The State of the Animation Industry

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Panelists
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A few years have passed since the great depression of computer graphics animation companies. New companies formed, a few survived, and the industry seems to be back on its feet. What have we learned from our experience? What will the future bring?

Panelists discuss their company's direction, current projects, their goals and views of the future.

Carl Rosendahl
My name is Carl Rosendahl, I'm President of Pacific Data Images and I'm also the Chair for this morning's panel, The State of the Animation Industry. What I'm going to do is give a quick overview of why we are here and then we are each going to get up and talk for ten or fifteen minutes, a few people have brought some work to show, and then we'll open it up for questions and answers.

With me today on the panel are, myself, Charlie Gibson from Rhythm & Hues, Ralph Guggenheim from Pixar, Pascal Bap from ExMachina in Paris, and Michael Wahrman from deGraf/Wahrman. They will each be giving their own introductions as to why they are special within those companies.

This whole industry, for those of you who follow it, has gone through some pretty amazing changes in the past decade plus a few years. Really, computer graphics started being applied to the entertainment industry for television, films, etc. in the late '70s. It's taken off and really seems to be a booming industry, with the exception of all those years in the mid to late '80s, when everyone went out of business.

Things are actually looking good again, and that's going to be one of the topics this afternoon. Around 1987, the majority of companies who where in this industry went out of business, for a variety of reasons. At that point, there is a fellow named Robi Roncarelli, who publishes a newsletter that follows this industry pretty closely, and he does a survey every year of the dollar volume of production. Just before the big bust, there was about $86,000,000 worth of revenue being generated from what Robi classifies as the development companies worldwide. Development really meaning it's a company that specializes in production and writes all their own software. And I think all of us write at least the majority of our own software. And this is a subgroup of companies that exist today, within that class. Anyway, worldwide in 1987, Robi estimated there was about $86,000,000 dollars in revenue, and that had been climbing over the prior four years. The year after that, it dropped down to under 50, and he estimated that last year was back up around 70-75 million.

I would say at this point, we are now, industry-wise, back up even to where we were in 1987. So, it's kind of taken us this long to get caught up. There are a lot of similarities now, between now and 1987. One is, obviously, the dollar volume like I mentioned, next is types of projects that we are doing.

There's a lot of broadcast graphics being done, as there was earlier. Commercials, finally, are starting to take off again. When you turn on the television now, you'll see a lot of computer animated commercials. 1988/89 were pretty slow for that time, and my thinking as to why that happened, this is purely opinion, is that the

two companies that did the majority of that work were Bob Able & Associates and Digital Productions. When they went under, there were two ramifications to that for commercials. One was, there were a lot of advertisers who got burned and really didn't ever want to see computer animation again. And also, suddenly there was no one out there marketing to that segment. The few of us who remained really weren't large enough to be doing a serious marketing effort to those people. So, not only didn't they want to see us, we weren't there saying "pay attention" anymore. As we've all grown and become better and a little slicker in our marketing techniques, we're back there being obnoxious.

Also the size of the companies and the position they're in is kind of back up to were it was. There's currently about a dozen companies in the US that are developmental companies, they're fairly large again, in the thirties or forties of people. And so that all looks pretty much the same as it was a few years ago, we've caught back up.

There are a lot of differences now, though. We all get the advantage of cheaper, faster technology. None of us own Crays. Generally the approach now is a large number of smaller machines, all networked together. We're doing much more significant imagery. Obviously, the things we are generating today don't look as much like computer graphics as they used to. The reason a lot of people are using computer graphics, I think, is because we can present solutions to problems, rather than being faddish like it was. I think also, I hope, that we're all better situated for survival in the future.

So that's kind of the overview of where we are right now. And what we are each going to address is where our individual companies are, and a little bit of personal ideas of where we think it is all going. So at this point, I'm going to talk about PDI.

We're ten years old this year, being one of the companies that survived all that. (applause) Thank you. I can't believe it. I'm only eighteen. We started out doing primarily broadcast graphics. And about four or five years ago we decided, where we really wanted to be was doing long format projects, doing a lot of character animation and doing large things — be it for features, be it for television programs instead of the graphics in commercials that go in between them. What we said is "Well, gee, broadcast graphics are great, and we want to keep doing them, but they're all very short, typically about ten seconds long, they have huge budgets, and they don't use any characters. And what we want to do is typically very long, with relatively low budgets, per second or per minute, but a lot of character stuff and I guess the only similarity is that we want to use computers to do both of those."

What we decided is, we needed a way to jump that gap. And we decided that advertising commercials was really a good way to bridge that. The budgets were still fairly high, the projects were still short, but the imagery was much more challenging for the direction that we wanted to go. We felt we could start doing a lot of character animation and a lot of very complex imagery. And indeed, that's worked out very well, and having done those projects has created a lot of opportunities for us in longer format projects. Our goal right now is really to get into doing a lot of longer format stuff and we're starting to do that. You saw in the film show that we did a few minutes for a film called Solar Crisis. We're doing quite a bit of work now for some theme park projects.

One thing that we found is that for us, we're based in Sunnyvale, which is in Northern California, and we found that we were missing a lot of opportunities, simply because we weren't in Los Angeles, where all the motion picture, television, and theme park work was originating from. And we were not even getting the opportunity to bid on projects, simply because we weren't in town. So we decided about eight months ago or so, that we were going to open up an office in Los Angeles, which we did do. It's been open for about a month now. We're still figuring out exactly how it works. But just knowing that we were going to open that, started opening a lot of doors. And we're getting opportunities to bid on some pretty great projects now. And we're getting some fun stuff to do.

We also decided, when we did that, actually one of the things that pushed us to doing that, is when we were working on Solar Crisis with Boss Film, that one of the contingencies for us working on that was that it had to be produced in Los Angeles. And actually, if we could work even more closely with Boss that would be even better. So, we rented a trailer and put it in their parking lot, and filled it with Silicon Graphics computers and a team of very talented people, and did all the work in a ten foot by forty foot construction trailer, all the way from the modelling through the final film output, all done in the one little four hundred square foot space. But it was great, because we were right in their parking lot, we were there for all the daily screenings, we were right next to their model shop, because we had to build computer models that looked a lot like the physical models that they were building for other parts of the film. And we could just walk in and see it. And we really ended up being incorporated as a part of the entire production team.

Not being dummies, and seeing the advantage of this, we coined this "Animation on Location." And we're making it also a big part of what we're doing in LA, by telling people that not only are we here and we can produce it in the facility that

we have at Raleigh Studios, but also, if necessary, we can set up the whole production or a part of it, right where you are. And that's a lot of the way Hollywood works. When a film goes into production, they hire a lot of people, they come in, and a lot of them work out of trailers. And then when the production is done, everyone packs up and goes home. So we're trying to fit ourselves into that way of working. And maybe next year we can tell you whether it is working or not.

That's basically where we're going and what we are trying to do.

So let me now introduce our next speaker, Charlie Gibson with Rhythm & Hues.

Charlie Gibson

Thank you Carl. I'm Charlie Gibson from Rhythm & Hues. Vice-president and one of the founders, one of the five founders of the company. Rhythm & Hues is three years, actually about three and a half, and the bulk of our work is high-end computer animated television commercials. We probably do more of that work, or have been doing more of that work in the past few years, than most other companies in the US. A lot of that was because of the experience we had at companies like Robert Able's and Digital Productions. Most people were integral to the formation of Studio. And, we were able to, we knew the ad agency infrastructure, and were able to sort of work that way and continue to do that kind of work.

But that isn't really what we set out to do, I guess not a lot of people know this, really the formation of the company was centered around production of a full-length computer animation feature. Three years ago we knew that was impossible. There's no market, really, for it, and the technology was maybe there, not really. But we did know how to work our commercials, commercial work was the closest thing that we could do, that paid anyway. Commercials are great, as Carl said, they do have pretty big budgets. Not as big budgets as broadcast, but you know, they do pay well, provide the most opportunity for variety, which is very important to keep things interesting. Sometimes special effects gets to be a little repetitive. And, you know, we could do things we'd all find stimulating, which is important to us, enjoyable character animation, which I won't talk about, Ralph will talk about. And, special effects, and you know, just whatever comes up; because TV commercials and advertising are always changing. So, we did opt to go for the commercial market and focus our efforts there, putting the broadcast market, like logos specifically, on the back burner. And industrials, which a lot of people do, on a back burner. We did them when the time was right and the budgets were right. But we thought, our plan was sort of to hone our creative and technical abilities and our staff, get our software going, always working towards this goal of someday doing an animated feature. And, just getting a reputation as a reliable, high-quality animating studio.

So, that was four years ago. Now, today, we're still doing a lot of commercials, mostly. But we are doing some other things. We did some theme park work, a very small bit of theme park work in conjunction with Michael Wahrman's company. And have done some IMAX science films, still some little nuggets here and there. And some feature effects work and some special effects work that I'll talk about. We would like to do more feature work, it doesn't pay particularly well, as Carl said, commercials are definitely more profitable; but everyone remembers movies, they're people still talking about their work on Tron, and they have it on their reel, and nobody remembers TV commercials, you know, two months after their gone, their gone. And if you have it on your reel, like a year later, people will say, that's old, get rid of it. The notoriety that, and the studio affiliations, and just the credibility you can get when working in the movies are very important and we feel like that will further us, you know, that will push us towards that original goal of doing a animated feature.

What else has happened in the last three years? Hardware's changed, I don't want to harp on that, but the most profound influence that it's had on our work, is that machines have gotten a lot faster and a lot cheaper, and to a studio like ours, that can mean two things. It can mean, it means you can crank out the same level of work, but more of it. Or, actually, excuse me, lower quality work and more of it. Or you can push higher and sort of do work at the same time, in the same time frame. And that's really the kinds of things we're interested in doing. You know, when you get a faster machine, the databases get more complicated, the animation gets more ambitious, that's really how the sort of hardware revolution that's been happening has affected us. We can do bigger, more complex animations, pretty much in similar time frames or even a little bit less, sometimes, than we would have dared done three or four years ago, and even when the company started.

What it also means, is that we can work at higher resolutions, which is very important to the feature effects and theme park markets. And, we can do, we can work cost-effectively and start to bring costs in line with other media. You know, for example, cell animation, high-end cell animation, high quality cell animation, and computer animation are pretty cost competitive in the commercial market. What goes on TV and goes on Saturday mornings sometimes, is significantly lower quality. Cell animation can be very cheap, but it can also, for what people are expecting from the post-Roger Rabbit era,

you know, that kind of animation and computer animation are pretty competitively ranked. I was surprised, but it's true.

It also allows, this kind of flexibility means that, it is another tool that movie producers can use and choose for the right reasons. Some really good examples, you know, I think, are projects that probably could not have been done in any other way, like the water sausage and the abyss, and the work Carl did and PDI did in Solar Crisis, the work that Tim Magovern at MetroLite did for Total Recall. You know, all those I think are excellent applications of computer animation, obviously they were done within the time frame of the rest of the picture, and they look good. I don't think there is a quality compromise and you know, in certain cases, they really could not have been done as effectively any other way. They wouldn't have looked as good, anyway.

So, I guess I want to talk a little bit about special effects, since that's something we'd like to do more of, as I said. I'm going to show two things, the first is a TV commercial we did for a bank, which is a combination of models and miniatures and computer animation. We shot the models on our stage we have, and it was nominated for a special effects award this year, which I don't think very many computer animation pieces typically get nominated in special effects. So that was very gratifying to us. One of the reasons we chose to use models and miniatures, was that there was a significant amount of detail. This spot, it entails looking at a small city and flying over it, and one particular house animates. And we animated with computer animation, the house that was animating on, but to model realistically and light a whole city, would have been a nightmare of computer animation. Never would have looked as good as a model.

And, you know, the goal is not to supplant other forms of film-making with computer animation, you know, it's just if something fits in computer animation better than a another technique, then do it. You know, we were able to do one computer-generated house very, relatively easily, but what they could do on a model stage was incredible. They would just throw some dirt on a building and point a big light and all the shadows would happen, and it was great. It was real time, and it looked good. Also gave us something to key off, when we were adding computer animation to the scene, which always helps, it makes a good fit. So, I guess I'd like to run that commercial now, it's on this recorder.

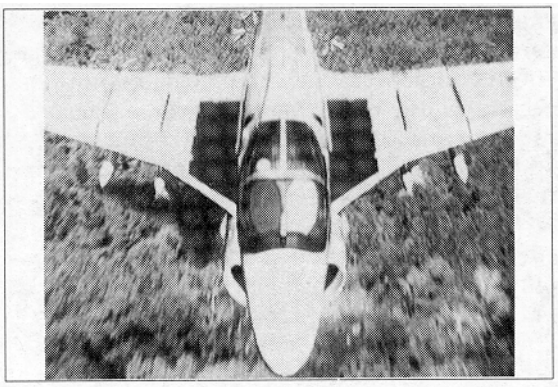
<Bank Commercial Film>

So, that was great, we kind of had something to show people that was a special effect that didn't jump out of you and say, hey computer graphics. It was good. Based on that work and our relationship with Mark Vargo, who was a special effects supervisor on a film called "Flight of the Intruder", which hasn't been released but Paramount is letting me show some pieces here. We were allowed to bid against other classical models and miniature effects houses to do some Vietnam War era aerial combat footage, about 100 seconds of it. And they paid us some money to do a test, we did a pretty nice test, and they found some pretty nice things out. Let me run a slide here. *<Slide reproduction unavailable.>* This is really dark, all this takes place at night, and when, you know, you've been sitting in the movie theatre for awhile, you eyes will get adjusted. Let's see, there we go.

Okay, the clouds here are live action. They were shot in the daytime and we processed them on the computer to look like it was night. The plane is computer generated, the smoke plumes here are computer generated. It turns out that we could do smoke better than they could practically. Because there are two options when you are doing smoke, practically, are to use real smoke, which usually gives away the scale at which you are working; or do some smoke in a water tank with ink, and that is a terrible problem, because it is hard to make it look like it is coming out of the back of the plane or missile. And there are scale problems, and matting problems. So, we incorporated some smoke into our test, and it was actually done by Larry Weinberg, *<inaudible>*, and they went nuts, they really liked it, it was a headache for them and we did it better. But, you know, clouds were like, not something we do so well, so we used live-action clouds. I apologize it's so dark.

This is a bomb job over Hanoi, I think, and the bombs are computer generated, the background here is a giant miniature model. *<Slide reproduction unavailable.>* Actually built by the same guy who did the Glendale model I believe. And it was great, I mean it looks fine and we would have been knocking ourselves out trying to build something like that. We didn't need to. The stuff that's hard to do in practical effects are articulated models, things that fly around, you have to do blue screen shots, all of that, you know, once all of the work that you have to do after you shoot your photography to make something look like it belongs in the scene, fit it, you know, it's really difficult for them to do. Twelve bombs dropping would have been horrible. So we did it, they liked it, looks real.

Here's our only day shot. Since go-motion is a very popular technique, yeah that's in focus, a very popular technique in model photography, we had to do a little motion blur, which we did, and it's kind of a cheat, but it worked well. And there's nothing really that leaps out, except that I put the slide in backwards. More aerial stuff, this is a blue screen composite we did, *<slide reproduction unavailable>* since the majority of the elements in this scene were ours, they gave



us one extra elements, live-action, piece which we pulled a mat on, and composited over the background. Opticals and computers are still a little cumbersome, scanning is not particularly easy. We'll do it, but it's kind of difficult. In this case, it made sense. It's something that, you know, was just better for us to do. So I'm going to roll, I'd like to roll the footage now, and these scenes are not meant to cut together so the motion may look a little wonky, but in context it all works. So, if you can roll the 35 please.

<During movie> No sound either, sorry. Oops, what do you know, yeah, this is it, they wanted the Jetson's look. I apologize, I didn't get a chance to screen this film, but it's on the end. It turns out to be the entire Rhythm & Hues film library, I'm afraid, four minutes long. Well this is good to see what our material looked before there were animated characters in it. And it really makes an amazing difference when you see the animation in there, it makes a good contrast. There is an experimental video to film transfer, a lot of studios don't really want to look at videos, so we trick them by taking our video work and putting it on a film. There we go. So the background is live, the missiles, the smoke is ours, the tracer bullets are ours, there's that blue screen shot. This is the kind of, the part of special effects that's not quite so glamorous, when you have to do a lot of coverage scenes. The explosions are real explosions that have been scanned in and texture mapped and positioned in the appropriate place on the screen. Got a lot of shots like this, they're not particularly thrilling, but they mean something in the story. All that smoke is computer generated. Our day shot. Those are radio controlled miniatures that we added the missile to. The one on the left is real, the one on the right is CGI there. There's another test we did, as long as we were doing it on Intruder, we thought we could do a 747 and Stealth bomber. And you can stop the film please.

Real quickly, and I'm running over, just in conclusion, you know, I think that things are going well, as Carl said, but I think this is a very fragile industry. Not, it's not inherent to the technology, but people, I think it's just inherent to the situation we're in. I think all the people on this panel, and people in the audience that are involved in the industry, really have a responsibility to nurture this medium as it grows. You know, everyone has a horror story about computer animation, and I think there are people out there that just want us to fail, they feel like it's threatened them, have been threatened, they don't understand it. And there are practices that gone, underbidding work deliberately, ultimately hurts everybody. You know, new companies sometimes need to do that, but it hurts, because there is an unrealistic expectation of what costs are, people are expecting us, computer does all the work, so it's going to be cheaper. Where a company runs out of money, if it's small enough, then say, "Gosh, sorry we ran out of money, we need another $200,000" or whatever. And that doesn't really help anyone everyone either, because the company never gets going. People say, "Ah that's computer graphics, I guess, well I won't make that mistake, again." Bad publicity goes a long way. So I think everyone has to sort of be on their best behavior for a few more years. And then we can, like, loosen up later on. Thank you.

Carl Rosendahl
Thank you Charlie. Our next speaker is Pascal Bap from ExMachina in Paris.

Pascal Bap
First of all, I would like to thank Carl for his invitation to this panel. I would like also to apologize in advance for my approximate English. I will mostly speak about the European market and the evolution of traditional applications and then I will try to speak about the future and what we can expect from new areas.

I think no dramatic changes occurred in Europe during the '80s. Maybe the only major event we've met was the fusion between the production departments of the two major companies in this field: Sogitec and TDI, which gave rise to ExMachina two years ago. The computer animation market in Europe has been increasing globally, thirty percent per year. If we exclude applications like simulations for product design, but if we include corporate, which is a major application in Europe, we can estimate the European market at about $60,000,000 for 1989, of which half is for Great Britain. Studying these growth more closely it striking to notice that companies now on the market, which where on the market before, see their net sales gross limited to only fifteen percent to twenty percent.

On the other hand, companies in related field, especially video production are equipping themselves. Ten years ago computer animation in Europe was done by specialist company. Today, with the development of turnkey systems, any video post-production firm can offer this kind of service. It remains only today very few specialized companies which continue to develop also their own softwares, like Digital Pictures in London, Mental Image in Berlin, ExMachina in

Paris. Sales figures for 1989 were, for ExMachina, about $7,000,000 with 70 productions totalling about 40 minutes in length. And the breakdown was about the following, and after that I stop with numbers: for corporate communications and industrial communications forty percent, thirty percent for commercials, twenty percent of TV graphics and five for architecture and five percent for special effects for feature films.

We can try to see what's the evolution of this traditional applications. For commercials, in the past, the efficiency of computer graphics had always to be proven. Today these techniques, is well know and credible. Storyboards we see are well adapted, but it's mainly called on for technical demonstrations, cosmetics, soaps, cleaning products, high tech products. What's very new is that for this year, it is to be noted, that there is a very new demand for animated films, I mean with character animation, where the product either becomes a character or is put forward by a character. This evolution of the market in Europe and especially in France, is rather remarkable since these techniques go against the traditional idea of commercial in Europe. Professionals have been used to turning to the cinema, rather than to animated films. Early in the year we did an animated film for Food Products, which was a cooky, it's not yet plate of spaghetti or hot dog, but it's a beginning. This would have been unimaginable a few years ago. I would like to present you some example of what is a new thing in Europe. We can see the tape.

<videotape playing>

Okay, corporate communications has always been a major application, today the demand for long, simple, low-priced film is increasing. And there are now two companies in Paris specialized in this area, but another important evolution is to be noticed, that's emergence of market for very high quality films, long films with high budget, and our big budget for last year was for a corporate film, especially for automobile industry. I would like to show you now a short film, which was made for Alfa Romeo, this film has been produced in European TVHD. So we can see about one minute of this film.

<videotape playing>

Okay, you can stop the tape. TV graphics have had a slow growth and are quite poor image in France for a long time. What we can see now is that they are moving towards American style of high elaborate logos, leaders for events or channel identity. American style is really now a reference in this market, so we can expect a sensible growth in this area. American companies are expecting a lot and significant growth from special effects for feature films, I think unfortunately for us, European, especially French cinematographic producers, are not today particularly attract by scenarios that need special effects. These sector therefore, remains only an occasional user for us. But at the same time, American movies with special effects are really appreciated by the agents in Europe and we hope that in two or three years, following the American industry we'll see some movies with special effects appears. I would like to present you our only work of last year which, was the only work in Europe for computer graphics.

<videotape playing>

Thank you. In Europe, computer animation techniques are hardly used in the programming industry. I mean, TV series, special effects for feature films, even full animated films. They are too reasons. Production costs which were no appropriate in relation to this market. Up until two years ago, computer animation only offered limited possibilities in relation to the needs of this industry. Our main object is to target the programming industry market and especially full animated films and why not TV series. This implies to design and perfect tools and processes that will allow either a lowering of production costs in the industry or an improvement of quality with same costs. In this way, we have two technical major axis of interest, first one of course, is character animation.

We're thinking that beyond the necessary software improvements, the main problem we'll have to solve in order to produce high lengths, high quantity of images with good quality of animation, will be methods, organization and training of people. We can imagine now to produce very high quality of animation for very short pieces, but I don't know where is the team who can do eighty minutes or ninety minutes of complete full animated films. Besides, we are strongly interested in the transfer between the various image formats. In connection with another French company, we have developed an input system for high definition, 35mm images we use for the piece I have shown you, we also carried out the first test on transferring European TVHD images on 35mm film. So there will be in Europe a transition period between the traditional applications of computer graphics, commercials, TV graphics and the program industry market. During this transition period, we are strongly interest by theme park attractions and especially IMAX films and rides, where the economy and visibility of, makes the computer animation an advantage; computer graphics could have a key role in this area. So I hope next year, to be able to present you our first IMAX film, maybe. Thank you.

Carl Rosendahl
Thank you Pascal. Our next speaker is Ralph Guggenheim from Pixar.

Ralph Guggenheim

Good morning! In talking about the various companies that we have present here, Pixar falls into a strange category in the commercial animation business. We are both one of the oldest and one of the newest in this game. As many of you know, for the last several years we have been producing short films; *Luxo Jr., Tin Toy, Red's Dream, Knickknack,* you have seen that at various SIGGRAPH Film and Video shows over the last four or five years. Prior to that we were doing special effects work. But we have been out of the commercial animation production for quite some time. It was only in the past year, the past ten months to be exact, that we've been back into commercial animation production. So, we are both one of the very youngest, because we consider ourselves really a new entry under the name of Pixar in the commercial animation field and yet we have been doing very much related work for a long time.

So I can't claim, like Carl, that we have been doing commercial work for ten years. But, we have been trying to make a new venture into the commercial scene and we have learned a lot in the course of the last year. Our group is still very small at Pixar. We are running a studio of about twelve people right now and we are expanding very slowly and very cautiously, trying to learn from the past history of computer animation, and being careful not to over-promise or over-expand so that we end up in a critical situation. I think in general, you will find that all the people involved in the computer animation industry such as it is right now are a lot older and more mature about the way they approach these things. So, they're less willing to take the kind of risks that ended up causing such critical problems in the past.

In looking at the SIGGRAPH film and video show this year, my reaction is that the overall quality of work has improved tremendously. If nothing else, this is a good indication of the state of the animation industry on the technical and the scientific visualization end, as well as on the commercial entertainment end that we are interested in.

The other thing that is very interesting is the tremendous variety of work. This year we see more feature film work, we see a lot of theme park work, television commercials, and we see a tremendous variety of style in the way images are being treated. This gives me a lot of hope that this is really a medium that we can do a lot interesting work in, in the future. We also have to keep in mind that computer animation is really just one of many animation techniques available to producers who want to make films, commercials, theme park rides, or any other attractions. We need to keep in mind that computer animation is just one type of solution for one particular sort of problem. Although it has a tremendous scale of variety, a tremendous sweep of what it can handle, and what kinds of images we can present, we still have to keep in mind that it is just one branch of a more global pursuit of creating animated images.

Within that, what Pixar does is specifically related to character animation. What we find most interesting and intriguing is the ability to create emotion and character. First, and foremost are story and narrative. Technical ability is extremely important to us and we have been working very hard over the last few years to create work that involves not only intricate lighting and sets, but also facial animation and a variety of other techniques, including motion blur and particle systems that allow us to create interesting imagery. The technical ability only works in so far as it helps to tell the story. Through the work that we have been doing with John Lasseter over the last few years as our chief animator, we have always been pursuing story and narrative and character as being the most important element in all the work that we do. Over the past year we have been trying to apply what we have learned about character animation to commercial production. I have a few pieces that were in the Film and Video Show and one extra piece that was too late for entry. I would like to show them to you now. They are on a 3/4 inch tape. These are four commercials that we have done in the last few months.

<demo inserted here>

In many respects we have been very fortunate this past year, in that the jobs we have been able to find have primarily involved character work, and we have been fortunate for two reasons. First of all that there has been enough work coming in that we have been able to be a bit choosey in what we select, and really look for the pieces that offer us the opportunity to apply the narrative and story telling techniques that we do best to the work we do. At times we must persuade the advertising agency to convince them that we can introduce one or two more gags, or that we can put in a little more emotion or character into a piece and make it a lot more interesting. By and large they are very responsive. Much like Pascal said, many of these people are looking to make their product into an animated character and that is the sort thing where we are very interested in and we feel that there is a lot that we can do.

We have also been very fortunate in the past year to have a number of animators added to our staff. In addition to John Lasseter we have added Andrew Stanton and Pete Docter, both of Cal Arts, as our animators. Andrew's work is seen on a Trident commercial. Flip Phillips, who has been with us for quite some time, did the animation on the California Lottery piece that you see here. So, we are bringing in new animators. Our two newest animators, Pete and

Andrew, do not really have much computer background at all. They are primarily character animators trained in traditional cel animation technique. But, we have been working with them to pick up on the way we do computer character animation. For them it has been a pretty smooth transition, which is very encouraging.

What we really feel is that we have a great deal of expertise. Technically, what we need is many more people who have the ability to do character animation and really carry on this narrative tradition that we feel is very important. It is also very important if we are going to go on in the future and tackle some of the bigger projects and problems that we would like to be working on, and that other people have already expressed an interest in. Such as longer format work and feature length films. It is impossible to carry on a piece for very long, much more than five or ten minutes, without having a human character who is going to figure as a key element in the story. Tackling the problems of human or human-like character animation and character in particular is going to be one of the most essential things that we have to be able to do.

Another thing that you will notice if you look at the film show this year, is that a lot of people are mixing and matching computer animation with various other techniques. This is another area that is really crucial to computer animation as an industry. Finding its niche and finding the way it can work within the structure of film making, commercials, theme parks, etc. If computer animation is really going to be an effective medium in the long run for communicating visual ideas and stories.

Along with our animators, we have an excellent technical direction staff with Flip Phillips, Craig Good, Yael Miló. Another essential part of what we do is maintaining R&D all the time. We have to constantly be looking for ways to pick up new ideas and implement new tools to help our animation and technical staff do the work they do. Bill Reeves and Eben Ostby currently are the key people in R&D.

I am going to take a bit of a risk and take a look at where the future lies for computer animation. Although we are talking about the state of the industry, we are feeling good about the fact that the industry looks very healthy, we also need to keep an eye out for where the future is going and where it is going to take us in the next few years. All of these areas that we see a great deal of interest in today, commercials, feature films, long format, short format, all of these different areas are going to change dramatically in the coming years. Commercial television, particularly commercials on television, are probably going to change dramatically and won't resemble at all what we see today. Feature films are going to change dramatically if HDTV really lives up to its promise. Theme parks are going to become more and more of a high-tech play land than what we are seeing today.

Computer animation is very well situated to handle a lot of these changes because they are based on new technologies that are going to come and help us to communicate ideas. Because computer animation is high-tech based, I think we are going to be in a better situation to handle some of these changes and pick up on them and take advantage of them, as time comes on. What we also need to keep in mind is that, again, computer animation is only one of many techniques that we can use and the most fundamental approach to it is that it has to be an effective communicator. At Pixar, we do that through our approach to character animation. But, there are certainly many other ways to look at it. We happen to be looking at one particular niche of that whole area.

So, I think if we are looking off into the future, there are two things we should be looking at. One is that our challenge is to remain flexible enough to adapt to new changes, while also keeping the traditional values of narrative and character that keep audiences interested and maintain a compelling aspect to the images that we produce. The other thing is that the industry needs to start thinking about moving away from just doing work for hire. Probably one hundred percent of all the work that is being done today is essentially work that we are contracted out to do. Although there are some lucrative aspects to it, our economics are such that our ability to survive begin and end with the check that we get for each project. Instead, what we need to be looking at doing is bringing the kind of creative talent that will allow us to create our own properties, our own stories, and really create an animation industry out of what we are doing so that we can own a piece of what we are doing and see that as an ongoing dividend to the work that we are producing, so that we can really become an industry much like the motion picture industry and the studios in the motion picture industry have today, we can become a computer animation studio industry as well. Thank you!

Carl Rosendahl
Thank you Ralph. Our final speaker this morning is Michael Wahrman from deGraf/Wahrman.

Michael Wahrman
I wonder if I could ask a favor to bring the lights up to look down on the podium a little and the lights up in the audience. Just a little bit so I can see who is out there. There are probably a half dozen or a dozen people in the audience who could be on the podium today. And I think that is pretty interesting.

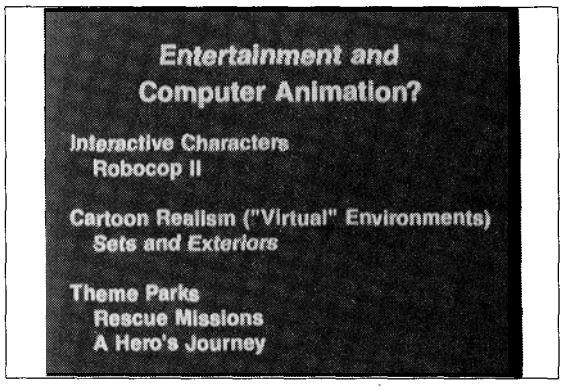
I want to do a couple of things before I get into any content, God forbid, and in case I forget

later. First is that there are twenty people full - time at deGraf/Wahrman. At least fifty people have come in free-lance doing what they have to do to get the job done. I want to thank them here. I also want to thank Rhythm & Hues for their help on the Hanna Barbera attraction in the film show. The slide came up and they attributed it all to us. They did the Jetsons section. That was in the credits. If you think those weren't political, think again.

When we talk about responsibility, which we are going to get to later on, one of the issues which we might talk about, if we actually get into the business section here, will be the responsibility of the vendors, which is what we are. We just work for higher vendors, for the most part over here and the responsibility of the studios. This is a whole panel all by itself.

How many people here have been to SIGGRAPH before? Could you raise your hand? How many people work at an animation studio of some sort? How many people run an animation studio or are involved in the management? That is not bad! How many people want to work in the computer animation? That will be a topic of the panel, I think. I really want to thank you for coming on Friday and sticking through on Friday. You should be sleeping probably!

What we are going to do is talk real fast about some of the history of computer animation and the film industry. Carl has touched on and I am going to give it a little personal perspective on it over the last two years. A little history of deGraf/ Wahrman, the kind, what we have wanted to do and what happened and talk a little bit about how we might think about the business. Just to give you some categories, throw out some categories and think if you can think in those terms. Tell me what you think about that, which will be the areas of service, technology, and content. What some of the business might be and maybe why it is we are doing it. Maybe if Carl lets me, we will throw out a proposal for



content in the theme park area to see how we are doing for time.

Richard Hollander, who might be in the audience today, and I ran a panel a couple of years ago at SIGGRAPH. Richard is a partner in Video Image. Richard and I would go to panels just like this one and we would hear about the glowing future and current use of computer animation in the entertainment industry. Then Richard and I went back to Hollywood, and it wasn't there. Richard was running a company and was producing serious work in the entertainment industry doing monitor graphics. These are those things that you see on computer displays intended to be Apples or future Star Ship displays. But there was not much high-end use of computer animation in the film industry. I remember attending SIGGRAPH since 1980, and you would see Tron, you would see the Genesis sequence, you would see The Last Star Fighter. It was like there work happening. Then, things just went away, for a number of reasons that Carl may have mentioned.

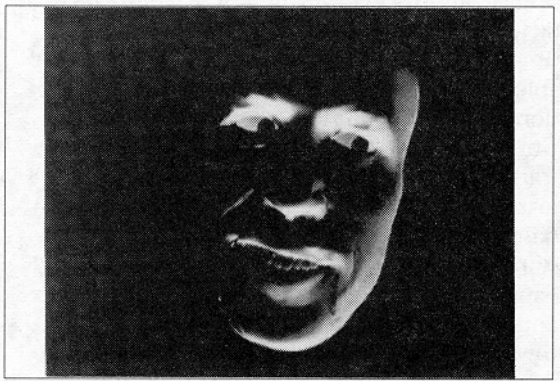
But at the time we did that panel in 1988, we were starting to see a change. We were starting to see that there was a renewed interest in Hollywood for our work. I think that some of the horror stories had faded, and I think that also a new generation of film makers were coming to power. They wanted to experiment with it, they wanted to see what they could do. That is essentially what happened. In at least the feature area, there is a significant amount of work. There was Solar Crisis,which PDI did, there was Flight of the Intruder by Rhythm and Hues that is coming out. There is Metro Light's Total Recall. There are the eight minutes of the Jetson's movie that we did. There is some RoboCop 2 work. There are significant amounts of work that is happening in the industry. Some of that is because we are becoming more interesting to them. We are capable of producing imagery that the audience wants to see, which is a key point.

Another thing that is happening is the tremendous boom in theme parks and special venues. Special venues mean world fairs and museums. They are places where people come together to either be educated or to be entertained. They can accommodate, they have a need for, spectacle. It must be a special event. They sometimes have good budgets. That allows us to be able to use this technique of computer animation, which is still pretty expensive, for their work.

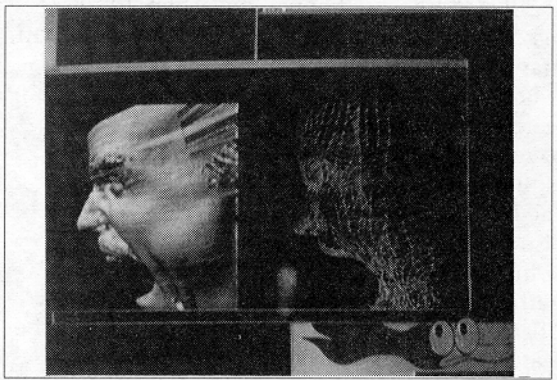
I am going to talk about deGraf/Wahrman for just a few seconds. We started about two and a half years ago. Brad deGraf is my partner. We started in his garage. We are essentially a garage band. We threw our amps in our living room and wrote a few tunes and took them around town. What we said was that computer animation hadn't been terribly successful in the entertainment industry. Here is what we were going to try to do. We were going to try to be available to you as a vendor to do footage, large amounts of footage. We have made associations with computer companies to help us to do that, including Symbolics and Silicon Graphics. We

were going to develop new technology because we believed that we needed to take some new approaches to creating large amounts of character animation, and to bring more expressiveness and performance into computer animation. I will be showing some footage that didn't make it into the film show from RoboCop 2, in a few minutes. We wanted to take the film emphasis. Almost everything that we have done at deGraf/Wahrman for the last two and half years has been on film. For the last year we have been doing nothing but rendering at 2000 resolution, putting it on VistaVision negative at 4000.

Let's talk briefly about interactive characters,



cartoon realism, and special effects. For interactive characters, we created a live performance system for RoboCop 2. Jon Davison, the producer, saw Mike the Talking Head and wanted to create a computer representation of the antagonist in RoboCop 2 and put it in the stop motion puppet. We took Tom Noonan up to Monterey to Cyberware Labs, and Lance Williams and I ran him through his part and worked on what he was going to have to perform and scanned what we thought were the best expressions. And from it, Ken Cope and Greg Ercolano of deGraf/Wahrman created a character that was performed live, transferred to film, the film was transferred to one inch, from one inch to video



disk single frame playback and to Sony Walkman 2 1/2 inch screen on a 2 1/2 foot puppet. What I want to show is the stuff that Phil Tippet sent us to show us where the characters should look and the footage as it was shot. Can we tape number one please. This is from our party reel, so you will have to bear with the ..... Sound up please.

<During film> Phil is speaking; that is Craig, the art director. This is where Noonan's brain is being pulled out. I really thought that was a great sound effect opportunity that was missed, if you saw the film last night. Why don't you fast forward into the computer imagery if you can. He is sucking the lens, by the way. This is where he is coming out of the maintenance monitor. This is where he is seeing his girlfriend who has betrayed him, or at least in the original script she betrayed him. This is shot live off the Silicon Graphics. It was performed live at about 8 frames per second and then shot on the 35 mm film right off the screen with the in-betweens filled in order to make this movie. He is having a bad day. This is at the final scene, his brain is being pulled out of the socket, it is an elegant and beautiful scene. I really felt that when the brain was smashed on the concrete, he could have had a better sound effect opportunity. I don't think we have to make any commentsas to the use our imagery is being put. That is the Zenith television fade-out at the end. You can cut the tape please. That was my contribution to the film.

Thank you. By the way, I have got Tom Noonan's head up here, it will take me five minutes to bring it on-line. I don't know if they have to kick us out or not, but if they don't and anyone wants to play with it, I brought him here and we can mess around.

The next tape is Fred's house. This is the test we did for Universal and Bill Hanna to show that we could create a cartoon realistic look for the Hanna Barbera's theme park attraction. The goal of Sherry MacKenna, the producer, and Mario Kamberg, the director, was to take the 2-D, the style of the Hanna Barbera characters, Bedrock, Scooby, and the Jetson's. At least in Bedrock and the Jetson's there is, I think, some of the most interesting design cartoon and style, and show that you could recreate it. Now Jetson's was a slam dunk. I really like the rocks on the right there. Jim Hillin, who is in the audience, and Ken Brain are primary technical directors.

Let's go to the next tape. The next tape is downtown Bedrock. It's depending on which version, 2-4 million polygons. The model shop on Bedrock was eight people. What you are seeing on the next tape when they bring it up, which will be tape #3, is shot off of the SGI. So this is graphics library ... Those clay pigeons are stand-ins for the dinosaurs. When we get into downtown Bedrock, which will be a cut coming here. This is all shot live off the graphics library at one minute a frame. I think that is really impressive, that it can do that hidden surface imagery calculating the whole database in that period of time on a 4D70.

There is sound on this. Elroy has been kidnapped by Dastardly, bring the sound up, and Yogi throws us a motion platform rocket ship to rescue

him. There are twelve motion platforms moving to this. Now bring the sound up please. That is Dastardly, that is Mutley, and that is Elroy. Yogi is piloting the ship, the seats are about to dive for example, here we go.

There are probably about one hundred people that worked on that film. Thirty-five at deGraf/ Wahrman, not to mention Rhythm & Hues, Sullivan Bluth, Bob Kurtz, Pacific Title did opticals, Greg Van der Veer was the supervisor on opticals.

I am pretty much out of time. Carl is kicking me off the stand. I want to thank everyone for coming. One last thing: I am going to propose a new name for Virtual Reality. Interactive Computer Graphics. I don't know, what do you think?

Thank you very much!

Carl Rosendahl
I am just going to open it up for questions now. We have about twenty minutes. Yeah?

Q. I just had one question. I noticed in all the pieces that we're seeing here and all the films in the art show, I mean the film show, nobody does any cuts in animation, except if you are specifically exchanging from one scene to another there is no change of point of view at all. Is there a reason for that?

Wahrman
Mike on? One of the, we are in the one reelers stage of a new medium which is motion simulators. We are sort of in the bank robbery, train robberies area. In these one reelers, we are supposedly in a rocket ship, or a space ship, or God forbid a stage coach or something, and it is a hero's journey into a mysterious world or a rescue mission. In all of these things we are supposed to be looking out a window. So, there is a tyranny, and this tyranny's point of view. What we keep asking the directors and keep pushing for is to break the percenium, get off the stage, let's try a little film making. That is certainly going to happen, especially after people start getting bored. It provides a really interesting technical challenge that Charlie has had to face, which is how in the Hell do you get cuts. There were twelve scenes in the, at least twelve in Foreign and four in the Rhythm & Hues section.

Gibson
Yeah, I think we had five scenes actually and they were cleverly masked. But, they are there.

Rosendahl
They don't have dramatic camera coverage in flight simulators either. You know, it is a simulation. Next?

Q Yes, I was wondering if the panelists saw any parallel between the development of the computer animation industry and the development of the traditional animation industry of the 20's, 30's and 40's?

Guggenheim
I do. One of the big things for me is that there was animation for a long time as an entertainment medium, but until Walt Disney came along there wasn't a feature film like Snow White. That in many ways created this industry. In case it isn't obvious to everyone, the animation industry is booming. Anyone who can draw a bouncing a ball is working, or could be working in Hollywood, Taiwan, Philippines, the People's Republic of China, etc. The traditional special effects had its George Lucas. I think that computer animation has not had its Disney or its Lucas. There are storm clouds on the horizon.

Gibson
I was just going to say that when animation started in America, they weren't really interested initially, just like when film started in telling stories. I think as Ralph is pointing out, as the industry matures, story telling will become more important as it did in film, as it did in animation, as it will do in computer animation. So, that parallel I think is very much present.

Rosendahl
I would say also that if you look at the evolution of any of those, there is kind of a first stage that it goes through. Emulating everything else that has already been done. Traditional animation did that. It started out, it was newspaper comics brought to life and it was really Disney who started defining a whole new way of story telling using animation. I think that we are still at that emulation stage for the most part. Most of the computer graphics is emulating traditional animation, it is emulating other forms of special effects, and we are all working to try and break out of that and start being, to do stuff that will really be specific to these techniques.

Q. Hi! Both Pascal and Ralph touched on the issues of employee education and the need for assembling teams to do all this great work that is coming in the future. I think it is really important as competition heats up and productivity gains become very important, I would like to hear more about that and particularly what model are you trying to follow? Are you going to assemble renaissance teams of artists and scientists? Are you going to try to train technical employees that also have artistic abilities, your pixel cowboy who can do everything? How are you going to do this?

Rosendahl
Are you specifically addressing Ralph and Pascal?

Q. I would like to challenge Ralph's assumption that training Cal Arts graduates is sufficient, particularly as you go into feature film work which is more effects work and requires a lot more technical expertise. But, anyone who wants to answer the question.

Guggenheim
I think in part, a lot of the logistical approach

that different studios take to their work is based on their own history. The history of Pixar is one of having highly trained character animators like John Lasseter working with highly trained technical directors like Bill Reeves, Eben Ostby, and various other people in the place. That has become the prototype for the way that we work. I am not sure that it applies to everyone. It just happens to be the convenient working style that we have arrived at. That is a partial from the answer, but I think it helps.

Rosendahl
We have found that with smaller jobs of broadcast with simpler commercials, you can really do that with one or two people. There, it is really your kind of renaissance person who is both technically very brilliant and artistically very brilliant. As you get into larger and larger projects, and you start building up bigger teams, it really makes sense to start specializing people a little more, and getting a number people that are more technically involved supporting people that are more animators, I don't want to say creatively involved because everything is creative, but more artistically involved, I guess, and put them together as a team. If you do it right, it is a pretty magical balance.

Gibson or Guggenheim
In talking about parallels with a conventional animation industry, you should keep in mind that even in conventional cel animation there are character animators and effects animators. In a large part, what our technical directors are doing is effects animation. In another part they are supporting the character animators, just handling some of the technical aspects of the work. But, these divisions of labor exist in conventional animation as well.

Wahrman
I think we have only done large projects and what I have noticed first and foremost, is a tremendous, when you look at all the different skills there is a division of labor that happens. But, rarely have we found, although I have tried often to build teams that have the specific particularly, everyone's strengths, everyone sort of gravitates towards their strengths. I am sure that you have seen that too! But, if they don't have an understanding of the rest of the process, you end up getting in a lot of trouble down the line. Especially if you have a time frame of one year, who's compute time is measured in ???? huge amounts. I think that the first thing that I look for, and you have just seen, it is just naturally selected for, is people who are willing to work, just understand that this is not easy. Special effects in film making is not easy. There is a lot tedium in it. That desire to keep going really sets people apart. Then their skills and their education, their willingness to grow, will all happen over a period of time.

Rosendahl
Thanks! Do we have a question over here?

Q. I would like to address this to all the panel members. One thing that I have seen in the last couple of years, which I think is promising, is the use of some fairly sophisticated computer graphics in education. Particularly in broadcast television, public television. From an idealistic point of view, I think that is a really good thing. I would like to see an emerging interest overall for computer graphics to be used in that application. I would like to know if you see that becoming a significant part of the computer graphics industry or will it continue to remain isolated projects.

Guggenheim or Rosendahl
Well, I feel that the development that we do and the images we do are slaves towards a pretty, well from a marketing standpoint and the people whom we directly serve, it is a pretty small target audience. I think that the work that is done, particularly by Pixar and some of the other high-end companies, generally brings the level of the other work that is going on, up, because people see what can be done. They, you know I mean I think that if you just go through years of SIGGRAPH reels you will see things that were terrible. Jaggies and, you know, kinky moves and things like that are basically going away. That is just not going to be tolerated or liked any more. I think that there is a, by presenting this as sort of the top of the industry and working that way, it sort of filters down. I, you can look at the animation screening room reel, for example, and see the work that is being done at very small schools as an example of that. That is how we influence that part of the industry.

Rosendahl
Question here.....

Q. This question is directed to Ralph, but I would like to get input from everyone on the panel. What is your experience in working with Colossal and working with a traditional animation company, coming in as a computer animation company, have you had any problems or do you have any general things to say about that experience?

Guggenheim
It has been a very interesting experience. I think that part of the reason why we view what we do as just being one type of animation style, is in context of the work we do with them. We see that we are just really one piece of the puzzle.

The experience with Colossal has been terrific. When we first decided to start working with them, it was a very carefully considered choice, because we really admired their style and the sort of aesthetic that they practice in the commercial work they do. We felt it was very close to our own. We admired the work that they do. It has worked out very nicely. If fact, they offer us the

ability to do combinations with live action. They offer us the ability to do combinations with other forms of animation work and computer animation. From their point of view, the same thing applies in reverse. They offer a number of animation techniques but not computer animation, so now it makes them something of a full service house.

Rosendahl
Ralph, everything you showed was 100% computer animation.

Guggenheim
Well the California Lottery Piece is not and we are working on some other pieces now that involve more combination work. Obviously, in the initial work that we are doing, it was easier to do computer animation only. We are in the talking stages, and we are actually working on another project now that is a combination with live action.

Wahrman
Can I take it? I believe very strongly that we, as a service company, we are a department of the infra-structure of the special effects industry and that we happen to focus on computer animation, which I find pretty limiting when you are designing shots. We provide elements. That was the goal of Abel's. We designed the system there. It is our goal now. I miss an optical department a little but we will be doing it digitally and it will be our digital department, scanning more. We create elements for the special effects industry. I think that it is the deGraf behinds biorchy, you understand that this is not specifically computer animation. Though sometimes, it is entirely. But, a part of a larger tradition of film making, or whatever you want to call the special effects industry, I think it makes more sense.

Rosendahl
Question in the back?

Q. One of you made mention that you have industrial projects that are perhaps on hold. I am curious why we don't see more animation being applied to industry?

Rosendahl
Money.

Q. It is not just there? It seems like it is a bigger pie than the film industry.

Rosendahl
I know for us, it is certainly a bigger pie with much, much lower budgets. Radically lower budgets. It is also a whole different way of selling. I mean, already we sell to the broadcast industry, the advertising industry, and to the film industry in three completely different ways. To get in, to sell to yet a fourth industry, that would be a completely new way. From the little I have seen, at least local to us in Sunnyvale, it is really from my perception and I could be completely wrong, it seems a lot like an old boys' network. There are a few people that do all the work because they know everyone there. Kind of a lot like Hollywood. But, it is one more arena, you have to do a lot of work for not too much money to really be able to do a lot better. Plus, there are one hundred people in town who do that.

Gibson
Yeah, we have dedicated our studio to really working with Ad agencies, with film studios, it is a completely different kind of staff. We would have people who would speak Hollywood, they don't speak aerospace. That is just a conscious decision that we make. There are several very, I think, successful industrial film studios around. A lot of them are trying to get into special effects and TV commercials because they feel that is more glamorous or whatever. I think it is just a choice you make in the direction of your company. For us, they are not necessarily exclusive but, the effort that we have to put in now to get into that market and the radical changes that we would have to bring about to our production techniques are essentially too much of a hassle.

Guggenheim
We get an occasional call about doing similar sets of industrial work, and I agree with Carl, not only is the money not there, maybe I should put it the other, not only is computer animation too expensive still, for the kind of budgets that the industrial market has, but in our case, since we interested in character animation, we would want to make the space shuttle smile or something. There is not too much call for it.

Rosendahl
Question here?

Q. Can any of you say something about the use of the kind of the kind of dynamic techniques that we have seen in the paper sessions here in the industry, as opposed to key framing which seem to be the most common technique?

Rosendahl
We can all address that! I'll start. We use primarily three different methods. One is key framing, one we do a lot of dynamics stuff in isolated situations, also we do a lot of performance stuff like Michael was talking. Particularly work we have done with Jim Henson for the Waldo character. It is a mechanical armature. That character in particular, we have a lot of basic simulated dynamics. Doubly simulated dynamics. In there, to add a lot of just kind of organicness to the character, to make him, instead of going through and hand-animating all the squash and stretches. His belly would do what a water balloon would do, when he moves

quickly. We build that into a number of things now. Also, particle systems we use all the time. That sort of dynamics. It is pretty applicable. We haven't started doing anything yet to the caliber of a lot of what is being presented with really intelligent characters. I would love to be able to start doing that through.

Gibson
It seems to me that a lot of research in automated character animation seems to be oriented towards, like computer animators doing character animation. Letting computer science people do character animation. Very few people, there a few, some at Ohio State, for example John Chadwick, are sort of attacking the problem from the other end. How do you get animators into the loop? The people that have been trained in telling stories. We know how to do that very well into the loop. I think that you are not necessarily always wanting to simulate reality or at least physically. We do use dynamics, don't get me wrong. We have done a horse's mane, waving banners and things like that, that are not crucial to the story telling but add visual complexity. At the same time, we are really trying to emphasize better interaction for animators so that they can do what they do best, as quickly as possible, and not have to specify mass parameters and damping values and hope that after twelve hours their simulation didn't blow up.

Guggenheim
Our approach is very similar to what Charlie is describing also. We have used dynamics on occasion and it always has an been assist to the animator. Even in the long run, we always see dynamics as being an intelligent assistant to the animator where the animator can always intervene and adjust the dynamics to invoke the kind of narrative element that he wants out of it.

Wahrman
We scripted with S-Dynamics on the Symbolics. We used WaveFront Preview sometimes for choreography. We push as hard as we can on the idea of bringing organic or performance information to the computer, in order to deal with a lot of the what I think is the cold look of computer animation. We push that idea. We use the Symbolics for behavioral. We have been doing a lot of behavioral animation. Mostly, pixie dust. Mostly magic pixie dust. The bean park????? What ever works.

Rosendahl
Once you get into the longer format, if you are going to do a full feature film or, heaven-for-bid, a television series, you are going to have make massive use of it. I think, the way I foresee it happening, is you do have a team of very talented animators but they are probably not going to touch every scene. There are going to be certain scenes where the character walks from point A to B, establishing shots, and stuff like that where you really can have much more intelligent characters and can, in essence, direct them to do what they are supposed to do. Then you can have your animators doing all the scenes where they have to be particularly innovative or do the unusual action. I think the computers are basically, and the model you have to work with in the long run, it is free. The technology is free because it is going to get there. The expensive part is going to be your animators. Your skilled talent. It is going to come all the way back to the people. However you can use them best and most efficiently is going to be the important part. I think that there really is a place to use as much intelligence as possible. If you don't like it, you throw away the scene and then you do it by hand.

Ok, here?

Q. Yes, I would like to ask the panel how they feel the development of turnkey animation systems has helped or hurt themselves and the industry as a whole?

Rosendahl
We were talking over this at breakfast. Does anyone else want to field it first? Charlie's answer was it doesn't.

I think for us on the broadcast graphics side, it has had an enormous impact. Basically, we get very little calls to local television graphics anymore because most of that is being done by turnkey systems in the local market place. Five or six years ago when that wasn't an option, we were doing networks in little stations in Tulsa, Oklahoma. That just doesn't happen any more. I think that is definitely going to filter up. Hopefully, as a lot of our market gets displaced to that, we will be picking up in new areas and pushing on. It is going to be a long time before you are doing three minutes of special effects for a feature film on a Mac

OK, we have time for one more question. Back here....

Q. This is directed to everybody, but especially Carl. You all try to push the state of art in what you do, in terms of using technology that has developed. How do you see the effect of patents affecting that style?

Rosendahl
Patents??? OHHHHHHH! It is a real danger. There is, one of the things that has been so wonderful about SIGGRAPH in the past has been that we all come here to learn and we all come here to share ideas. I think the production companies too, try to get up and share what we are doing and how we are doing it. There is certainly proprietary information there. A lot of this, people are starting to patent ideas and it hasn't been tested in court. It is really turning into a mess. My personal opinion is that it is

really going to hold the brakes on a creative industry and cause people to start worrying about legal issues, court debates and enormous fees to a legal industry that can survive pretty well without all our money, too. In particular, like Charlie said, we need to be on best behavior. We have got a long way to go before this industry is really well established. I think that we all need to support each other and not fight each other in the meantime. There will be time to make the big bucks on that stuff.

Wahrman
There will be proprietary technology and there will be patents and there will be trade secrets as there are already. When I look at certain ideas, for example, like live performance, two percent of putting on a live performance or putting on a show with characters whether they are in real-time or not is the idea. I can tell what a Waldo would look like. We could buy a SGI. It is the idea behind the character. It is the craft and skill and to some extent the technology. A tremendous amount of artistry and care goes in creating that work. That is not particularly patentable. Those are people and a system.

Rosendahl
Thank you very much. Thank you very much for coming. The next talk isn't until 1:30 I believe, so if it is all right with the AV guys, we should let Michael boot up his SGI stuff and do a little bit of his stuff.