Disney Animators

- Sent to special drawing classes to get past standard cartoon formulas.
- Studied models in motion and live films.
- Studied actions over and over.

- The analysis of action became important to the development of animation.

Fundamental Principles

- Squash and Stretch
- Timing
- Anticipation
- Staging
- Follow Through
- Pose-to-Pose
- Slow In / Out
- Arcs
- Exaggeration
- Secondary Action
- Appeal
Squash and Stretch

- Movement changes object’s shape.
- The amount defines rigidity.
- Must preserve volume.
- On a face, it connects different parts.

Timing

- Speed of action gives meaning to motion.
- Defines weight and/or intent of actor.
- Realistic behavior more important than looks.
Timing: Effect of Longer Action

Character turns his head and raises the chin slightly. How does the number of frames influence interpretation? (from few frames to many frames)

• ...has been hit by a tremendous force.
• ...has been hit by a rolling pin.
• ...has a nervous tic or a spasm.
• ...is dodging a rolling pin.
• ...is giving a crisp order “Move!”
• ...is more friendly “Over here”.
• ...sees a nice car.
• ...tries to take a look at something.
• ...searches for tea on a shelf.
• ...appraises thoughtfully.
• ...stretches a sore muscle.

Action in Three Parts

• An action occurs in three parts:
  – Preparation ➔ Anticipation
  – Action proper ➔ Staging
  – Termination ➔ Follow-Through

Anticipation

• Anticipation provides:
  – Natural muscular anatomy
  – Device to catch audience’s eye [will they see it?]
  – Direction of audience attention
Staging

• Present an idea so it is unmistakably clear.
• One idea seen at a time.
• Object of interest should contrast with scene.
  – Sometimes ensured with silhouette.

"Look at this, now look at this, then look at this..."
Follow-Through

- Action **seldom** terminates with a **sudden stop**.
- They often **carry past termination point**.
- Lead part initiates motion, other parts follow.
- Lead part stops, other parts stop later.
- E.g. the eyes lead the head, which leads body.
- Sequences of actions should **overlap** (coarticulation).

Pose-to-Pose

- The method of creating frames:
  - "Straight-ahead" let’s animator do one drawing after another from a starting point
    - Slightly zany look for scrambling actions
  - "Pose-to-Pose" let’s animator first pose character into key poses and then fill in between.
- Digital animation mostly done "Pose-to-Pose" through hierarchical posing of limbs (layered).

Slow In / Out

- More time spent at the **beginning** and at the **end** of an action.
- Initially done because animators wanted audiences to see the action better.
- Achieved expressive "spirited results".
Slow In / Out

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Arcs

- Action paths are always arcs.
  - Based on swinging limbs and thrown object trajectories.
- Achieved with splines.
- Separate motion paths from timing arcs.

Exaggeration

- Make the essence of an idea bigger.
- Provide a “ground” for comparison in scene.
Secondary Action

- New actions can result from an action.
- Can be subtle effects (e.g. Luxor’s cord)
- Might still need staging or it gets lost.

Appeal

- Live action actors have charisma.
- Animated characters have appeal.
- Avoid “sameness”, “stiffness” and “mirrors”.

Tying it all together

- Consistent personality
  - An underlying personal story ties all the actions together into a believable whole.
  - The actions are merely a view into the inner world of the character.
3D Animation Basics

Preparing a Model: Skeletal Rigging

Joint Animation
Joint Animation