf format for all to enjoy.

It is a fair criticism of animation as it stands today to say that with few exceptions, every animator animates forms instead of forces. During a recent session, Tytla's dwarf animation was studied. It is obvious that he does not animate forms, but rather forces. This has become apparent only within the last three or four months in his work. All he draws in his roughs are symbols of force....he turns these symbols over to his cleanup man who draws in the forms.

For example, when he brings a character's upraised arm around to a bent position with the hand near the chest, he never conceives this as an arm having shape but as an actual force working from key points and studies what happens. He indicates the transition of strain from the elbow to the wrist as it sweeps around....he really makes shorthand notes of the tension between the elbow and the wrist. In animating a figure it is usual for the animator actually to draw forms. When he draws forms, he gets forms - generally lifeless. For a long time here in the life classes there has been emphasis placed on the forces of drawing - drawing symbols of forms, of expressive tensions of force. Tytla is the first animator who has consistently carried this principal throughout his animation - drawing symbols of forces, using these symbols to animate with and leaving the entire responsibility of the forms to his cleanup man. This is a revolutionary conception of animation.

This is perfectly logical. The animator works with forces all the time....there is a constant use of graphic accents in his manipulation, and these accents may be used to as symbols of forces. The actual form is something which is really a by product of animation. The vital element is force.

What does this concept lead to? As soon as these forces are under control it is possible to create feelings or emotions or reaction in the audience. By sweeping an arm around fast, an animator expects a reaction from his audience; but in moving the arm, does he conceive

it as an arm moving (which is animating forms) or does he conceive it as a FORCE? There is a world of difference in the mental approach - there is an entirely new philosophy of animation wrapped up in this concept of animating forces.

Roberts: That leaves the responsibility of translating force into form up to the cleanup man which is quite a job.

Yes, but that is where it should be. It is assuming that an animator has a cleanup man with whom he can work hand in hand. It is also assuming the cleanup man knows and understands these forces as well as the animator does. The symbols must be understood thoroughly by the two.

Margo: How can you move a form or mass form one position to another without force?

That of course is impossible.

Margo: Do you mean the animation we have had so far has no FORCE?

Not at all - this is a matter of conception. If he moves the arm through fast the animator knows that in doing it a certain way he will get a reaction from the audience. He is dealing with forces all the time and it is with the expression of these FORCES that he gets reactions from the audience. But in visualizing his animation, is he conceiving it as a FORCE or as a moving form?

Margo: This is a matter of terminology rather than a difference of approach.

No- there is a philosophy here. In drawing the figure an artist can say: "I am going to draw that figure - those forms - and by drawing those actual forms I will get that figure. In order to draw these forms he will have to understand balance and thrust to a certain extent to make the drawing hold up. But that us a different approach than going into the

drawing consciously from the point of view of thrust and FORCE.

To illustrate: In drawing the lines representing a leg, a symbol for the force or thrust is first drawn. The artist is not drawing a form at all but indicating a force. If, however he draws lines bounding various parts of the body and puts a series of forms together, manipulating them and getting a leg in the right position, he is not representing FORCE but form. But if he approaches his drawing as a thrust problem - shows the thrust on the hip and an indication of the hang of the rest of the body - there he has the basis of the drawing - he doesn't think of the body as made up of forms but FORCES.

Elliot: Isn't it possible to work both at the same time?

Actually, in a drawing, just where form leaves off and FORCE begins is difficult to determine; but it makes all the difference imaginable if the artist is thinking of his problem from the point of view of force or the point of view of form. It is all in the conception.

Margo: Therefore if you draw from the point of view FORCE the chances are ten to one that the form will describe itself.

The forms have to conform. Of course it is possible to get out of character, but if the forces are indicated correctly and the cleanup man understands the character and the animator's FORCE symbols, the resulting forms have to be right.

Klein: I think if you put just as FORCES it sounds too much like philosophy.

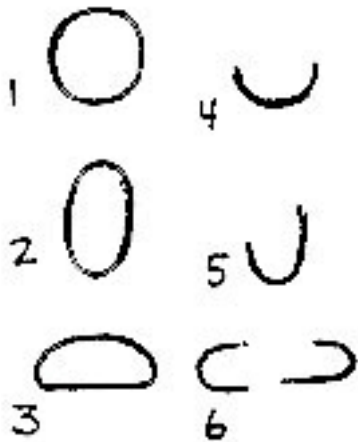
It is philosophy.

Klein: Your problem is not so much one of drawing but of timing. Timing is the vital force. If you have an object falling, contacting, bouncing then landing again, you can make a series of drawing say 100 and if you space the whole thing very carefully - say 1/16 inch apart without reference to anything else, you will have too uniform spacing; You will have a float

down, a soft land, a float up and again a float down. In other words, the timing won't be there but you will have a perfect

drawing. If you space those drawings properly however, you are expressing a FORCE through timing. Doing it with just a single line or movement as Bill Tytla does, is indicating the spacing which means the timing of the figure. The FORCE is in the space, but not in the drawing.

Timing is a constant for good animation whether animation is approached from the point of view of form or FORCE...the timing must be correct to make the action read. The point however is this: take a simple object such as a ball bouncing. One man will conceive it as a ball - it may drag out, hit, squash and go back into the bounce.



He will see this as a ball changing shape... * 1, 2, 3. Another will analyze this problem from an entirely different angle... 4, 5, 6 (the being the symbols of the important forces involved). This is a concept based on the FORCES involved. The symbols indicate FORCE form and timing. The timing will be the same in both cases



Another illustration: in drawing an arm, (7) represents the principle forces and only these need be animated. These symbols represent forces within the body, timing becomes an independent factor. Observe these points and the way they are laid out when examining Tytla's scenes.

Elliot: It depends on the type of animation required. For instance, Bill Robert's Goof walking over the edge of the cornice was almost entirely a problem of FORCES.

The problem is not a single track one – one cannot say animation is timing, or a well drawn character. It is the sum of all the factors. This is merely a new way of looking at old material...there is nothing new in it except that the whole thing is new – it is a conception.

Review and study the different philosophies, the different big steps forward, the progress made in science, history, art. Rarely will one find these forward steps entirely new – merely old material given a new twist. In drawing classes the instructors are working on this very problem every minute – teaching the fellows how to draw the figure a new way, giving an old subject that has been drawn for thousands of years a different interpretation. It is putting a new twist to an old subject – a new philosophy of approach...not really new, but adapted to studio uses. The approach differs from that of an illustrator as studio methods of study differ from art school methods.

Everyone in the plant has been dealing with forces for years. Everyone who ever drew a figure has been concerned with forces. But whether an artist STARTS WITH THE CONCEPTION OF FORCE AS THE IMPORTANT THING – AND WHETHER HE SEES THE FORCE AS THE BY-PRODUCT OF THE DRAWING, OR VICE VERSA. IT IS THE APPROACH THAT IS IMPORTANT.

Klien: When you use a pan in animation you forget all about the figures. On the exposure sheet you will find each move of the pan is not marked on the space which represents the drawing, but on the line; so if you have a series of 1/8 inch movies – if you mark them all down, there would be a ten 1/8 inch marks on the lines between the spaces. These lines represent space in the drawings. If you want to get a certain very slow movement of the pan, the space between each movement is 1/8 inch. If you want it faster, you mark it wider. In other words, your action is the space in the drawing; you have the same drawing all the time in the background.

In close dialogue action the same thing is true. There is probably no one in the plant with sufficient knowledge to comprehend these FORCES; but they are still there. As the animator faces more and more difficult problems in animation, he will find himself the one at fault, not the approach. In a very close action, a hand or face, most draughtsman and probably most animators too, tend to overlook change of movement in favor of change of form or shape. This is the principle reason so few can draw hands.

Klein: To my way of thinking, the difference between an artist who illustrates (who can every drawing as well as or perhaps even better than the animator can) and the animator, is not the drawing, but in the spacing between the drawings.

If the problem is treated in these two ways, the timing being exactly the same but the approach different, there will be a more vital result from the one handling because of a keener understanding of the forces.

There are several factors that go into the making of a drawing: proportion, movement through the whole figure, a feeling of strain and strain. How can an artist leave any one element out and say he has a figure. How can he leave proportion out, and yet because he has suggested strain, say that he has drawn a good figure? He must have a complete statement of all these things and many more before he has a good drawing.

In a piece of animation he must have timing - that is the essence of animation - the punch of variety that puts over his idea; but he must have some vehicle to work with - some visual form. Look at a scene coming through the plant. Up in one corner of the drawing will be a timing chart which is very clear to any assistant; but if the scene is shown to an average spectator or without further explanation, he will not know what the chart represents. The animator must have something visual with which to convey the idea - this is the drawing. There can be all the timing and punch imaginable in the scene, but if that quality of life isn't in the drawing too, the animation will suffer; just as the drawing will suffer if it doesn't have proportion. movement, etc.

But it is impossible to draw space. These lines are time units - they are separations in space; but before an animator can draw this, he has to have a visual body. In others words, there is no pan move unless there is a marker.

Margo: Suppose you took two pieces of animation, timed exactly alike, the same animator roughing one out with idea of FORCE as his objective and the other with just the idea of drawing form. Which would have the better punch?

The one with the idea of force. Put it another way, draw two figures - identical pose and model, the same person making both drawings - one form the point of view of form, the other of FORCE. One will be almost a tracing of the other, yet the one based on FORCES will have vitality and the other will not.

Klein: I doubt that very much.

It happens everyday in the art classes.

Klein: If you draw a set of roughs, make a test - it will be the same; but with a change of timing, it will be altogether different.

This thing is something one either feels or does not feel. Vitality in a single drawing is something that can't be bought in a drug store.

Really, all this means is that the animator should take all the loose ends, and coordinate them. He can assume in an animation job that the drawing itself is not the most important factor - that the most important thing is the timing and the study of the basic FORCES. He then can say to himself, "I have a first class assistant who understands what I am doing - he can make the actual drawings for me, but I must leave him something on which to build his drawings - not a bunch of half completed drawings, but symbols of the basic FORCES. He will take my symbols and build the form from them, retaining the vitality of the figure".

Beard: Would he conceive a figure as being static until a FORCE acted in it?

He would see the figure as made up of vital FORCES - the form of the figure itself as a by-product. For example, drawing #7. The important thing in this arm is not the proportion or color or position, but the fact that there is a strain in the arm from the elbow to the wrist. INSTEAD OF HANDING OVER TO THE ASSISTANT A SERIES OF DRAWINGS SHOWING THIS ARM AT ONE POINT, THEN PROGRESSING TO ANOTHER, AND ANOTHER, THE ANIMATOR CAN SAY, THE IMPORTANT THING IN THIS ARM IS THAT THERE IS A STRAIN BETWEEN THE WRIST AND THE ELBOW.

My assistant knows how big the arm is and he knows my symbols. All that I have to do is draw two important symbols and leave the rest to him. Almost every animator in the plant has done this at one time or another, but not consistently. HAVE THE ANIMATORS THOUGHT OUT THIS APPROACH AND REALIZED WHAT THEY ARE DOING? HAVE THEY REALIZED HOW THIS APPROACH SAVES THEM HOURS OF WORK?

The interesting thing about Tytla's drawings is that instead of seeing a character as a round body, beautifully modeled in drawing, he SEES THE ANIMATED FORCES INHERENT IN IT. In a pose for example, with two hands protecting the head, the lower part of the body would be indicated by just a few FORCE lines because they represent the essence of the pose. It is impossible to get very far off in the drawing of the form if the FORCE symbols are in the right position. The big proportions have to be right of course. But it is the relationship of one FORCE to another which gives the correlation of the whole.

McCrea: Then most of the drawings would have to be done mentally.

It is all mental. This is no simple plaything. It is the synthesis of FORCES and forms to a few symbols. This implies great knowledge. Just as an artist cannot go into a life class without first knowing something about the figure and the symbols. In order to turn out a good drawing he must know the figure perfectly. In the drawing classes the problem is to constantly BOIL A WHOLE BIG FORM OR STATEMENT DOWN TO A FEW LINES WHICH IN TURN ARE SYMBOLS OF THE WHOLE. That is the problem in the classes and the reason for quick sketch. Every artist must know his subject perfectly. Whether or not he does today is a question he will have to answer some day.

Rugg: But how many do? It would take a man almost as good as the animator to be his assistant, and such a man would be animating instead of assisting.

All this is being used in the studio today...not all the men are using it, but just as with every other principle evolved in this plant, as soon as something has PROVED ITS WORTH, it will spread throughout the plant. True, there are some animators who will never use the approach; but the young assistants in this class will be the animators of tomorrow and the ones who will use it. A great many of the animators across the street will use it. Many of the most progressive men in the studio are the oldest men in it and they will use it. The idea is valuable and it will be used and become a common thing in the studio some day.

Rugg: How about scrapping all the time worn rules and regulations about animation - bending a foot, etc. Wouldn't this approach eventually do away with all that?

No - it is a matter of evolution. Bad habits die out because something else works better, but they have to go their own way. All the different trick methods of doing certain things - stock actions - take a long time to be eliminated...they eliminate themselves eventually. Two men may have the same kind of action to animate - one doing it one way, the second, another; the man doing it the more original and better way will outmode the stock handling in one show. But sometimes the

animator who does the action the stock way does not realize that it is stock and it takes him a long time to find this out.

Klein: A stock method of doing something is simply careless animation based on casual observation. Once you get an action based on accurate observation, it will again be a stock way of doing it, although better than the careless analysis.

But it will not be stock because there are too many varieties in life because no one knows the possibilities that nature holds. Man knows only a very small part of it. Even the best scientist in the world knows but a little about it -therefore how can the animator hope to exhaust nature? When one really experiments, recognition of these efforts, if the results warrant, is almost inevitable.

Roberts: Stock walks are a very necessary prop in this business. Economically we couldn't do without them. The other process of experimentation takes time.

Rugg: In just an ordinary walk, a man animating it just observing someone else's animation would animate it in more or less a similar way; but if he took the figure and analyzed it from bottom to top, he would arrive at an original treatment and not a stock handling.

Eventually that will come about but not overnight.

Regarding Tytla's approach: it is merely a confirmation of all that the instructors have been trying to do here for years in the drawing classes. It is the first time that these principles have been evident in the animation. The approach to drawing here in the classes is entirely different from that of many other places. Yet for years it has been impossible to see this influence in animation...it has always been the other way around...Tytla's work has been a revelation.

No matter how fine the animator, eventually he is going to be limited and tied down by his lack of understanding of the fundamentals of drawing. Animation is still a graphic art. This business is based on a pencil and what can be done with a pencil. It is possible to get fair animation with a mediocre drawing, but the studio cannot build on that. As animation grows, drawing must grow right along with it, because animation is a graphic expression. The young men who have just come into the studio the past few months have been picked for one reason primarily - that they all start with a good drawing background; so they have a certain edge over many of the older men in the studio who lack the training and experience. However just drawing alone will not make animators. If the new men utilize all their drawing background and learn all about animation, they will be in a good position because they will have good tools to work with. But there never has been a draughtsman who could rest on his laurels and still be a draughtsman. Drawing is an elusive thing that keeps moving and changing. There has been a fiddle player who has not played the fiddle constantly. That is the reason for the art classes here at night....that is why everyone should see to it that he attends one or two classes a week, else his drawing will drop. No matter how good he is, he must keep studying or he will lose his freshness. In spite of the fact that an animator draws eight hours a day, he always draws from himself. HE MUST HAVE CONSTANT STIMULATION FROM OUTSIDE. There is nothing so stimulating and inexhaustible as the human figure and these life classes are important for that reason.

Animators and artists are all familiar with the terms "LINE OF ACTION" and "PATH OF ACTION".

To define "LINE OF ACTION", please consider this: THE LINE OF ACTION IS A VISUAL EXPLANATION OF WHAT HAPPENS TO FORM THAT HAS BEEN ACTED UPON BY - FORCE.

The LINE OF ACTION can be present in a single drawing or frame of information.

PATH OF ACTION IS THE RESULTING MOTION OR ILLUSION OF MOTION CREATED BY FORM THAT HAS BEEN ACTED UPON BY - FORCE.

In each case, FORCE is what must be understood first to achieve the strongest visual presentation.

This force can be internally initiated -ACTING, THINKING, EMOTION. This force can be externally initiated - ACTION, MOVEMENT, MOTION. For the animator this force is most often initiated INTERNALLY. It is "thought" that is the creator of the forces that we must know before animating a character begins. Even in the case of a battle between two characters where there are strong forces of action, these actions are initiated through an internal mechanism that is at least - reflex reaction. That means that a mental perception takes place before the action.

A character can be acted upon without forewarning. Say a bat to the back of the head and that character's sprawl to the ground is not the result of an emotional thought process. It was an emotional thought process that initiated the swinging of the bat by the other character. For analyzing animation and clearly communicating the needs of a scene through acting and action, please consider the following paper prepared 1937 at the Walt Disney Studio. This is also the starting point for sketching for scene planning. The emphasis is not on the structural clarity of the drawing, but rather the information contained in the drawing.

Use any and all of this information that you possibly can. Refer to it often. Apply it to the planning of your scenes. The accompanying drawings are to help explain visually what is contained in the text.

If you have information that will strengthen this package, please pass it on so that it is available to everyone.