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THE ANIMATOR'S SURVIVAL KIT™
A MANUAL OF METHODS, PRINCIPLES AND FORMULAS FOR CLASSICAL, COMPUTER, GAMES, STOP MOTION AND INTERNET ANIMATORS
WALKS

Advice from Ken Harris:
'A walk is the first thing to learn. Learn walks of all kinds, 'cause walks are about the toughest thing to do right.'

Walking is a process of falling over and catching yourself just in time. We try to keep from falling over as we move forward. If we don't put our foot down, we'll fall flat on our face. We're going through a series of controlled falls.

We lean forward with our upper bodies and throw out a leg just in time to catch ourselves. Step, catch. Step, catch. Step catch.
Normally we lift our feet off the ground just the bare minimum. That’s why it’s so easy for us to stub our toes and get tipped over. Just a small crack in the pavement can tip us over.

USELESS (?) BUT INTERESTING SCIENTIFIC INFORMATION ON WALKS:

DID YOU KNOW WE PUT A MILLION POUNDS OF WEIGHT ON OUR FEET EACH DAY?

1. EACH ARM MOVES IN COORDINATION WITH THE OPPOSITE LEG, GIVING BALANCE AND THRUST.
2. AS WE DIP DOWN, WE SPEED UP, RELEASING ENERGY. GRAVITY IS DOING SOME OF THE WORK.
3. OUR ARMS ARE AT THEIR LOWEST POINT.
4. AS WE RISE UP, WE SLOW DOWN. WE’RE STORING UP POTENTIAL ENERGY. OUR FOOT GUIDES DOWN HEEL FIRST FOR A SOFT LANDING.
5. OUR CALF MUSCLES PRODUCE HORSEPOWER. EVERY TIME WE THRUST FORWARD, OUR CALF MUSCLE PULLS OUR FOOT INTO THE SHOE.

DOESN’T HELP YOU MUCH WHEN YOU’RE ASKED TO ANIMATE THE WALK OF A SAD BUT HAPPY MAN — OR DOES IT?

BUT

ALL WALKS ARE DIFFERENT.
NO TWO PEOPLE IN THE WORLD WALK THE SAME.

ACTORS TRY TO GET HOLD OF A CHARACTER BY FIGURING OUT HOW HE/SHE/IT WALKS — TRY TO TELL THE WHOLE STORY WITH THE WALK.
Why is it that we recognize our Uncle Charlie even though we haven’t seen him for ten years—walking—back view—out of focus—far away? Because everyone’s walk is as individual and distinctive as their face. And one tiny detail will alter everything. There is a massive amount of information in a walk and we read it instantly.

Art Babbitt taught us to look at someone walking in the street from the back view. Follow them along and ask yourself:

- Are they old?
- Young?
- What’s their financial position?
- State of health?
- Are they strict?
- Permissive?
- Depressed?
- Hopeful?
- Sad?
- Happy?
- Drunk?

Then run around to see the front and check.

So what do we look for?

The big eye-opener for me happened like this. (Unfortunately it’s a little politically incorrect, but it’s a great example, so here goes.)

I was in my parked car turning on the ignition, when out of my peripheral vision I semi-consciously noticed a man’s head walking behind a wall.
It passed through my mind that he was gay. A gay walk. Now I'm quite short-sighted — my eyes were focused on the ignition key, and it was a busy street with lots of cars and people — and he was about fifty yards away! Wow! How did I know that? This is crazy. All I'd seen was his out-of-focus head moving along behind a wall for a split second!

I started to drive away, then stopped. Wait a minute — I'm supposed to be good at this. I'm supposed to know these things. I have to know why! I remembered Art's advice, re-parked, jumped out and ran a block and a half to catch up with the fellow. I walked along behind him, copying him. Sure enough, it was an effeminate walk. Then I got it. He was walking as if on a tightrope and gliding along.

Now how could I have registered this with out-of-focus peripheral vision at fifty yards without even seeing his body? Simple, really. There was no up and down action on the head. Try walking on an imaginary tightrope and your head stays level. No ups and downs.

From then on the first thing I always look for is how much up and down action there is on the head. The amount of up and down is the key!

*Women often take short steps in a straight line — legs close together — little up and down on the body

As opposed to *Mister Macho*:

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Women mostly walk with their legs close together, protecting the crotch, resulting in not much up and down action on the head and body. Skirts also restrict their movement.

Mr Macho, however, because of his equipment, has his legs well apart so there's lots of up and down head and body action on each stride.

GETTING THE WEIGHT

WE DON'T GET WEIGHT BY A SMOOTH LEVEL MOVEMENT.

When we trace off a live action walk (the fancy word is rotoscoping), it doesn't work very well. Obviously, it works in the live action – but when you trace it accurately, it floats. Nobody really knows why. So we increase the ups and the downs – accentuate or exaggerate the ups and downs – and it works.

IT'S THE UP AND DOWN POSITION OF YOUR MASSES THAT GIVES YOU THE FEELING OF WEIGHT.

IT'S THE DOWN POSITION WHERE THE LEGS ARE BENT AND THE BODY MASS IS DOWN WHERE WE FEEL THE WEIGHT.
Before we start building walks and ‘inventing’ walks – here’s what happens in a so-called ‘normal’ walk:

**First we’ll make the 2 contact positions –**

In a normal, conventional walk, the arms are always opposite to the legs to give balance and thrust.

**Next we’ll put in the passing position –**

The passing position is slightly higher than mid-point.

Because the leg is straight upon the passing position, it’s going to lift the pelvis, body and head slightly higher.

**Next comes the down position –**

Where the bent leg takes the weight.

And just to complicate life – in a normal walk the arm swing is at its widest on the down position (and not on the contact position as we’d prefer.)

We can ignore this as we proceed but we might as well understand the norm before we start messing around.
Next we put in the up position - the push-off.

The foot pushing off lifts the pelvis, body and head up to its highest position. Then the leg is thrown out to catch us on the contact position so we don't fall on our face.

Let's spread it out and exaggerate it a little more so it's clearer...

So, in a normal 'realistic' walk the weight goes down just after the step. Just after the contact, just after the passing position.

Here it is again - (exaggerated)
SET THE TEMPO

The first thing to do in a walk is set a beat. Generally people walk on 12's — March Time (half a second per step, two steps per second.) But lazy animators don't like to do it on 12's. It's hard to divide up. You have to use 'thirds' — think partly in thirds.

Either

The in betweens are going to be on thirds.

Or

Oops - now where do we put the down or up? Hey, this is getting hard — especially when we get into the arms and head, and 'acting' and drapery — maybe there's an easier way?

There is an easier way — have him/her walk on 16's — or walk on 8's. Much easier to walk on 16's — it's easy to divide up — same thing on 8's.

(Each step = 3/8 sec)

When, that makes life easier. Nice even divisions now —

(Reduced up and down action — since it's taking place in a shorter time)

This is why cartoon walks are often on 8's. Bump, bump, bump, 3 steps a second.
So, we set a beat:

4 frames = a very fast run (6 steps a second)
6 frames = a run or very fast walk (4 steps a second)
8 frames = slow run or ‘cartoon’ walk (3 steps a second)
12 frames = brisk, business-like walk – ‘natural’ walk (2 steps a second)
16 frames = strolling walk – more leisurely (3/8 of a second per step)
20 frames = elderly or tired person (almost a second per step)
24 frames = slow step (one step per second)
32 frames = ‘show me the way...to go home’...

The best way to time a walk (or anything else) is to act it out and time yourself with a stopwatch. Also, acting it out with a metronome is a great help.

I naturally think in seconds – ‘one Mississippi’ or ‘one little monkey’ or ‘a thousand and one, a thousand and two’ etc.

Ken Harris thought in feet, probably because he was so footage conscious – having to produce thirty feet of animation a week. He’d tap his upside-down pencil exactly every two thirds of a second as we’d act things out.

Milt Kahl told me that on his first week at Disney’s he bought a stopwatch and went downtown in the lunch break and timed people walking – normal walks, people just going somewhere. He said they were invariably on twelve exposures – right on the nose. March time.

As a result, he used to beat off twelve exposures as his reference point. Anything he timed was just so much more or so much less than that twelve exposures. He said he used to say ‘Well, it’s about 8s.’ He said it made it easy for him – or easier anyway.

Chuck Jones said the Roadrunner films had a musical tempo built into them. He’d time the whole film out, hitting things on a set beat so they had a musical, rhythmic integrity already built in. Then the musician could hit the beat, ignore it or run the music against it.

Chuck told me that they used to have exposure sheets with a coloured line printed right across the page for every sixteen frames and another one marking every twelve frames. He called them ‘16 sheets’ or ‘12 sheets’ I guess ‘8 sheets’ would be the normal sheets.

I mentioned once to Art Rabbitt that I liked the timing on the Tom and Jerrys. ‘Oh yeah,’ he said dismissively, ‘All on 8s.’

That kind of tightly synchronized musical timing is rare today. They call it ‘Mickey Mousing’ where you accent everything – it’s a derogatory term nowadays and considered corny. But it can be extremely effective.
In trying out walks, it's best to keep the figure simple. It's quick to do and easy to fix - easy to make changes.

Also, in doing these walks - take a few steps across the page or screen -

Don't try to work out a cycle walking in place with the feet sliding back, etc. That all becomes too technical. We want our brain free to concentrate on an interesting walk progressing forward.

We can work out a cycle for the walk later... perhaps just for the feet and body. But then have the arms and the head performing separately. Cycles are mechanical and look just like what they are - cycles.

Chuck Jones tells of his tiny 3 year-old granddaughter saying, "Grandad, why does the same wave keep lapping on the island?"

Incidentally, if you are using colours as I am here, it works just fine when you film them. I often have a lot of colours going at first, and you still see the action clearly.

Now we're going to start taking things out of the normal:

**The passing position or breakdown**

There's a very simple way to build a walk. Start with just 3 drawings -

First we make our two contact positions -
Then put in the middle position - the passing position or breakdown.

This time we're raising it higher than previously. We're making it the up position - the high. We've omitted the bent leg taking the weight and our contacts will act as the low.

When we join these up with connecting drawings, the walk will still have a feeling of weight because of the up and down. We can make tremendous use of this simple three-drawing device.

But look what happens if we go down on the passing position!

We get a very different walk - a 'cartoon' walk.

Now the passing position is the low and the contacts act as the high - still giving a feeling of weight.

The crucial thing is this middle position and where we put it.

Squash with a bend? Like a kidney?

How about this one?
These contacts are all the same but the middle position utterly changes the walk.

Delays the foot?

Obviously we'll need the time to accommodate broad moves like this.

In a slow step we might go as far as this—almost a sneak.

What if the feet swing cut sideways on the passing positions?

And maybe straighten the body on the pass positions?

Or just tilt the head and shoulders sideways on the pass positions—

"The key thing is where do we want to put the middle position—"

"Not to mention what we can do with the head, hands, arms or feet—"

The variations are endless—
AND WHY SHOULD WE BE STUCK WITH THE SAME SHAPE?

How about instead of raising the whole body on the pass pos - stretch it. Gives flexibility.

Let's say it's a heavier man - got a pot on him.

Or conversely squash it. Gives flexibility within the walk.

Keeping the pelvis level through.

To my knowledge, I think Art Babbitt may have been the first one to depart from the normal walk or the cliché cartoon walks. Certainly he was a great exponent of the 'invented' walk. He became famous for the eccentric walks he gave Goofy – which made Goofy into a star. He even put the feet on backwards! He made it look perfectly acceptable and people didn't realize they were backwards!

Art's whole credo was: 'Invent! Every rule in animation is there to be broken – if you have the inventiveness and curiosity to look beyond what exists.' In other words, 'Learn the rules and then learn how to break them.'

This opened up a whole Pandora's box of invention.

Art always said, 'The animation medium is very unusual. We can accomplish actions no human could possibly do. And make it look convincing!'

This eccentric passing position idea is a terrifically useful device. We can put it anywhere and where we put it has a huge effect on the action. And who says we can't put it anywhere we want? There's nothing to stop us.
For that matter, we can keep on breaking things down into weird places – provided we allow enough screen time to accommodate the movement.

Take this one for instance:

This would be pretty wild - put the down where the up would normally be and bend the leg.

Anyway, back to the normal:

2 WAYS TO PLAN A WALK

Reviewing the 'contact' method:
First we make the contact positions, then we put in the passing position (normal).

Then we put in the low and the high positions.

Pretty strange - but why not try it? People do move strangely.
I've found that this contact method is the one that gets you through – takes you home. It's especially suitable for natural actions – which is what we mostly have to do. I've found it to be the best way to do most things.

Milt Kahl worked this way. 'In a walk, or anything, I make the contact positions first – where the feet contact the ground with no weight on them yet. It's kind of a middle position for the head and body parts – neither an up or down. I know where the highs and lows are and then I break it down. Another reason I do it is because it makes a scene easy to plan.'

'I always start off with that contact because it's a dynamic, moving thing. And it's much better than starting with the weight already on the foot, which would be a very static pose!'

* Which is exactly what the second system does.

This is the way Art Babbitt often planned a walk – and it has a very cunning thing to it:

- Start off with the down positions (for want of a better term we'll call it the down position method).
- Now put in the passing position – for now, right in the middle.
- Now we've got both the up and the down covered in just 3 drawings.
- Although it's kind of awkward to get good contact positions this way –

And one of our next mid-positions will be the contact.
The cleverness of this approach is that we've already taken care of the up and down in the first three drawings. Of course, we can put the passing position up, down or sideways — anywhere we want. But having the downs already set helps us invent; it gives us a simple grid on which to get complicated, if we want.

We know it'll already have weight and so we're free to mess around and invent eccentric actions, or actions that couldn't happen in the real world.

Again, we're not stuck with one method or the other. Why not have both? Not only but also . . .

I highly recommend the contact approach for general use, but starting with the down position is very useful for unconventional invention.

From now on we'll use both approaches.

It's kind of academic, but if we take both methods...

And push them together:

Contact Method

Down Pass Method

We get all the up and down phases of a normal walk.

It's the same thing, we're just starting off one phase earlier or one phase later.
The Double Bounce

'Truckin' on down.' The double bounce walk shows energetic optimism – the North American 'can do' attitude. They used this walk like mad in the early 1930s – lots of characters (bugs and things) all trucking around doing jazzy double bounces.

The idea is 2 bounces per step. You bounce twice. You go down (or up) twice instead of once to the step.

Say it's a 16 frame step (on ones because there's a lot going on.)
We'll start with the bent leg down - spread the legs apart for clarity:

Add in the stepping foot -

So it's like this -

Conversely let's use the contact approach - start with the contacts.

Contacts + pass pos are the highs and mid positions notations.
I made this double bounce walk by combining the two approaches. I did the straight leg contacts first, but also made them the low - the down.

This is on ones - taking one step of a walk on 12's

#13 down

#1 down

The inbetweens are on thirds - unfortunately.

#13 down

Pass pos. #7 down

#1 down

13 down

#10 up

#4 up

#1 down

Contact

Contact

Contact

Contact
LOOSENING IT UP

We'll start out with this simple cliche walk - nothing fancy yet.

The arms normally will move opposite to the legs - but simply by having the shoulders opposing the legs will give it more life.

(Front view pulling 1/4 apart for clarity)

Now let's tilt the shoulders for some Vitality -

We're taking our basic plan now and adding in things to build on the system.

Now let's do something with the head to make this simple formula walk more interesting - let's tilt the head:
HOW ABOUT THIS?
LETS DELAY
THE TILT OF THE HEAD
ON THE
PASSING POSITION

LETS DO
SOMETHING ELSE
WITH THE HEAD -
STICK THE HEAD OUT
ON THE
PASSING POSITION
(GIVES A SLIGHT
PIGEON EFFECT)

OR

THE HEAD
GOES FORWARD
AND CONTINUES
AT THE
END OF THE STEP

HEAD TILTS
AS IT GOES OUT

ONE SMALL
DETAIL THATS
DIFFERENT
WILL GIVE A
WHOLE DIFFERENT
FEELING TO
THE FORMULA

PASS POS
PASS POS
PASS POS
PASS POS

BACK VIEW

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Any small detail alters a walk-like moving the head up or down—or tilting it from side to side—or moving it back and forth—or a combination of any of this.

You see this a lot with politicians, actors or people who imagine the camera is on them all the time.

Some comedians do it when they get a big audience response.

In Hollywood, I've even seen the mailman doing it.

Floating along in love with itself—'It's wonderful to be wonderful'—will work nicely with not much up and down.

When I was a kid I always wondered why animators drew heads like this—with construction lines on them.

Now I know why—they're turning masses all the time.
A CAUTIONARY NOTE FROM KEN HARRIS:

FOR WALKS, DON'T MAKE CYCLES OF BODY AND HEAD ACTION IN CIRCLES OR FIGURE 8'S - IF YOU DO IT WILL LOOK LIKE A BIRD OR PIGEON WALK (UNLESS YOU WANT THAT).

DON'T  DON'T  DO

FOR SAFETY KEEP THE MASS MOSTLY STRAIGHT UP AND DOWN.

BUT BEARING THIS IN MIND WE SHOULD STILL BE BRAVE AND TRY THINGS...

BUILDING ON OUR BASIC PLAN, WE'VE NOW ADDED IN MORE ACTION IN THE HEAD, SHOULDERS, ARMS, HIPS AND FEET:

NOW LET'S BEND THE BODY ON THE EXTREMES

KEEP STRAIGHT ON THE PASSING POSITION

AND NOW WE'RE GOING TO DO THINGS TO THE LEGS AND ARMS THAT LOOKS WEIRD.
We're going to 'break' the leg.
We're going to bend it whether it would bend that way or not.

Of course the bones remain the same length.
The only time it changes is when it's foreshortened in perspective.

We've taken a hammer and 'broken' the joint.

Bending it the 'wrong' way.

It looks weird enough, but if we draw a ballet dancer on top of it, it looks just fine.

So we can take incredible liberties with the underlying structure (if we want to) and it will be perfectly acceptable - especially in motion!

We're doing what Art Babbitt calls 'breaking' the joint.

We're going to have a lot more of this later.
WHY ARE WE DOING THIS?
EVERYTHING WE'RE DOING IS TO GET MORE CHANGE, MORE ACTION WITHIN
THE ACTION.
TO LUMBER THINGS UP - GET MORE LIFE INTO IT.

Grim Natwick said:
'We used to bet ten dollars against ten cents that you could take any character and walk it
across the room and get a laugh out of it.

'We used to have about twenty-four different walks. We'd have a certain action on the body, a
certain motion on the head, a certain kind of patter walk, a big step or the "Goofy" walk that
Art Babbitt developed.

'While the opposite arm naturally moves with the opposite leg, we'd break the rules eight or
ten different ways to make the walk interesting.'

WE'RE TAKING OUR BASIC PLAN NOW AND ADDING IN THINGS TO BUILD UPON THE SYSTEM:
SAY WE HAVE A KIND OF ANGRY WALK - WE'D NORMALLY DO THIS:

BUT LOOK WHAT HAPPENS WHEN WE DO JUST 2 THINGS:

PUT HIM DOWN
ON THE PASSING POSITION
MAKING HIS
BACK CONVEX
-- AND DO THIS
WITH THE ARM
"BREAKING"
THE ELECW.

UP ON
THE PASS'
POS

WILL GIVING
FASTER THEN
HERE

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LET'S TAKE THIS ANGRY WALK MUCH FURTHER -
THIS IS THE KIND OF THING ARE BEATRIX DID ALL HIS LIFE - MAKING IMPOSSIBLE MOVES LOOK
CONVINCING AND BELIEVABLE. HE'D SAY, "BE A LITTLE BIT TRUTHFUL"

SO IT DOESN'T JUST LOOK LIKE ONE STEP REPEATING, WE SLIGHTLY CHANGE THE SILHOUETTE
ON THE 2ND CONTACT (#15) SO THE COUNTER ARM POSITIONS ARE DIFFERENT FROM CONTACT #1.
ON THE CONTACT THE BACK LEG IS 'BROKEN' AND THE FOOT SWIVELS BACKWARDS.
HE'S ON TWOS - EACH STEP TAKING 14 FRAMES.

Breaking the first step down further:

1  2  5  PASS POS.  9  11  13  16

(Just an illusion)  Hand 'breaks'  Arm 'breaks'  Arm still broken  Foot swivels back.  Butt is at its highest.  Back arch reverses.  Foot swivels faces away from US.  Both hags go straight  Butt falls as he contacts ground.  Body twists arm from leg.  Clearest foot is on backwards.

Now the opposite step:

16  17  19  PASS POS.  21  23  25  27  BACK TO #1

The arm swing doesn't "break" - and the foot swivels back farther. - THE REST OF THE PATTERN IS THE SAME.
Incidentally, on a profile walk it helps to have one foot a little in front and angled sideways a bit. (I've been keeping things very diagrammatic till now.)

Let's keep taking things out of the ordinary - why not a simple reversal of the up and down of a normal walk?

Still keeping to our 3 main positions -

This is fine but a bit ordinary.

Go let's try swinging the knee in on the passing position.

Foot flops.
DIGGING DEEPER INTO WALKS

Here's a kind of strut.

Let's bend the bodies outwards on the extremes - heads, shoulders, hips tilted. Put the passing position down and swing the leg inwards and 'break' the support leg - kind of knock-kneed -

This'll give an interesting result.

Now let's take the same extremes and put the passing position up and we'll straighten the support leg to lift him up and swing the passing leg inwards as previously.

But make the next breakdown down (as normal) with the leg angling outwards and the other breakdown just coming forwards (the body just in between) - except for the leg.

Gives a very different result.
We can go on forever this way, altering bits and switching things around on our basic drawing plan.

How about this? Keep the same 2 starting extremes but use the bent legs position. Put the passing position up.

How about one like this? Start with knock knees - (broken jointed legs)

What we're trying to put over here is a way of thinking about it - a simple grid on which to build quite normal walks - or wildly eccentric ones - and all that lies between.
Here's a kind of feminine walk on the same basic figure.

The shoulders do not oppose the hips.

The variations are endless...

Tilt shoulders and head on pass pos.

And imagine what we can get up to when we stop treating the body like a block.

Even if the actions are impossible (broken joints, etc.) to do, it's a good idea to act out all the business to see whether it will fit into the time allotted. Discard all modesty and act it out.

When I asked Milt Kahl about a marvellous female walk he'd animated, he said: 'I closed the door, but if you'd seen me doing it you'd have wanted to kiss me.'
Let's try this one:

Let's simply change the tilt of the body on the passing position.

But keep the head level.

Delay foot.

Again, it's all in the timing and in the spacing and the variations are endless.

We'd get something like this:

Make the passing position down but alter the heft like this:

Pulled apart—add in #5 as in between but make #4 the high 2nd keep its foot flat.

Let's try this one—
And we shouldn't be afraid to take liberties and distort things—especially for fast action.

(on ones)
I'm including this basketball figure I animated - just to show how far we can go (it worked fine.)
CONCLUSION:
WE CAN TAKE GREAT LIBERTIES
WITH FAST ACTIONS -- EVEN
WITH REALISTIC FIGURES.
IT'S OBVIOUS THAT FOR REALLY
FAST ACTIONS YOU HAVE TO
MAKE EVERY DRAWING --
AN ASSISTANT (FOR THIS) MIGHT
BE A HELP SHADING MUSCLES
OR STRIPES BUT NOT MUCH ELSE.
MILT KAHN
"IF IT'S FAST ACTION
I MAKE EVERY DRAWING!"
There's nothing like trying it.

Innumerable possibilities exist.
We're not copying life, we're making a comment on it.
And if we make a mistake, who cares? It's just a test. Make the corrections and test again. Half the time we'll fall on our face(s) - but the other half of the time it'll work and be new.

Here's a rule breaker -

(A bow-legged person)

Break it down further, adding in 5 and 13 like this -

Spread out so it's clearer -

And we haven't done anything with the head or arms. Maybe with such action on the feet we should keep the arms and head very conservative - maybe, maybe not. This will work on twos - but be better with ones added because of the broad spacing.
BACK TO NORMALCY FOR A BIT-

THE HEEL

THE HEEL IS THE LEAD PART.
The foot is secondary and follows along,
the heel leads and the actual foot drags behind
and flops forward - but the heel controls it.

FOR WALKS AND RUNS-

LOCK THE HEEL FLAT ON THE GROUND FOR THE FEELING OF WEIGHT.
KEEP THE FOOT BACK TILL THE LAST POSSIBLE MOMENT.

AND RELUCTANTLY LEAVES THE GROUND

AND

DRAG

DRAG

DRAG

FLOP

FLOP

PANTS CATCHES UP
GIVES AN ADDITIONAL BIT OF LIFE

FOOT ACTION

Let's review
the passing leg in a normal walk -
starting with the contact,
(say it's on 8's)

SPREAD OUT-

1 3 5 7 9

MID WAY PELVIS DOWN TILL LOW MID WAY
PASS POS. SLIGHTLY UP TILL HIGH MID WAY

THIS IS THE PATTERN OF A NORMAL STEP STARTING FROM THE CONTACT POSITION - DOES THE JOB FOR MOST THINGS...
But let's start with the 2 downs -

As Milt says,
it's kind of a static position -

But with the passing position up we've taken care of our ups and downs.

Now we don't have to think about the ups and downs and we can concentrate on doing things with the feet.

This time make both feet flat.

Push it all together as it would be to take a normal step.

Then add in straight in between and we get a pathetic approach to a walk - weak, boring...

Now start with the exact same thing.

But alter the next two breakdowns - 3 and 7 = more change, more vitality.

Delay the toe leaving the ground.

Lift the foot higher with a different foot angle.

Add in straight in between (bearing in mind that the heel ends and the foot follows and watch the arcs!)

It's obvious we've got more life in it now.
Now let's make it more sprightly.

Make #3 straight as it pushes off.

And make #7 straight as it contacts the ground.

Now we've got some changes!
Bent to straight
- to bent
- to straight
- to bent.

Although so far this isn't really very different than we'd end up with if we'd started from our contact method.

Anyway - add in straight in between.
Except keep the foot sole flat on #2, and have the foot on #6 flat like #9.

Delay foot on #2
Delay foot on #8

We've got change and vitality -
The leg and foot pass fast through the middle and cluster at the beginning and end of the step.

Now we'll find method in the madness -
Here's what Art Babbit might do -
Start with the same 3 basic positions but put #1's foot on backwards.

Leave the passing position as is, but delay the foot on #3 and make the foot on #7 backwards again.
NOW ADD IN 2, 4, 6 and 8
2 AND 8 ARE ALSO ECCENTRIC

MAKE #2 STRAIGHT AND DON'T MOVE THE FOOT

#4 IS JUST IN BETWEEN

#6 IS AN HEEL BETWEEN BUT THE HEEL LEADS THE ARC

MAKE #8 STRAIGHT, AND THE HEEL CONTACTS

THIS WAY OF WORKING AND THINKING IS THE BASIS OF THE KIND OF THING ART DID WITH HIS 'GOOFY' WALKS. IT HAD A TERRIFIC INFLUENCE ON ANIMATORS.

ART ALWAYS SAID,
'WHEN WE'VE GOT AN OPPORTUNITY TO INVENT — CERTAINLY WE'VE GOT THE RIGHT MEDIUM FOR IT.
THAT'S WHAT SEPARATES US FROM LIVE ACTION — WE CAN INVENT.'

NORMALLY A FOOT PICKS UP SLOWLY
THEN TRAVELS QUICKLY THROUGH THE MIDDLE
AND PUTS DOWN FAST.

WHY NOT REVERSE IT?

HAVE THE FOOT PICK UP FAST (1 TO 5)
PASSE THROUGH THE MIDDLE NORMALLY (5 TO 11)
AND HAVE A SLOW PUT DOWN (11 TO 15)

AND THIS IS EXACTLY WHAT THE LIVE ACTION MIME ON THE NEXT 2 PAGES IS DOING—
HER STARTING STEP TAKES 12 FRAMES — HER FOLLOWING STEP TAKES 19 FRAMES.
AND IF SHE CAN DO ALL THIS "LIVE" HOW MUCH FURTHER SHOULD WE BE ABLE TO GO IN ANIMATION!
NORMAL WALK SPACING

We haven't yet quite shown the spacing and cushioning on a normal walk. Here's a formula spacing for the conventional walk on 12's. (Spread apart)

Contact Down Pass pos. Going up Fully up Contact

We speed thru the contact and cushion into the down & edge out of the down and speed thru the pass pos. #7 and cushion into and out of the high #10

It looks a bit odd spread out like this but it works fine when compressed as it would be.

An 8 frame walk uses exactly the same drawings with just single in between.
BACK TO INVENTION -

WHAT ABOUT STARTING WITH THE DOWN POSITION AND TAKING IT DOWN FURTHER? KIND OF A GROUCHO MARX WALK.

NOW LET'S START TO TWIST THINGS -

START WITH THE FEET KIND OF ON BACKWARDS.

FEET TWISTS AWAY.

FOOT LANDS TWISTED IN THE WRONG DIRECTION.

VARIATION ON THE SAME SOKI OF THING -

PUNCH FOR GROUND THIS WAY.
Let's keep fooling with how the foot goes down:

Down

UP

Down

UP

KNEE

KNEE

OR THIS FOR THE OTHER FOOT:

UP

Down

UP

KNEE

KNEE

Walking backwards with the feet on backwards:

Standing foot swivels

No human could do it but it works convincingly.
Again, we can invent what doesn't take place in the real world. Art Babbit said, "A good dancer invents. It's not natural for a person to leap into the air - do scissors with their feet and then land on their toes. We can do anything we want as long as we make it 'work' - make it look believable."

Let's walk a dancer 'on point' - on toes.
WEIGHT SHIFT

The weight shifts from one foot to another in a normal stride. Each time we raise a foot it thrusts the weight of our body forward and to the side over the other foot, and the shoulders mostly oppose the hips and buttocks.

Contact The Down Pass POS. Up Contact The Down Pass POS. Up Contact

Plants the Foot

And takes the weight to the side over the foot

Straightens - But the lifted passing leg causes the weight to drop on its side

Plans the Foot

And takes the weight to the side over that foot

Straightens - But the lifted passing leg causes the weight to drop on its side

Here's an exaggerated weight shift formula:

(Not so much shift for runs)

Contact Pass POS. Contact Pass POS. Contact

Weight over his left foot

Weight over his right foot

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THE BELT LINE

TILT THE BELT LINE BACK AND FORTH favouring the leg that is lowest.

Normally the belt line is down with the foot that is down and up with the foot that is up.

AND

NORMALLY
THE SHOULDER OPPOSES
THE PELVIS
(BUT WE CAN DO WHAT WE LIKE)
**ARM MOVEMENTS**

While the shoulder rises up in the passing position, the hand is at the lowest part of the arc.

The wrist maintains the arc.

As they swing to balance, the thrust of the walk, the arms will tend to be in a wavelike pendulum-like movement.

With the leg, the knee maintains the arc.

Most actions follow arcs, generally an action is in an arc.

Most of the time, the path of action is either an arc or a sort of figure 8, but sometimes angular or straight.

And just to make life difficult, we should remember that 'normal' to the government — issue walk — the arm swing is at its widest on the down position, not on the contact position.

Down | Puck Pos | Up

- Widest point of swing

But of course we're not stuck with this.
ARM MOVEMENTS CAN BE BROAD OR PRACTICALLY NON-EXISTANT.

TO GET MORE FLEXIBILITY BRING THIS HAND ALL THE WAY ROUND.

AND THIS HAND ALL THE WAY BACK.

TAKE THE FEET OFF THE PARALLEL.
TWIST THE FEET AND TWIST THE HANDS.

NOT IN PROFILE.

DON'T MOVE THE HANDS MUCH.

MAYBE JUST FROM HERE TO HERE.

HOW ABOUT THE ARMS UP LIKE THIS ON AN UP PASSING POSITION.
AND DOWN ON THE EXTREMES.

OR SAME THING WITH A DOWN PASSING POSITION.
HOW ABOUT HAVING THE ARMS RIGHT UP ON THE EXTREMES AND THE ARMS RIGHT DOWN ON THE PASSING POSITION WHICH IS ALSO DOWN.

HERE'S A JAUNTY WALK DOING JUST THAT - AND A LOT OF THE THINGS WE'VE BEEN TALKING ABOUT: BELT LINE, SHOULDERS OPPOSE HIPS - TILTING AND DELAYING HEAD, TWISTING FEET - REVERSING BODY.
To get some flexibility in an arm swing, we'd drag the hand—

The wrist maintains the arc.

And this will give us a nice little overlap of the hands at each end of the swing—

Going this way

And coming back

And we can get a bit more flexibility into it by dropping the shoulder on the pass position—making a deeper arc.

Drop shoulder on pass pos.

But here's the secret—

When we go forward we'll 'break' (bend) the elbow joint whether it looks right or wrong and whether it would bend that way or not.

And when we come back, we'll 'break' (bend) it again—although going this way it looks quite normal—

A natural 'break' or end.
SO, FOR GREATER FLEXIBILITY—

BY BREAKING THE JOINT

WE CAN GET LIMBER MOVEMENT FROM STRAIGHT LINES.
WE WON'T HAVE TO DRAW IN A RUBBERY CARTOONISH WAY TO BE LIMBER.

LET'S MAKE THIS REALLY CLEAR — AS WE'RE GOING TO HAVE A LOT OF THIS...

BUT WON'T IT LOOK STRANGE? NOT ON THE SCREEN... WHEN INBETWEENED IT PROBABLY
GOING TO BE FOR 4 FRAMES OR SO, 1/6 OF A SECOND. TOO QUICK TO 'READ.' BUT WE'LL FEEL
IT—WELL FEEL THE INCREASED FLEXIBILITY — INCREASED 'CHANGE.'

SOMEONE ASKED FRED ASTAIRE HOW ON EARTH HE
COULD DANCE AND MOVE LIKE THAT — AND HE SAID,
'OH, I JUST START BY PUTTING BOTH FEET IN THE AIR.'

BUT IF YOU ANALYSE FRED ASTAIRE FRAME BY FRAME
YOU'LL SEE THAT HE'S BREAKING JOINTS ALL THE TIME
ALL OVER THE PLACE.

Sensing this,
THEY PERCEPTUALLY CALLED HIM 'THE HUMAN MICKEY MOUSE.'
Here's an adaptation of a superbly animated flamboyant arm swing — breaking the joints like mad —

Breaking the joints (or whatever you want to call it) is second nature to the experts.

Oh, you have to do that! Everybody knows that.
I find that once the drawings are even remotely interesting - it's harder to see past any charm or style and see the structure of the underlying movement clearly. Even adding an eyeball seems to create character and throw one off the chase for the structure. And it's the structure we're after here, acting and pretty drawings or designs can come later.

We can alter the timing of an arm swing - say we make the arms swing slower than the feet...

We animate the walk on 8's - taking 4 steps (pulled apart)

Now we'll add the arms but we'll put them on 16's - so with the feet on 8's and the arms on 16's, the arm swing takes twice as long as the feet.

The arm extremes are on the same drawings as the feet but on #17, the arms 'twin' unnaturally on the same side as the feet.

This sort of thing is very effective on a run!
Now let's do the converse-
We'll have the arms pumping away twice as fast as the legs.
We'll make the walk on 16's and work the arms on 8's.
Take one step - (spread far apart for clarity)
We'll need more inbetweens to show this.

Now add the arms-
The extreme positions are on 1, 9, and 17.

This needs single inbetweens - must be on ones because of so much arm action in a short space of time. (This won't work on a run for the same reason)
COUNTERACTION

EXAGGERATED COUNTERACTION - AS IN A FAT MAN'S WALK

The stomach mass moves up as the body mass moves down.

When the character goes up, the drapery or hair or soft bits go down.

Again, exaggerating - buttocks and breasts and hair counter to body ups and downs.

But restrain these actions just give some movement.
As we near the end of these walks, let's look at what the end is doing...

Take a woman walking...

The buttocks move in the direction of the forward foot.

The buttocks would normally be centered on the passing positions but delay them.

The movement of the drapery momentarily opposes the hips. When the hips move, the drapery moves the other way.

Skirt billows later.

Again, we're showing these things in exaggerated form. It's according to taste how broadly or how subtly we use these devices...

And remembering that women tend to walk on a straight line - 'tightrope walking.'

When foot crosses over = more feminine walk.

'Normally.'

Fashion models cross right over.

As do strippers.

And ballerinas.

On 12's:

1 4 7 10 13 16 19 22 25
HERE'S A FORMULA FOR A BOUNCY WALK - ON 8's

THE REST ARE STRAIGHT INBETWEENNS

IN THE 50's WHEN THEY SWUNG RIGHT AWAY FROM 'NATURALISM' THEY INVENTED SOME CHARMING WALKS - ESPECIALLY WITH CHILDREN. THEY OFTEN DID THIS - THE CHARACTER WOULD TAKE A STEP, THEN POP UP IN THE AIR FOR 4 TO 6 FRAMES OR SO, THEN CLICK DOWN AGAIN, AND TAKE ANOTHER STEP.

THE CHARM OF THIS IS ITS 'STYLISED STIFFNESS'. INVENTIVE THOUGH IT IS, IT'S HARD TO EXTEND ON THIS APPROACH. IF WE DON'T STRETCH AND OVERLAP AND DELAY PARTS, THINGS JUST LOOK LIKE A PIECE OF PAPERBOARD OR A PAPPE CUT-OUT MOVING AROUND.
Here's a boxer's walk with the head floating level and the butt and pelvis actively moving up and down and from side to side as the main feature. The butt action gives it the weight. But just to complicate things we've made the extremes with what would normally be our passing position — and the 'contact' is now the passing position. Of course there are no rules. We can build from any point.

Now we make another extreme here with the butt at its highest.

Then we make another extreme here with the butt at its lowest and the arms at their widest.

Now that we have the highs and lows we join it all up and efficiently get the result we want.
HERE'S A TECHNICAL AID FOR PLANNING A WALK IN PERSPECTIVE (IF WE WANT TO BE TECHNICAL ABOUT IT)

1. Draw 2 lines - one along the top of the posts - the other along the bottom. Both meet at the vanishing point.

2. Then draw another line (blue) halfway between.

3. Now draw a line from the top of the first post going through the centre of the second post to the lower line.

4. Now we know where to put the third post — and all the rest.

5. Add in our figure making all the right foot contact. Then put in the left foot contacts. Then add passing positions etc. The usual routine...
HAVING GONE THROUGH ALL THIS WALK BUILDING AND FORMULAS, ETC. WE END UP AT THE MAIN ISSUE = NO TWO CHARACTERS WALK THE SAME. ALL WE CAN DO IS GENERALIZE:

**A SPINDLY GIRL WALKS LIKE THIS**

**AND AN OLDER WOMAN MIGHT LOOK LIKE THIS**

**IF PREGNANT, LIKE THIS—MOTHER’S PRIDE AND VERY CAREFUL.**

**A FAT MAN LEANS BACK SIMILARLY, GUIDES DELICATELY LIKE A DANCER.**

**SHE’S BALANCING THE WEIGHT—SO’S HE. THE WEIGHT HAS TO BALANCE—EXCEPT FOR THE BRIEF INSTANT WHEN WE STEP OURSELVES FALLING OVER—WE REGAIN OUR BALANCE.**

**ANGRY WALK—ALWAYS HIT FOOT THROUGH AND DOWN FAST!**

**SAILORS WALK—WHOLE BODY ROCKS SIDE TO SIDE—(NICE TO DELAY HEAD)**

**CHILDREN WALK—OVEREXAGGERATED FOOT ACTION—LEFT LEG HIGHER THAN ADULTS.**

**BABIES ARE CONSTANTLY OFF BALANCE.**

**FLIPS SPREAD APART.**
Timing is so important in walks. Ken Harris said, "Base walks on 12's - (as did Milt Kahl) And everything is just so much faster or is so much slower than 12."

Again, it's not just how they look - it's how is the person feeling?

- Sad
- Lonely
- Happy
- Thoughtful
- Drunk
- Sprightly
- Old
- Young
- Addled
- Surprised
- Hopeful
- Confident
- Empathetic
- Conceited
- Nervous
- Ill
- Angry
- Lame
- Inhibited
- Militaristic
- Depressed
- Joyous
- Shy...

Take a drunk for example - there are so many different kinds -

- The Silly Drunk
- The Lascivious Drunk
- The Self-Pitying Drunk
- The Expansive, Happy Drunk
- The Out-Of-Control Athletic Drunk
- The Overly Graceful Polite Drunk
- The Very Dignified Drunk
- The Vicar (I saw a vicar walk into a wall)
- The Inhibited Society Matron
- The Fighting Drunk
- The Sentimentalist
- The First Time Drunk
- Etc., Etc.,
TO SUM UP:

WAYS TO GET VITALITY IN A WALK

THE RECIPE

1. LEAN THE BODY
2. USE STRAIGHT LEGS ON CONTACTS AND PUSH OFF POSITIONS (GOING FROM STRAIGHT TO BENT OR BENT TO STRAIGHT)
3. TWIST THE BODY — TILT THE SHOULDERS AND HIPS; HAVE THE SHOULDERS OPPOSE THE HIPS; SWIVEL THE HIPS
4. FLOP THE KNEE IN OR OUT
5. TILT THE BELT LINE FAVOURING THE LEG THAT'S LOWEST
6. FLOP THE FEET
7. DELAY THE FEET AND TOE LEAVING THE GROUND UNTIL THE VERY LAST INSTANT
8. TIP THE HEAD OR MAKE IT GO BACK AND FORTH
9. DELAY PARTS: DON'T HAVE EVERYTHING WORKING TOGETHER AT THE SAME TIME
10. USE COUNTERACTION — FAT, BUTTOCKS, BREASTS, DELAYED CLOTHES, PANT LEGS, HAIR ETC.
11. BREAK THE JOINTS
12. MORE UPS AND DOWNS (FOR WEIGHT)
13. USE DIFFERENT TIMINGS ON LEGS VERSUS ARMS VERSUS HEAD VERSUS BODY ETC.
14. TWIST THE FEET — TAKE THEM OFF THE PARALLEL
15. IF WE TAKE A NORMAL CLICHÉD ACTION AND ALTER ONLY ONE TINY PART — WE GET SOMETHING DIFFERENT!
I Want to close off on walks with this example of a "Milt Kahl type' Strut.

In his career he animated many energetic, superelectric 'can do' walks. I've adapted
and simplified several of these into a composite one (using a generic figure - not a character) - a maquette to show the work process of a master. It's certainly not to provide yet
another formula, but as an insight into how a master works and thinks - how he starts
on a simple basis with the contacts and loads it with depth and interest as he builds.
And it's full of the stuff we've been talking about.

First he makes
the contacts -
(We'll take 2 steps)
- on 12's

Right away
there's lots of
vitality
in the contact
positions

Let's spread it out
so it's nice and clear.

1

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Head side on

Shoulders opposite hips

Belt line bends down with lowest leg

Feebly twist and are off the parallel.

Back arm is down

Head slightly left

Front arm is up

Body twists sideways

And twists back
THE PASSING POSITIONS GO IN NEXT:

DASH PS

HEAD TILTS FORWARD

SHOULDER ANGLE INCREASES AND INVERSES

BROKEN JOINT

PHS PS

HEAD TURNS TOWARDS US

SHOULDER ANGLES INCREASES AND INVERSES

BROKEN JOINT

(THESE WOULD ALREADY MAKE A GREAT WALK AS IT IS - WITHOUT ADDING IN MORE HIGHS OR LOWS!)

NOW WE'LL ADD IN THE LOWS - THE DOWN POSITIONS.

DOWN

DELAY ARM AND DRAG HAND

DELAY ARM AND DRAG HAND

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NOW WE'LL PUT IN THE UP POSITIONS -

THEN ADD IN THE IN BETWEEN'S ON THIRDS

AND YOU CAN BET THEY'RE GOING TO BE THOUGHTFUL IN BETWEENS - NOT MECHANICAL ONES. EXAMPLE:

WITH THE LAST 2 IN BETWINS THE RIGHT LEG IS NOT JUST IN BETWEENED. THE REST IS.

NOW THE WHOLE THING IS PACKED WITH VITALITY AND 'CHANGE!"

"SOPHISTICATED USE OF THE BASICS."

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SNEAKS

There are 3 definite categories of Sneaks:

1. The Traditional Sneak
2. The Backwards Sneak
3. The Tip Toe Sneak

A Traditional Sneak has a very interesting construction, the main things are:

A. The Body goes back and forth, the Body goes back when the foot goes up, the arms are used for balance.

B. When the foot reaches and contacts the ground, the body is still back and the head is held back, delayed just a little bit.

C. After the foot contacts the ground, the body follows - going forward as the foot takes the weight. Next the body will go back (as in A) as the other foot goes forward.

As with a walk there are 3 important drawings - the 2 contacts and a very interesting passing position.
Ken Harris showed us this formula for a slow sneak:

It takes 2 feet = 32 frames = 1 1/2 seconds for each step.
On two's — (but of course it'll be even better adding in between on ones)

The arms don't oppose the legs - they just balance.
Generally very little action in the arms and hands.

Animate the feet with even spacing.

Body

Head

Feet

Even

It's a good example of counteraction -
As he moves along, the head goes forward and the hands go back.
This is the basis. It will work nicely just in between the 3 positions as is -
and NOT adding any fancy bits of inner action.

Of course we can add anything we want within - but this does the job
with just 3 drawings and the charts.
We could use arcs or just straight mechanical in between. It'll work well.

If the hands were open it would look frightened.
But of course, we could delay parts—

Crosswise, head back and looking down

Head is still going back on start position

Head continues forward

Could stay fully on the toes all the time to enhance the feeling of caution—

Try it on front view—
Waistline shows what's happening—

What about a 3/4 view?

In 3/4 view we hit drawing problems—perspective, volumes, etc., which is why lot of animators stay in profile—
(It's a good idea to plan it first in profile.)
Here's an adaptation of a billtyla sneak.

There are 4 planning drawings. It's on 36 frames = 1 1/2 seconds per step.

Funny, soon as we give it an eye, it somehow creates personality - becomes entertaining or attractive 'nd we stop paying attention to the 'anatomy' of what's happening.

Charlie Chaplin says, 'Personality transcends everything else.'

Spread apart.

As in a walk.
The arms - wings do counter.
The feet here.

There are all numbers he had on his drawings so I'm making a guess at what his charts were -

But look how clever this man is! Look at his changes of shape!
The amount of change! This is what he's really doing -

- Going from curve to opposite curve to straight to curved to opposite etc.
After Art Babbitt finished his first month of intensive training at my London Studio, four of us sat up all night and animated a quick satire for him of his seminars.

I did this horse sneak as an exercise in "over-animation" which came out kind of funny — shows how far we can go — sitting right on the basics. (on twos)

Sneaking on 12.5
2nd 14's

Keep me just the extremes and the mid-positions — the extremes for clarity.
Here's a more conservative sneak on 24's - I see for each step it's typical of Ken - not a lot of fancy stuff but does the job perfectly.

And spread apart -

Note the foot springs fast through the middle and puts down gingerly.

The body goes back as the foot takes the weight.

Then the body goes forward again as the foot reaches back.

Backwards sneak:

Roughly the same pattern as a forwards sneak - but backwards.

The arms could oppose the legs as in a walk.

For body goes forward as the foot reaches back.
The TIP TOE SNEAK

It's something between a walk and a run and a sneak.

The feet work up and down like pistons - has to be on ones.
Can be as quick as 4's = 6 steps per sec.
Or on 6's, 8's, 10's.
12's, 14's, whatever.
But it's more suitable for fast timing.

Here's the well-known formula for the short-legged creature (canes)

```
1 2 3 4 5 6 7 8
```

Extremes of the up
I'm in Pass pos. The down
Contact Extremes of the up
I'm in Pass pos.
The down
Contact Extremes of the up

But with a taller figure with long legs we've got the familiar problem of too much action in too short a space of time.
The feet tend to 'flick' down with the top leg, just looking like it's hanging there.

So to get around this we take a bit longer for the action.
- Plus we can twist the pelvis
- Plus we can vary the cycle positions.

We can change the silhouettes slightly on all phases of each step - lower the knee etc.
Here's one that works - (On 5's = 5 steps per sec.) He's up in the air for just one drawing.

1. Spread out - Extreme
   2
   3
   4. Pass pos
   5
   6. Extreme

1st step

Here's another version that works - (On 6's = 4 steps per sec.) He's up in the air for two drawings.

7. Extreme
   6
   5. Pass pos - High
   4
   3
   2. Extreme
   1st step

Back to 1

8. Extreme
   7
   10. High
   9
   8
   7. Extreme

2nd step

Contact

Head
WE CAN GET SOME COUNTERACTION GOING ON A FAST SNEAK (THIS IS EXAGGERATED)

CONTACT  THE DOWN  PASS POS  THE UP  CONTACT

A  B  C  D  E

KEEPING A SLIGHTLY DIFFERENT PROFILE FROM A

- AND THE COUNTER STEP -

CONTACT  THE DOWN  PASS POS  THE UP  CONTACT

F  G  H  BACK TO A

BELLY DELAYED  ALSO A SLIGHTLY DIFFERENT PROFILE FROM C

BOTH STEPS
EXTREME  PASS POS  EXTREME  PASS POS  EXTREME

A  B  C  D  E  F  G  H  BACK TO A

(ANYWAY, THIS IS THE IDEA - WHICH CAN APPLY IN A REDUCED WAY TO A LESS CARICATURED ACTION AND FIGURE.)