POWER_TIPS_PRO

COLLABORATORS

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POWER_TIPS_PRO

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1.2   Power Tips Pro.guide: Disclaimers and Notices of Copyright

```
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              Ronnie Norwood
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```

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in, which was gathered from the FidoNet VIDEO_TOASTER echo and from
the Internet LightWave Maillist and Newsgroup.

If you find POWER TIPS PRO for LightWave Volume 1 to be of worth, then
please honor the shareware concept by
                        REGISTERING
                        your
copy!

Future volumes of POWER TIPS PRO for LightWave will be made available
as Dean and Ronnie search the nets, collecting and compiling hints and
tricks into new hypertext help files, for BOTH Amiga and Windows PCs.

Thanks to all who've contributed to PTP from the various LightWave e-
mail forums. Keep up the Great work! A special thanks to Ron Kramer,
Moderator of the Fidonet VIDEO_TOASTER and to Daniel J. McCoy and
David Warner, former and current Moderators of the Internet LightWave
Maillist and Newsgroup, for their volunteer labors of love!

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1.3 Power Tips Pro.guide: About the Authors

Dean Scott is the Video Graphics Artist for WSMH TV 66, a Flint, MI
FOX affiliate. He's been LightWaving there with an A2000/030/30/10MB
VT2000 2.0/3.1. He has a Bachelor of Science in Television Production
and an Asscoiate in Applied Science in Audio/Visual Production. "I've
been very active in cyberspace for over 4 years and decided to compile
a collection of relevant LightWave e-mail into a large Frequently Ask-
ed Questions document. The result evolved into POWER TIPS PRO!"

You can e-mail Dean at: dscott5663@aol.com.

Ronnie Norwood is currently owner and Lead Animator of Impact Imaging,
a 3D animation company. "I have never owned a computer before in my
life, until I bought the Amiga 4000 Video Toaster. I persued a musical
career for about eighteen years, then I decided it was time for a
change after doing almost everything from teaching guitar, to road

gigs, to running a small demo studio.   I sold almost everything I had
and invested it into the Toaster and Impact Imaging.   Now I do mostly
flying logos and architectural renderings, loving every minute of it!"

You can e-mail Ronnie at: rnorwood@cris.com.

1.4   Power Tips Pro.guide: The Shareware Concept

              Shareware is a method of distributing new software at free to   ←
                  minimum
cost. The software is usually a demo version and usually has some
features rendered inactive or unusable as an incentive to the user to
buy the the full commercial version.

Most shareware titles, however, are fully functional and require the
user to register the software with payment to the author.

PTP is in this category. It's fully functional and relies on the honor
system and morality of the user to
              REGISTERING
              their copy of
PTP.

1.5   Power Tips Pro.guide: Registering Power Tips Pro

              Dean Scott
              and
          Ronnie Norwood
              have adopted an interesting method to
register users of PTP. In lieu of a check or money order, simply mail
each a VHS demo tape of your LightWave animations as payment for their
effort! If you have no tape as of yet and would like to help offset
the cost of thier Internet accounts, then please send a donation of $5
to $15 US (check or money order only and payable to Ronnie Norwood)to:

                  Impact Imaging
                    PO Box 834
                Roebuck, SC 29376

Registering entitles you to recieve the next volume of PTP, FREE!

Your LightWave Demo tapes can be sent to Ronnie Norwood at the above
address and to Dean Scott at:

                  Silicon Magic
                2043 Hillsdale Dr.
              Davison, MI 48423-2313

1.6   Power Tips Pro.guide: Introduction And Welcome

POWER TIPS PRO Volume One for LightWave is a compilation of care-
fully selected and edited messages from Fidonet VIDEO_TOASTER and
AMIGA_VIDEO echos and the Internet LightWave Mailing List. It con-
tains 100 cross-referenced topics of helpful tips, tricks, and gen-
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1.39   Making A Page Turn Using Bones

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------------------------------------------------------------
                Making A Page Turn Using Bones
------------------------------------------------------------
```
QUESTION: How does one use bones to turn a page of a book
object?   I need an inside page to flip realistically to the
next page, as if it were pulled from the top corner.

I will tell you how to do this with bones, but I think it
would probably be simpler with morphing. First   triple the
polys in your page in modeler and subdivide until you have a
few hundred polys. Then be sure to save the page as a sep-
erate object from the book, because you do not want the
bones to influence the rest of the book.   Export back to
layout and with the page object selected, go to the Skeleton
menu and add two bones. In Bone Select mode, select the
first bone and select Rest Length from the tool menu on the
left of the screen. Now, make the bone about the same size
as your page and poisition the bone so that it's axis is
parallel to the page. Hit Enter to make a key frame for the
bone at frame 0, and hit 'r' to make the bone active. Select
the second bone and with rest length active make the bone
about 1/4 the size of the page.   Make   the   first bone the
parent of the second one and place the second bone at the
corner that you want to curl and set a key frame at 0,   and
at the last frame before your curl starts. Hit 'r' to make
the bone active. Moving the second bone should cause the
corner of the page to curl after it, while moving the first
bone will move the entire page. Since the page is a seper-

ate object it will have to be parented to the book and have
it's pivot point moved to the books' spine so that rotating
the page on the correct axis will cause it to turn while
moving the bones will cause the page to curl. In my opinion,
it would be simpler to curl and turn the page in modeler and
save several copies in different positions and morph between
them.

1.40   Moving Fingers Using Bones

```
----------------------------------------------------------------
                  Moving Fingers Using Bones
----------------------------------------------------------------
```
QUESTION: My character, a living tree, is supposed to have
3 seperately moveable fingers, but each one of the bones af-
fects all 3 fingers! I've turned Limited Range ON, decreas-
ing the value, but this only results in lack of control of
the finger tips.   Is there a way to restrict the effects of
a bone to an assigned surface?

Unfortunately, all bones in an object affect all parts of
the object. In this case "Limited Range" will be of "Limit-
ed Usefullness." Even if you get the bones to where they
only control the finger they are in, when you move the
fingers close together, the bones will again interact with
the other fingers.

You might try making each "finger" a separate object.   The
only problem with this is if you are going to move the arms
with bones.   The finger objects will not follow the end of
the arm if it is moved with bones. If the arm is a separate
object then making the fingers seperate objects with the arm
(or hand) as a parent should solve your problem.

1.41   Moving Legs Using Bones

```
----------------------------------------------------------------
                   Moving Legs Using Bones
----------------------------------------------------------------
```
QUESTION: I'm having a problem using Bones for the first
time. I'm trying to move a human figure, but when I try to
move the bones to bend one leg why does the other leg and
foot deform?

Try thinking of bones as skins rather than bones. If you put
only a central bone in something like a leg, you will get
those problems where the influence of the bone affects some
places you don't want influenced, and misses some places you
do.

Do this: put a central bone as a parent for 6 or 8 bones in
a ring around it. You don't even need to activate the cen-

tral bone. You need to do something similar for the thigh,
leg, and foot. Then you manipulate the central bone and the
others follow.   Since they are right on the polygon skin of
the object, you get better influence.

Don't forget to put a bone/skin structure into any area ad-
jacent to the areas you are moving, to act as an anchor. For
example, even if you will only move one leg, put bones in
the other so the influence doesn't 'leak.'   And if you are
moving the legs, you must put bones in the belly, so it does
not distort as the legs move.

1.42   Calculating Image Size For Print

```
-------------------------------------------------------------
                 Calculating Image Size For Print
-------------------------------------------------------------
```
QUESTION: How do I go about figuring out the correct resol-
ution to render at for specific print sizes?

What you need to have is a couple of pieces of information
regarding the final printed image. You need the size, and
you need the density of the line screen. You can then use
these pieces of information to figure out what pixel resolu-
tion you need for a given print job.   The relationship is
that you need between 1.5 and 2 times the number of pixels
as you have halftone dots. For simplicity, let's use 2x the
line screen and work from there.

Let's say that your printer tells you that your image is go-
ing to be reproduced at 8.5 x 11, with a 133 line screen
(common in magazine work).

Translated, this means that there will be 133 halftone dots
per inch in the final piece. That means, you will need 2x
that, or 266 pixels per inch, in order to produce a quality
reproduction.

Now, you know the size of the piece is 8 1/2 x 11, which
means your image has to be 8.5 x 266 = 2261 pixels wide, and
11 x 266 = 2926 pixels tall.

If the line screen goes up, so does the resolution you need.
For example, say that the 8.5 x 11 is going to be printed
with a 150 line screen. Then you'd need 300 dpi in your
image, which works out to 2550 x 3300 pixels.   If the line
screen goes down, then you need less resolution.   That same
8.5 x 11 at an 85 line screen (common in low-end printing)
would only need to be 1445 x 1870 pixels.

Now that is in theory. In practice you can get away with
less resolution. The 2x quality factor we used above is the
limit. Beyond 2x there are no quality gains. However, gen-
erally anything above 1.7x is a waste of resolution and will
not result in a visible difference in the printed piece.

Have a look at the following chart, which shows resolution
requirements for that 8.5 x 11 picture at different line
screens and quality factors:

```
Line Screen    2x Quality Factor   1.7x Quality Factor

    85              1445 x 1870         1228 x 1589
   133              2261 x 2926         1921 x 2486
   150              2550 x 3300         2167 x 2805
```

1.43   Combining Field Rendering & Motion Blur

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--------------------------------------------------------------
          Combining Field Rendering & Motion Blur
--------------------------------------------------------------
```
Motion Blur pretty much overwhelms the effect of field rend-
ering. Also, I was >told<... that FR and MB are mutually de-
feating, and if memory serves... Allen Hastings confirmed
that conjecture.

See also: Field Rendering vs. Motion Blur

1.44   Efficient Scene Renders

```
--------------------------------------------------------------
          Making Scenes More Render Efficient
--------------------------------------------------------------
```
QUESTION: I read someone say that segment size was a factor
in making scenes render more effieciently. As far as I know
it's irrelevant unless you use anti-aliasing where it has to
anti-alias between the segments, also. What's the truth?

It's NOT irrelevant at all! In fact, this feature was re-
quested back when Allen Hastings first implemented field
rendering. LW does a fair amount of setup calculations every
time there is camera or object motion. With field rendering,
their is motion between the two fields, meaning that these
calculations must be performed twice. But, when you render
with multiple segments, the setup calcs are performed twice
for each segment. Using the default segment size, that means
8 times rather than 2. This can really add up for relatively
complex scenes. The same is true for Motion Blur and Depth
Of Field, ie. Number of Setup Calculations = (AA passes) *
(# of segments). This is one of the many little things to
make scenes more efficient that most people don't know about

Another way to chop render time significantly is to not
render your entire scene for every frame.   Compositing is
much faster than rendering.

If your camera is locked off, render the Background once and
then composite it with your foreground objects.   You can do

some amazing things in a compositer that would be quite
costly to do in the render. And if your render is just a
tad off, you can fix many minor faults in the process, like
gamma, contrast, and other color correction issues.

Even if you have a moving camera, you'll save yourself a ton
of time by rendering out your BG and FG layers seperately.
When the lighting for one layer is done, that's it, you
never have to render it again.

Rendering in layers affords scenes of greater complexity
than your current level of RAM can hold. But most impor-
tantly, anything that cuts back on per-frame compute time
will allow for more iterations on a scene. I know it sounds
rather snotty but a majority of the images published in LW
and PC graphics mags look like the artist tried one or two
cracks at their lighting and that was that.

Watch your favorite CGI laden film, commercial, video, etc.
and you can bet that each and every rendered element was
and you can bet that each and every rendered element was
tested and tested and tested, tweaked and tweaked and tweak-
ed, ten, twenty, thirty iterations. Not aways full frame
ranges, sometimes tweaking parameters on single frames is
all it takes.   The devil's in the details, and sometimes it
just takes a few tests to make something that looks "ok" in-
to something that looks "outstanding."

1.45   Field Rendering vs Motion Blur

```
-----------------------------------------------------------
               Field Rendering vs. Motion Blur
-----------------------------------------------------------
```
If one is trying to emulate the "film look," Motion Blur is
much more an artifact of film than video, so MB is more de-
sirable for film look. Field Rendering is exclusively a
video phenomenom, so motions rendered with FR are going to
look more video-ish, for better or for worse.

1.46   Animation/Video Keys Using Alphas

```
-----------------------------------------------------------
     Keying Animations Over Video Using Alpha Mattes
-----------------------------------------------------------
```
QUESTION: How do you superimpose LW animations over video?
I have tried using the Toaster's Luma Keyer with very poor
results... I get a lot of bleed through on darker objects
and shadows even after adjusting the key clip level.

You can composite animations over video by rendering your
animation on a black background, render mattes, and combine
it over any video footage you want. In this way you have the

option of changing the background footage at any time.
When rendering you have the option of saving alpha channel
animations in either 8 or 24 bits.   Alpha channels are pure
white shapes over a black background everywhere an object is
rendered. In the switcher you can use the art card effect to
combine an alpha channel animation with it's normal counter-
part over a video background. Because the alpha channel is
pure white over black it cuts a hole for the regular anima-
tion to be luma keyed through, even self shadows.

With the art card active, have your background selected on
the program bus, the alpha channel on the preview bus, and
the animation on the superimpose bus. Key on black to allow
the background to show through.

1.47   Foreground Keying

```
-------------------------------------------------------------
                     Foreground Keying
-------------------------------------------------------------
```
I recently used this trick for a flying logo. Using a fore-
ground image as a key, I got Lightwave to render the frame
where the logo came to a stop, then used ToasterPaint to
color the image red (R=255, G=0, B=0) wherever I wanted the
foreground image to be transparent. In fact, I cut off a
little extra so the object itself would be partially visible
behind the keyed image.

This way, Lightwave would be forced to render and anti-alias
the places where the object met the background, which was
also animated; a 100 frame loop I'd previously rendered and
saved to the hard drive, used as a sequence in this scene).

The keyed image was rendered seamlessly with the object
right behind it, and Lightwave wasted no time rendering the
part of the object that was covered by the mask.

I'm still using 2.0, so it was important that I be able to
render this part of the sequence in high resolution.   With
the foreground mask, it took about a minute to render each
frame; without the pre-rendered foreground, it took nearly
ten. The "fly on" and "fly off" parts of the logo were done
in medium resolution. You can't tell the difference when the
logo is moving especially since the moving background seq-
uence was also rendered in high res.

1.48   How To Use LW For CrossFade Dissolves

```
-------------------------------------------------------------
          How To Use LW For Crossfade Dissolves
-------------------------------------------------------------
```
QUESTION: Does anyone know of an easy way to cross fade one

sequence of frames to another? Perhaps using ADPro, FrEd,
Multi-Frame or something like that?

LightWave!

Put one sequence in the Foreground (Effects Panel) and the
other one in the Background and use the Foreground Fade En-
velope to control the transition.

1.49   How To Use PAR Clips In LW

```
--------------------------------------------------------------
                  How To Use PAR Clips In LW
--------------------------------------------------------------
```
QUESTION: How do you import PAR clips as image sequences in
LightWave?

In the PAR's Preferences menu, click on EMULATE and then re-
turn to LW (keep the PAR running).   In LW, when you select
Load Image Sequence, choose the PAR's DDR: drive and click
on which animation or video clip you've recorded. The impor-
tant thing is to put a PERIOD at the END of the selected
filename of the sequence (ie. TestAnim.).   It will then act
as a sequence and the frames of the clip will correspond to
the frames of your new anim.

```
--------------------------------------------------------------
```

You have to have the EXPORT gadget in the PAR software set
to IFF and the EMULATE button pressed ON in the PREFS screen.
To load a PAR anim or video clip into LightWave as an image
sequence, enter the directory path and anim name followed by
a PERIOD. To load a single frame of an anim do the same but
add the three digit frame number after the period. To load a
PAR still just click on the file name like a normal image.
This procedure will also work for AdPro, but not for TPaint.

1.50   Lens Flare Alpha Channel Keys?

```
--------------------------------------------------------------
                 Making Alphas For Lens Flares
--------------------------------------------------------------
```
QUESTION: Is there a way to produce an alpha channel for
lensflares? Please explain the theory behind it to me

Read the article on alpha channels in the July 1994 issue of
LWPro. This as well as many other issues were covered.

Lens flares are an additive effect, ie. adding them to some
image should not in any way diminish the intensity contribu-
tion of any pixel. The standard formula for combining two
images using alpha is: PixNew = [PixFG * alpha] + [PixBG *

(1 - alpha)] where alpha is scaled to a value from 0 to 1.

As you can see, with a translucent object (say alpha = 0.5),
the background will be decreased in value by 50% to arrive
at the new pixel value. Therefore, what you really want to
do is render your lens flares over a black background, and
then when you composite them, simply do an absolute add of
flare to the background (or using the format of the equation
above: PixNew = PixFG + PixBG). Once your flares are rend-
ered over a black background, you simply load the image(s)
into the forground in LW and composite them over your other
graphics using a completely black image for alpha (or using
the alpha that was generated by LW when the flares were
rendered, which will be all black unless there were objects
other than lights in the scene). The other option is to
composite the flares externally in something like ImageFX.
In this case, you would use the "absolute add" compositing
mode for the flares.

1.51   Displacement Map Envelope

```
--------------------------------------------------------------
                Displacement Map Envelopes
--------------------------------------------------------------
```
QUESTION: What I would like to do is morph one object with
a Displacement Map into another object without one.   On the
source object I have an animated rippling displacement (so
I can't just save transformed).   When I morph to the target
object, the Displacement Map of the parent still sticks.   I
wish there was an envelope menu to control the time span and
% of the displacement, then I could ramp it out as I ramp in
the morph. Is there a way to fix or fake such?

There's a hidden feauture of using the Polygon Size envelope
to control a Displacement Map. Be careful only to use 1 for
100%. 0.5 for 50%, and 0 for 0%, or any thing in between and
not 100 for 100%. etc.

1.52   Moving Liquid Using Multiple Morphs

```
--------------------------------------------------------------
                Moving Liquid Using Multiple Morphs
--------------------------------------------------------------
```
If you just want to have wine (or any liquid) seen through a
glass, you'd have to make sure that not only was the liquid
surface at the proper refraction index (and color for wine),
but also the polygons of the glass that are below the sur-
face of the wine would have to be the same refraction,
color, etc.

Now, to get the wine to move, as in up and down the sides of
the glass, the only way I know would be to use morphing. In

Modeler, create three identical wine glasses, and make three
different wine appearances in each one. One glass would have
the wine surface level; completely horizontal. This could be
named Wine1. The second and third would have the wine at a
slant, as if sloshing inside the glass... one slanting one
direction (Wine2), the other in the opposite dir. (Wine3).

In Layout, set Wine2 as the morph target of Wine1, and Wine3
as the target of Wine2. Now set a repetitive morph envelope
for Wine2: have it at 0% at frame 0, 100% at frame 8, and
back to 0% at frame 16, with the envelope set to Repeat.
This will set the sloshing effect of the wine.

Now set the morph envelope of Wine1. Let's say you have the
wine glass on a table, and the table gets bumped so the wine
sloshes around a bit, finally settling back to a stable con-
dition. Set a key in the morph envelope one frame before
you want the sloshing to begin, with the morph level at 0%
and the spline control at Linear. On the next frame, set a
key at 100% morph level. Now calculate how long you want the
sloshing to go before settling down completely. If you want
it to slosh for 8 seconds, set a key 240 frames after the
sloshing began, with the morph level at 0%.

I borrowed this idea from a trick I read on how to make a
plucked string vibrate, then settle. The principle is the
same (set the Wine2 and Wine3 glasses at 100% dissolve). For
Wine1, it will be stable until its morph is anything above
0%. Then it will begin morphing into Wine2, which is oscil-
lating from its own sloshed state to the opposite slosh in
Wine3, and back again constantly. Therefore, with the Wine1
morph at 100%, you will get the full sloshing effect. As the
morph level decreases, the sloshing decreases in intensity.

To add realism in the sloshing, slowly rotate the glass on
the Y axis as it sloshes. Since the glass is symmetrical,
the rotation should not be noticed, and it will appear as if
the wine is randomly sloshing around the glass, instead of
just back and forth in the same positions.

1.53 Particle Sand Storms

```
------------------------------------------------------------
                  Particle Sand Storms
------------------------------------------------------------
```
QUESTION: I would like to make a storm of some kind with
wind blowing dust around and I don't know how to create such.

For the dust storm you might want to make a particle cloud
using the Points Spread macros in Modeler. Save it as Dust,
then load multiple copies into layout. Make sure each cloud
is a fairly large cube, possibly covering 500 meters.

If you want steady moving dust, try using parenting in rows.
This way, you can cycle each row back to repeat a pattern

for constantly moving dust like this:

Try loading 12 copies of your dust object. Parent copies 1
& 2 to 3; 4 & 5 to 6; 7 & 8 to 9; and 10 & 11 to 12. Now
arrange them in 4 rows using the X and Z values given below
for each numbered copy:

```
            Particle Cloud # | Z value
            -----------------|---------
          1 |    2 |    3 |    1500
          4 |    5 |    6 |    1000
          7 |    8 |    9 |     500
         10 |   11 |   12 |       0
         ------|-----|-----|---------
   X value  1000 | 500 |    0 |
```

(This is if you used the 500 meter size in modeler)

Now, by moving the parents 3, 6, 9, and 12, each entire row
will move. To make this dust cloud cycle, set the motion
envelopes for the row parents as follows:

(all values given are for the Z position):

```
        Frame#    Value                    Frame#    Value
   ----------------------            ----------------------
Dust3:    0       1500        Dust6:      0       1000
         74       2000                  149       2000
         75          0                  150          0
        300       1500                  300       1000

Dust9:    0        500        Dust12:     0          0
        224       2000                  300       2000
        225          0
        300        500
```

Set all motion envelopes to repeat, with ALL keyframe spline
controls on Linear. This will cause all the dust to move at
200 meters/second, covering 2 Km in 10 seconds and making a
complete cycle of the rows.   You can scale the keyframes as
you wish to speed up or slow down the dust.

To surface the dust, make it the same color as your desert
and maybe a tad transparent. Use Particle Blur on the Camera
panel to make the motion less strobed and possibly Motion
Blur as well.

1.54 Aligning Lights To Points

```
-------------------------------------------------------------
              Aligning Lights to Objects
-------------------------------------------------------------
```
QUESTION: Since we can't load lights into modeller, is there
a way that I can aligh a bunch of lights in layout to the p-
ath of an object?

Yeah. Use the Macro called "Lightswarm." It'll take all the
points in the current Modeler layer, and create a scene file
with a light at each point.

Poke around in the ARexx_Examples directory sometime. You'll
be amazed at what you can find in there.

1.55   Controling Lens Flare Size

```
-------------------------------------------------------------
                  Controlling Lens Flare Size
-------------------------------------------------------------
```
QUESTION: I'm working on an anim where there are 30 - 40
animated lights. Each changes intensity over time, starting
very close to the lights then moving away. Unfortunatly, as
you move away, the flares don't get smaller in the distance.
Is this normal?

I did an animation that simulates a fiber optic cable. My
scene has more than 30 lights! I didn't set the Dissolve
With Distance option ON in the Flare Options Panel (version
3.5 only). Instead I used envelopes for both light and flare
intensity and it works very well. I wanted to have some kind
of flash at the beginning and the results were great. After
the camera went into the fiber optic cable, I put the light
and flare intensity to zero.

1.56   Faking Translucent Objects

```
-------------------------------------------------------------
                  Faking Translucent Objects
-------------------------------------------------------------
```
QUESTION: I have a lamp from a kit that is made up of many
pieces of very thin wood. The wood's thin enough that light
on one side shines through the other, making it glow in such
a way that you can see the light's hot spot, but not the
light itself. How can I model/render this effect in LW?

You have an interesting problem there. What it sounds like
what you are trying to simulate is translucency, which is
something that LightWave has to be tricked into doing. Add-
ing a little luminosity to the surface sounds like a good
start for getting a little glow into the wood. But here's a
more subtle approach.
Try to place a light inside the object, set to Ray Traced
shadows. This will give you the pattern of light coming from
the object as it shines on other objects. To make the wood
glow properly, try placing several small lights around the
outside of object set to an orangish colour with low intens-
ity and moderate intensity falloff. This will have two
benefits... it will warm up the shadows in the immediate

vicinity of the lamp (simulating translucency) and will make
the wood appear to have a glow.

By carefully positioning these external lights and by care-
fully controlling their intensity and intensity falloff, you
can get a more realistic effect than just luminosity alone.
Have a look at the real lamp and see if the glow in the wood
strips isn't more intense at the midpoint and less so at the
top and bottom.   The external lights will help you simulate
this kind of effect.

As for the light being visible inside the object -- it won't
be unless you go out of your way to make it so.

1.57   How To Match LW Lighting To Daylight

```
----------------------------------------------------------
              Matching LW Lighting To Daylight
----------------------------------------------------------
```
For matching daylight shots, it is often handy to crank up
the ambient light a bit to mimic all the diffuse reflected
light that is present outdoors.

Here's another tip.   Find your brightest and darkest values
in the footage you're trying to match to. Now match your CG
elements to these values. The brightest part of your CGI
element should be no brighter than in the live plate, like-
wise the darkest areas.

A good inspection of your live plate will also show you any
bias towards a particular primary that you need to match as
well as the distribution of midtones.   Once you find the
range that you should be in either wank on your CGI element
in the render, altering object and lighting settings, or do
it post-render in a compositer/image processor. Neither way
is going to be quick or painless (rendering a relatively
neutral CGI element gives you latitude to color correct it
in the compisition, but at the same time if you have to
alter your CGI element too far you'll start clipping your
values).

        o Light your object with ZERO specularity...phong
          shading looks like phong shading, and after THE
          LAWNMOWER MAN even Ma & Pa Kettle out in BFE
          know what phong shading looks like.

        o Get your diffuse lighting working. Get your color
          going in the right direction, contrast, etc.

        o Create some planar objects which will represent your
          lights like squares, circles, etc. Make them com-
          pletely ambient (LUMINOUS) so that they do not shade
          but will look like a flat color.

          Turn off shadows for these objects completely.

Position these objects so that they're approximately
where your lights are. You can even parent the
shapes to your actual lights. Just make sure that
they aren't in your picture.

o Now add reflectivity to your object needing specular
highlights and tweak until your highlights appear as
desired.

...this works really well at simulating light from light-
boxes and bounce cards and lets you create nice little "Tin
Toy"-like windowframe highlights too! But, if you think
about it, and look closely at the objects around you, most
highlights don't look like little pinpoints of white, which
is all you get out of most CGI packages.

This technique also makes shiny objects look "slick," more
like they were lacquered. Many colored shiny surfaces are
actually two surfaces: a rather matte layer of color with a
glossy clearcoat over the top. Phong shading doesn't approx-
imate a non-homogenous surface like this very well.

1.58   Projecting Slide Transparencies

```
---------------------------------------------------------------
                Projecting Slide Transparencies
---------------------------------------------------------------
```
QUESTION: Can spotlights shine through partially transparent
objects to make a soft shadow on something? I know you can
use Clip Maps to allow a Shadow Mapped spot to cast a shadow
of an image (like the letters example in the manual), but
it creates a hard edge.

Spotlights can be set to "shadow mapping" which casts soft-
edged shadows, but these do not recognize object trans-
parency. Ray-traced shadows are hard edged, but they cast
shadows that vary according to oject transparency.   It's a
trade off. Clip Mapping is something else.   The example in
the manual is trying to show you the difference between ob-
ject transparency and clip mapping with respect to shadow
mapping. Since the shadow mapped spotlight will not honor
transparent objects, don't use transparency to shape objects
that are to cast shadows; use clip maps instead.

QUESTION: Okay, what I want is a slide projector effect.
Can an image be mapped onto a plane and have a light shine
through that image to project that same image onto the rest
of the objects in the scene?

Yes. Make sure that the surface of your "slide" polygon is
set to "doublesided," otherwise it will not cast a shadow.
Map the picture you want projected onto the polygon as a
color texture, set transparency to 100%, and press the Color
Filter button ON. Set up your spotlight to shine through

this polygon (view from light works great for this) and ad-
just your spotlight Cone Angle to control the spread and
coverage along with the light placement.   The closer the
light is to the polygon and the wider its Cone Angle, the
wider the field you can cover with the projection.   Turn on
"trace shadows" in the camera and you are all set.

(This will cast hard edged images since it's done via ray-
tracing, using a processed image that's blurred or softened
a bit will make for a more diffuse image will be projected -
Editors)

1.59 Selective Shadow Map Casting

                Selective Shadow Map Casting

QUESTION: Is there any way an object can be excluded as a
possible target for shadow maps?

It may be little known, but in order to disable shadow maps
appearing on an object or an object casting a shadow map,
you must have BOTHh Self Shadow and Cast Shadow options tog-
gled OFF as opposed to the single options for Ray Tracing.
For an object not to recieve a shadow map, turn OFF Receive
Shadow AND Self Shadow.

1.60 Simulating Search Light Reflectors

                Simulating Search Light Reflectors

QUESTION: How difficult would it be to add a flare effect
that simulates a reflector based on light sources such as a
flashlight, car headlights, or helicopter searchlights? For
instance, when a helicopter's searchlight is oriented 45
degrees away from the camera, the flare (and glow) is much
less intense than if the light were pointed straight at the
lens.

By recessing your flare source into your reflector object,
enabling Fade Behind Object, and making the object a shadow
caster, you will get a very basic attenuation.   The flare
will fade quickly as the reflector obscures the source and
maybe not as gradually as you might want. Although it is not
perfectly accurate, it looks pretty good.

1.61 Smooth Repetitive Object Motions

```
            ----------------------------------------------------------
                          Smooth Repetitive Object Motions
            ----------------------------------------------------------
```

QUESTION: I have set up a 30 frame animation of an object
swinging back and forth. When I create a wireframe preview,
the point where it goes from frame 30 back to 1 is very
rigid. I want it to be smooth. How do I do this?

Are your start & end key frames in the same place like fig 2?

```
                              INCORRECT

 fig 1        Frame 0                              Frame 30
                /                                      \
              /                                          \
            /                                              \
          *                                                  *


                               CORRECT

 fig 2      Frame 0 and 30                        Frame 15
                /                                      \
              /                                          \
            /                                              \
          *                                                  *
```

You should not have a keyframe at 1 and the Tension setting
for 0 and 30 should be 1.0.

(set the motion path mode to REPEAT and the object will use
those first 3 keyframes throughout an entire animation, no
matter how long it is -- Editors)

1.62 Satellite Tragectory Using Null Object

```
            ----------------------------------------------------------
                       Satellite Tragectory Using Null Object
            ----------------------------------------------------------
```

QUESTION: How can I animate the motion of a satellite that
orbits the Earth in a perfect circle then shoots toward then
begins to orbit the moon?

Parent the satellite to a null, but don't parent the null to
the Earth. Instead, select the Earth object and get its co-
ordinates from the numeric requester and input them for the
null and make a key. Spin the null to make the satellite
orbit the Earth and make a key at the end of its rotation at
the point you want the satellite to fly off.   At this key,
set Linear motion so the null won't anticipate the take-off
move and set Tension to -1 for a fast "throw" away from the
Earth.

To get the satellite to leave the orbit and head towards the
moon, make a new key with the null at t he moon's position

(use the numeric requester again) and the motion tension for
this key at 1 to ease the null into position.   At this same
frame, adjust the position of the satellite in relation to
the null to account for the moon's different size. This way,
while the satellite is moving from the earth to the moon, it
is slowly changing its distance from the null in preparation
for a new orbit size.

Finally, rotate the null to spin the satellite around the
moon, and make a key where the rotation ends. Set motion to
Linear so the null won't over-shoot its position at the moon
after coming from the Earth.

1.63 Tips On Making Objects Walk

```
----------------------------------------------------------------
                 Tips On Making Objects Walk
----------------------------------------------------------------
```
QUESTION: I have constructed a walking mechanical looking
thing similar to the Sand Walkers in Star Wars, but much
smaller and only two legs.   This objects starts it's motion
from a crouched position then stands and starts to walk.
When the object begins it's standing motion the feet go be-
low the ground surface. When giving multiple parented ob-
jects such as this a walking motion path, it seems that the
feet slide as the object takes a step. How do I overcome
these problems?

A good looking walking motion is one of the most deceptively
difficult tasks to animate properly. Plan to spend some time
with this. I can give you some hints though.

First, don't try to make a single set of motions to make the
object stand up and then walk.   Break it down into two dif-
ferent sets of motions, where the end position of the stand-
ing motion is the start position of the walking motion.

Second, work with the model alone in the layout, without any
background elements. Create the stand and walk "in place"
without forward motion.   That comes later.

Third, work out the walk motion on a piece of graph paper
first. Figure out exactly where you are going to move the
feet, and make sure that when the foot is in contact with
the ground that it has a linear velocity.   If it speeds up
and slows down as the foot draws back, it will make it ex-
tremely difficult to add the forward velocity to the body
and not have the feet slide. Figure out the movement for ONE
leg, and then copy and transpose the values for the other,
once you get the first leg figured out.

Save the "Standing" Scene and "Walking" Scene as two differ-
ent scenes, because what you will want to do is to work out
a single walking cycle and then have it repeat over and over
again in the final scene as you move the body around.

Fourth, once you have the legs walking, you can then start
to play with the forward motion, figuring out how far the
body has to move so that the feet don't slide.

Dean Scott adds:

He he! Even the gang at FI can't do this! Take a good look
at part 2 of the episode where they find the planetary mach-
ine inside Epsilon 3, the planet B5 orbits.   Look for the
"slide" walking Londo on the catwalk about 3/4 thru.

Best that you can do is to eyeball it.   Can't get perfect
without inverse kinematics (foot stays planted while body
moves forward, leg pieces follow).   It can be done, though.

The art is to move the body using a start and end key, then
make a single cycle of the legs to match the speed of the
body (use Scale Keyframes in each object's motion graph to
adjust the "frequency") and set end of motion to Repeat.
Scaling the keys will squish or stretch the keys until the
feet "move" at the same speed as the body in opposite direc-
tions.

In this way, all you have to do is set the initial STYLE of
leg movement keys once. Just make sure you scale adjust
EQUALLY to EVERY piece.

1.64   Using Multiple Null Object Parenting

```
--------------------------------------------------------------
                 Multiple Null Object parenting
--------------------------------------------------------------
```
Using "extra" parents via null objects gives ypu much better
control over spline motion. An example is when 2 boxes have
to land, one after the other, inside a larger box. In this
case each box takes up half of the larger box and any spline
motion in the X direction will make the second box crash in-
to the first as it lands.

The solution is to parent the second box to a null object
which is used to provide the X-axis motion. Now, by making
the spline Linear on the X-axis, you can still have the ob-
ject ease into place on the Y-axis. This is a very successful
technique.

1.65   Faking Multiple Surface Morphs

```
--------------------------------------------------------------
                 Faking Multiple Surface Morphs
--------------------------------------------------------------
```
QUESTION: I know you can morph from one object to another

to another to another (just with successive morph parenting
and setting morph envelopes appropriately), but I thought
this worked with surface morphing as well?

No, you can't morph surfaces beyond the first morph target.

But, as with most things in LW, there's a good way to fake
it.

1. Load objects 1, 2, and 3.

2. Set 1 to morph to 2, 2 to morph to 3. Turn Morph Sur-
    faces on for object 1 only.

3. Set up an object 3 Dissolve Envelope that starts at 0%
    and remains there until the frame right before it's 100%
    morphed to 2. Create a Dissolve Envelope for 2 that
    starts at 100% and remains there until the frame right
    before 1 is morphed to 2. At this frame, set the envel-
    ope for 1 to 100%, the envelope for 2 to 0%, and set the
    spline for the frame to Linear.

4. Create Morph Envelopes for 1 and 2.

When you render and playback the animation, object 1 and its
surfaces should morph to object 2, which should then seam-
lessly morph to object 3 and its surfaces.

1.66   Making Animated Tank Treads

```
-----------------------------------------------------------
                 Making Animated Tank Treads
-----------------------------------------------------------
```
QUESTION: I need to make tank treads move. What's the best
way to do this?

Create a Bump and/or Displacement Map in a paint program
with the raised area of the tread white and the in-between
areas black. Then go into modeler and create a two sided
plane object with a slight amount of thickness.   Be sure to
create it with a generous amount of segments. Give it the
surface name of "Treads" and save it. Now use the Bend tool
and curve the plane back upon itself in the manner of a tank
tread. When you have the proper shape give it a different
surface name and save it under a different name.   Now, in
Layout load both objects and give the plane object the Bump
Map, or the Displacement Map if it has lots of polys. Morph
the the plane into the tread shaped object and give the tex-
ture a velocity on the lengthwise axis.   The texture will
now follow the circular path giving the illusion that the
tank treads are moving.

1.67   Making A Bell Curve Reveal Graph

```
-------------------------------------------------------------
                Making A Bell Curve Reveal Graph
-------------------------------------------------------------
```
For the sake of simplicity let's say the shape of your graph
that you want to reveal is an upside down letter 'U' (close
to a bell-shaped curve). Let's assume you'd like the curve
to start being revealed from the left, proceed up the left
leg around the arch and down the right leg.

Modeler Steps:

1. Create a long straight bar in the Face view by using the
   square tool, let's say 4 meters long on the X axis and .5
   meters high. If you want you can give it some depth along
   the Z axis, but for test purposes don't add any depth.
   Give the bar about 50 segments on the X axis.   The more
   segments, the smoother your final image will look.

2. Name the polygons for this bar "StraightBar" and save the
   object with the name "StraightBar.lwo"

3. Copy this object to layer 2.

4. Now comes the fun part. Using the bend tool under Modify
   bend the bar until you get the shape you want (in this
   case an upside down 'U').

5. Rename the polygons to "BentBar" and save the object with
   the name "BentBar.lwo"

Layout Steps:

1. Load your two objects "StraightBar.lwo" and "BentBar.lwo"
   into Layout.

2. Under the Objects panel, set Object Desolve for "BentBar"
   to 100%. We're only using this for a morphing target, so
   it shouldn't be visable.

3. Select the "StraightBar" object and set Metamorph to 100%
   and Metamorph Target to "BentBar."   If all has gone well
   your "StraightBar" will look just like "BentBar."

4. Now go to the Surfaces panel and apply the (previously
   created image brush sequence of a black rectangle turning
   white from left to right over 60 to 120 frames - Editors)
   as a transparency map.

The trick here is that the surface maps still see "Straight-
Bar" as being straight and not as having been morphed to the
bent version (so that the image sequence travels straight
across the straightbar now morphed into the bell curve bar -
Editors).

Remember that an object that has been morphed and who's
surfaces have any Specular Level at all will prevent the ob-
ject from being 100% transparent when using an image map or
animated sequence.

1.68   Making An Explosion Shock Wave

```
----------------------------------------------------------------
                 Making An Explosion Shock Wave
----------------------------------------------------------------
```
QUESTION: If anyone has seen STVI: The Undiscovered Country,
there's a scene where the Klingon moon, Praxis, explodes
sending out a ring "shock wave." How can this be done in LW?

Here is a short and simple summary: Create a long rectang-
ular strip (or bar) with 40 or more segments along on the X
axis with dimensions something like X = 60, Y = 0, & Z = 6.
Save it. Perform a 360 degree X axis Bend so that the strip
loops around on itself. Save it as a morph target. Now load
the first object and morph it 100% to the target. Then use
multiple noise textures that move toward the center of the
ring and falloff to 100% transparent on the inside. Give the
textures some velocity and then animate the whole thing by
just scaling it up from size = 0.

(Try using the Disc tool to make an eliptical tube in stead
of a bar and setting Edges to Transparent with a Threshold
of 2 – 10 –- Editors).

1.69   Morphing Particle Volumes

```
----------------------------------------------------------------
                   Morphing Particle Volumes
----------------------------------------------------------------
```
QUESTION: Is it possible to create an object, make its shape
into particles and then create another object with different
shape, but with the same # of particles and then morph both
of the one particle object into the other?   In other words,
particle morphing?

Creating objects filled with particles is pretty simple:

Use Modeler's Point Distribution macro to create lots of
points in a sphere. Use the object that you need to fill
with particles as a cookie cutter and use the AND boolean
function between the object and the mass of particles. You
will be left with only those particles contained within the
object's shape

(Do this for each object volume and make sure the same num-
ber of points are in each volume. If not (most likely) then
add the required number by hand. –- Editors)

1.70   Tips On Surface Morphs & Chrome

```
-------------------------------------------------------------
               Tips On Surface Morphs & Chrome
-------------------------------------------------------------
```
QUESTION: I want to do a morph between two objects. The only
problem is, the morphed object takes the parent object's
surface. What do I do?

Turn ON the Morph Surfaces button. Surface settings are
fully morphable, but only between a source and ONE target,
i.e. you can't do morph sequences.

QUESTION: What is a good method of creating a believable
liquid chrome surface?   I haven't played with chrome text-
ures, but I think that if a liquid object had its polys tri-
pled and subdivided that you could then use a Displacement
Map on it to get a true rippling chrome look.

The fractal reflections image included with the Toaster used
as a Reflection Map combined with a fractal Bump Map with
the texture size set at around 1/100 the size of the surface
will yield a decent chrome.

1.71   Wraping A Flat Polygon Into A Sphere

```
-------------------------------------------------------------
               Wraping A Flat Plane Into A Sphere
-------------------------------------------------------------
```
QUESTION: I saw a cool demo tape where somebody took a map
of the earth on a flat plane and morphed it into a globe,
but it was done perfectly! How was this accomplished?

The Wrap-To-Sphere Modeler macro does a fine job of turning
a flat plane into a sphere.

One trick in using Wrap-To-Sphere macro is to rotate the
original flat plane 180 degrees on the Y axis (if the plane
is in the XY axis, for example) and resave it as the source
object AFTER running the Macro. This avoids the "implosion"
look to the morph.

You also have to start off, before using the Wrap-To-Sphere
macro, with the polygons of the flat plane facing the away
from the camera.

Another idea you might try is careful use of the bend tool
to create a cylinder from the flat plane as an intermediate
morph to the macro-created sphere; this allows more control
and generates a more pleasing morph.

1.72   Making Panel Maps

```
--------------------------------------------------------------
                    Making Metallic Panel Maps
--------------------------------------------------------------
```
QUESTION: I have an old version of D-Paint and I want to add
a metal panel type of look to a mechanical walker robot like
most of the B5 objects have. Any tips on this?

Use DPaint to make simple 16 color (gray scale) maps of
orderly, yet random filled squares and line boxes, then take
it into TPaint (load as a brush) and do the streaking and
dirtying in 24-bit, then take it into Adpro and reduce with
dithering to 256 step gray-scale. Try making guidelines of
varying distances between them (rows) like this:

```
-------+-----+---+-------+-----+-------
       |     |   |       |     |
---+--+---+-+-+---+---+---+---+-+---+---
   |      |      |      |   |   |      |
--+-+-+----+-+--+----+--+-+---+-----++--
  |   |      |   |        |     |      |
  |   |      |   |        |     |      |
--+---+------+--+-------+----+------+--
--------------------------------------
```

Then make verticle guidelines of varying widths in each row
and then bucket fill each with different shades of gray. Put
smaller filled and outline boxes in random sets of patterns.

1.73   Making Fire With Procedural Textures

```
--------------------------------------------------------------
               Making Fire With Procedural Textures
--------------------------------------------------------------
```
Some excellent results for flames can be created using just
the procedural textures in Lightwave.   Use the Underwater
texture on the Color channel from black to bright yellow with
Additive ON.   Then use a Fractal Noise Transparency map to
make it look more flame-like. Also, put a fast upward veloc-
ity on both textures.

Here are the suggested settings for a 4.3 by 3.4 meter plane:

```
FLAMES
--------------------------------------------------------------
Surface Color = 0, 0, 0 --> Texture   = Underwater
Luminousity   = 90%         Size      = 9000, 5000, 50000
Diffusion     = 100%        Falloff   = 0, 5, 0
                            Center    = 100, -1, 100
                            Velocity  = 0, 2, 0
                            Color     = 255, 220, 95
                            Wave Src  = 10
                            Wave Lgth = 1
```

```
                                Wave Spd  = 0.025
                                Band Shrp = 4


Transparency  = 0%  ------> Texture   = Fractal Noise
                                Size      = 0.5, 1, 0.5
                                Velocity  = 0, 0.25, 0
                                Value     = 100%
                                Freq      = 4
                                Contrast  = 4
```

Add a second plane the same size just behind with these set-
tings:

```
COALS
----------------------------------------------------------
Color     = 255, 200, 70 --> Texture   = Fractal Noise
Luminousity = 90%            Size      = 0.5, 0.5, 0.5
Diffusion   = 50%            Velocity  = 0, 1, 2
                             Color     = 95, 30, 0
                             Freq      = 4
                             Contrast  = 1


Transparency = 0% --------> Texture   = Underwater
                                Size      = 50000, 50000, 50000
                                Center    = 100, 100, 100
                                Velocity  = 0, 2, 0
                                Value     = 100%
                                Wave Src  = 10
                                Wave Lgth = 30
                                Wave Spd  = 1
                                Band Shrp = 10
```

This yields very realistic fire. It could be adapted for
explosions as well.

1.74 Making Light House Light Beams


```
----------------------------------------------------------
            Making Light House Light Beams
----------------------------------------------------------
```
QUESTION: I'm trying to make a beam of light that rotates
for a lighthouse. I made a cylinder and tried using a trans-
parency image map to create a gradient so the light would
fade in the distance, but this hasn't worked right.   How is
this done?

Here's a real simple way to get what you want...

Assumeing that your light beam is made of two cylinders, one
for each direction, and that it was modeled in the XY view
so that the length lies on X, AND that their pivot points
are on the origin (0, 0, 0), AND that each has a DIFFERENT
surface name like "beam1" "beam2", AND each is saved as sep-
erate objects, do the following:

What you need to know first is exactly how long one beam is
on the X axis (use Automatic Size to get an exact measure).
Let's say for instance that it's 500 meters long.

For the LEFT HAND side beam (the one extending in the minus
X direction):

In Layout use the GRID texture for a Transparency Map with a
Line Size of 1 (100% coverage, no holes) on the X axis. The
Texture Size is null and void in this condition so just ig-
nore it.

Next, divide 100 by the length of this object (this example:
100/500=0.2) and enter this value for an X axis Falloff.
This causes the "Grid," which is now really just a plain
solid surface, to become a gradient, starting at 100% tex-
ture and falling off 0.2% per meter so that at the end of
500 meters the texture has completely fallen off to 0%.   If
you need the beam to remain "solid" longer, just double the
falloff value or increase it value to suit your needs.

Now you have to place the center of falloff at the END of
your beam. Do so by entering the NEGATIVE value of the
beam's length on the X axis for Texture Center.

Here's the trick. Set TEXTURE value to 100% (meaning the end
will be 100% transparent) and set the actual TRANSPARENCY
value to 0%. In this way the texture is a gradient map tel-
ling Transparency to go from 100% to 0% transparency.

If you need the beam to be see-thru even at the source, then
simply set the Transparency value to a higher value, instead
of 0%.

Set the edge treshold to 2 and edges to Transparent.

Set luminousity to 100%.

TIP: If you want the appearance of haze or fog in the beam,
then use a Luminousity Map of fractal noise with a suitable
size and about 80% value. SET WORLD COORDINATES 'ON' so that
the noise DOES NOT travel WITH the beam as it rotates, the
beams slicing through the texture, instead.

Surface Color will give you the color of the light you want.

The only other thing to do is REPEAT the above for the second
right-hand beam, remembering to "reverse" the polarity of the
setting for Transparency Texture Center, that is, instead of
a negative value on the X axis, use the postive value of the
beam's length. This will move the center of the falloff to
the start end of this beam.   The falloff occurs in BOTH dir-
ections, so by moving it to this end, you'll get the other
side of the falloff and not have to change any of the other
settings.

That's all there is to it!   AND it doesn't take up any RAM

since there's NO image map involved. Of course, you'll want
to put a real spot light with a suitable flare at the source
of each beam... just remember to set an Intensity Falloff
value of say 1% on each light (intensity=100%) so that the
lights are completely faded out at 100 meters, instead of af-
fecting everything out to infinity!

1.75 Making Star Trek Deflector Shields

```
--------------------------------------------------------------
              Making Star Trek Deflector Shields
--------------------------------------------------------------
```
QUESTION: I'm trying to create a deflector shield effect
similar to that seen on the modern Star Trek series.   You
know, the egg shaped object around a ship that glows when
hit. I can create the glow by fiddling with the Transparency
envelope of the "egg," but is there a way to make it glow in
just one spot? (maybe some specularity setting or something
along with a light source?)

Basically, make a 3D sheild object, egg or whatever, then in
a paint program and make a grayscale circular gradient from
white to black. Use it as a Transparency or Luminousity map
(its ONE of them), then just fool around with the texture
coordinates until you get it at the right spot [the blast].

(In fact, if you use DeluxePaint, you could make an anim of
the impact zone (gray scale) showing the firey dispersal of
the energy along with a fractal noise texture with a large
velocity and some falloff.   You may need to have TWO sheild
objects, one slightly larger than the other.   The inner one
should have the fractal noise as a Transparency map, the
outter one should have the animation sequence as both a
Transparency and Luminousity map. -- Editors).

1.76 Making Displacement Mapped Canyons

```
--------------------------------------------------------------
             Making Displacement Mapped Canyons
--------------------------------------------------------------
```
QUESTION: What is a good method of creating canyon cliffs?

Simply clear TPaint to white and used a black brush to carve
out trenches. Then use various settings of transparency us-
ing Darken to get thin gradients from the black canyon floor
to the white cliff tops. Add very light touches of gray "air
brush" to add bumps to the canyon floor and the plateau tops
and to cut water gullies, notches, and mounds.

Save this quarter-screen sized image as a brush, take it in-
to Adpro and reduce to a 256 step gray-scale, then Displace-
ment Map it on to a 100 x 100 meter, 20,000 polygon triangle

mesh. Planar and Bump image map it using your favorite rock
texture.

1.77   Correcting Flipped Image Maps

```
-------------------------------------------------------------
                Correcting Flipped Image Maps
-------------------------------------------------------------
```
QUESTION: Why would a PAR sequence mapped onto a flat plane
be flip?   Viewed from the PAR the grabbed video looks fine,
but when applied to a plane (single flat plane) the image is
flipped (left to right). The image is Cubic Mapped and the
poly is a single sided type with double sided turned OFF.

I don't think the problem is with the PAR sequence, but the
way the image was mapped. You say the image is to be on a
flat plane? Use Planar image mapping. Cubic image mapping
is for cubes and reverses the image on some sides.

> Even when I tried just a Planar map it remained flipped.

You could be looking at the back side of the polygon, if it
is double sided. To flip it the other way, simply make your
"width" axis negative. For instance, if you're Planar map-
ping on Z, you would make your X texture size a NEGATIVE
value. This will flip the image left to right.

1.78   A Procedural Texture Water Fountain

```
-------------------------------------------------------------
               A Procedural Texture Water Fountain
-------------------------------------------------------------
```
QUESTION: I have a fountain on top of a pyrimid and want to
make flowing water spray from the top.   What's the best way
to create one? Particles?

For the water fountain, particles certainly help the effect
and Sparks will do the trick.   If you can't afford Sparks,
there is a PD program called Particle Fountain that will do
a similiar effect but obviously with less features.

However, you don't have to use particles as particles by
themselves will not do a complete water fountain with spray.
For that you can use a fractal noise transparency. Map it
onto a cylinder and give the texture a positive Y velocity.
Then create a morph target for the cylinder by succesively
pulling down the topmost points of the cylinder to form a
fountain shaped sheet of water object.   The positive Y
velocity will now curve back down to form the parabola of a
water trajectory.   By playing with the transparency values
and also using a moving fractal noise specular texture you
can mimic the spray of water with a static object.

1.79 Making Lightning-Like Neon Objects

```
-------------------------------------------------------------
              Making Lightning-like Neon Objects
-------------------------------------------------------------
```
QUESTION: I'm trying to do some neon-like stuff (it's not
really neon-like, it's more lightning-like energy rays going
around an object). Any way to get objects to glow?

Use the Sketch tool to draw a zig-zag, bent-wire-like line
in one layer.   Make a flat disc that is the right diameter
for your lightn-ing-like objects in another layer and rotate
and position it at the start of the sketched line in the BG.

Rail Extrude the disc. This will give you a tubular version
of your lightning-like object. Surface it as "LightningGlow"
or something similar. Redo the above extrude, but use a flat
disc that's 1/3 to 1/4 the size.   Surface the result as
"Lightning." Put both of these objects in the foreground and
save them as one object.

In Layout, surface the outter glow tube like this:

```
  Color same as the inner lightning object
  Additive ON
  Luminosity 100%
  Diffusion 0%
  Transparency 40%
  Smoothing ON
  Edges to Transparent
  Treshold > 2
```

Surface the inner tube like this:

```
  Luminousity 100%
  Diffusion 0%
  Transparency 0%
  Smoothing ON
  Edges to Transparent
  Threshold > 2
```

This will make a nice glow around the lightning. If you make
your disc with 8 sides sides, it shouldn't take that long to
render.

A similar technique would work for a glow on a neon sign.

1.80 Making Spotlight Beams

```
-------------------------------------------------------------
              Making Irregular Shaped Light Beams
-------------------------------------------------------------
```
QUESTION: I would like to put a light inside a planet and
make a state or country transparent in a manner that I could

see inside the planet as a light beam comes out, projecting
light streaks all over the place in the shape of the outline
I think that this is not too difficult if I use the 'light
beam trick,' but I want the beam to be 'broken' as if dust
was in the air. How can I do this?

Here are some ideas:

Planet:

Make a tessalated sphere in modeler or use the planet that
came with LW. Be sure to give the planet a surface name like
"planetsurf" (if you use the one that came with LW, be aware
that it is constructed of two spheres, one as the planet and
one slightly larger for the atmosphere).

You may wanna use this and you may not depending on the type
of scene you need.

Planet Map:

If you don't have a planet map, go into your paint program
and paint the planet's terrain as if it were flat. Make sure
the left and right edges (also top and bottom) connect and
match up when wrapped around the sphere. Save this map as
something like "Planetmap.iff."

Now paint Black (on this same image) the section of terrain
that you want to be transparent. Make sure that nothing but
the section that you want to be transparent is black.   Save
as "PlanetTrans.iff" and import it into something like Adpro
and convert to a grayscale image and resave under the same
name.

Mapping:

Load the planet object and the two planet maps into Layout.
Go to the surfaces menu and select Planet surface, then
under the surface color section, choose 'T' and use your
"planetmap.iff" as a spherical image map. Choose Automatic
sizing and Ok.

Under the transparency section choose 'T' again and use the
"PlanetTrans.iff" as a spherical transparency map, auto size
and Ok.

Surface:

You can get as detailed as you need, but for simplicity, use
the default surface settings and add doublesided and smooth-
ing. Now the black area of the planetTrans map should give
you a transparent hole for that section of the planet.

Lightbeam:

I'm not sure what kind of light beam you're looking for, but
here is what my first impression was. Go into Modeler, load

the planettrans map as a back ground image (on the Y axis –
Editors). With the point making tool, simply outline the
black section of the map with points in a clock wise direc-
tion. Choose make.

Now that we have a polygon in the shape of the black section
of terrain (you can turn the BG image off now), choose the
extrude tool and extrude this polygon to the desired length
(on the Y axis – Editors).

Enlarge the top polygon to the desired beam angle dimensions
to achieve the 'V' shape of a light beam.   Surface it as
"Planetbeam" and save the object by exporting it out to Lay-
out as "PlanetBeam.lwo." Once in Layout, postion the beam
properly at the right location of the planet.

Lightbeam surface:

Choose smoothing, additive, transparent edges and doublesid-
ed. Set the desired color for the beam.

Choose 'T' beside Transparency and use the Grid texture (wit
a Line size of 1 – Editors) as a gradient (transparency) map
(with a falloff value calculated by dividing the Y axis
length of the beam by 100 and a center value on that same
axis equal to its length – Editors). A texture value of (0%
and a Transparency value of 100% – Editors) should do it...
This will make the beam brighter at the light end and fall
off towards the other end. Play with the settings (if the
effect is reversed – Editors).

To break the beam up as if dust particles would do, set up a
Luminousity fractal noise texture.   You'll have to play
around with the fractal sizes to get the desired effect and
also the contrast and frequencies.   (Set the Texture value
at 100% and Luminousity at 40% – 60% – Editors).   Set World
Coordinates ON if you plan to move the light beam around. If
not, and you want the dust itself to fly around, give the
texture itself a velocity setting.

Final Touches:

After saving all of the objects with there new surface set-
tings, load a second copy of the planet and for this one re-
move the planettrans map. Save it as "PlanetPlain.lwo."

Set the two planets up to morph and turn the Morph Surfaces
button ON. Use an object Dissolve Envelope to fade the
lightbeam object in as the plain Planet morphs to the trans-
parent hole planet.

Last thing to do is to put a light inside the planet with
the desired flares and envelopes.

1.81   Surface Settings For a Glass of Wine

```
--------------------------------------------------------------
           Surface Settings For A Glass Of Wine
--------------------------------------------------------------
```
QUESTION: I know how to make water in Lightwave, but I would
like to make a glass of wine WITH WINE IN IT and I cannot
figure out how to make realistic looking wine.   The surface
of the wine would be easy if I applied the same method as
making water, but what about the rest of the wine? We should
be able to see the whine through the glass, and MOVING. What
settings are suggested?

I have been working on a drink bottle for a few days and ran
into all kinds of problems but have since solved most of
them. For a nice looking liquid I set the appropriate color
for the drink. I used '0' for Luminosity, Diffuse level,
Specular level, and Reflectivity (since mine was in a bot-
tle, I gave the specular and reflective values to the bottle
itself, not the liquid, but in your case you may need to
give both of these some values). I used Transparency 85% and
gave it a Refractive Index of 1.2 with Color Filter, Smooth-
ing, and Double Sided ON. When rendering make sure you turn
on Trace Refraction. My bottle has a 98% Transparency,
a Surface Color of 225, 225, 225,   100% Luminousity,
Specular level 100%, Glossiness = High, Refelectivity set at
15%, Refractive index 1.1, and I turned Color Filter ON,
Smoothing, and Double Sided. I used shadow maps to cast a
shadow and the final image looks excellent. Maybe you can
incorporate some of this into your project.   I just kept
rendering test frames in low res, tweaking this and that
each time until I got it right.

1.82   Dual layer Textures With Transparency

```
--------------------------------------------------------------
           Dual Layer Textures Using Transparency
--------------------------------------------------------------
```
QUESTION: What I'm trying to do is have the white part of
an image be transparent to an underlying procedural texture
and have the black part of the image superimposed on top of
it. I've tried using a Transparency Map, but it makes the
whole surface transparent where it's white, instead. What's
the trick?

LW does not treat the various surface settings as seperate,
overlapping layers, but instead, as a hieracrchy with Trans-
parency being the highest (over-riding) attribute. Thus, to
accomplish what you're asking requires that you have actual
surface layers by making an slightly larger object from the
original and use this to map your B/W image on to.

You can do this by taking your base object into Modeler and
select all the polys assigned to the surface in question.

Copy them to another layer and give them a different name,
something relating to being a transparency.   Put your base
model in the BG and select a view that gives the clearest
side view of the copied polys and model.   SLIGHTLY move the
copied polys out away from the center of the model, even a
millimeter will do (use the Numberic button). If the copied
polys surround the object (like a sphere), use the Size
function and Numeric to increase the polygons a fractional
amount, say a factor of 1.01 or so.

Save these polys as a new object and load it up along with
the base model. Now you can use your Tx map OVER your under-
lying Surface map.

1.83   Making Seamless Texture Maps

```
-------------------------------------------------------------
                Making Seamless Texture Maps
-------------------------------------------------------------
```
Here's a good trick to render your own seamless Fractal
Noise bitmap!

1. Start with a single rectangular polygon that fills your
    screen. Don't worry if it hangs off the edge.

3. Create the surface you would like to have repeat includ-
    ing any fractal texture you want.

4. Select Save RGB and render a frame.

5. Run ADPro and load the image you just rendered.

6. Use the Crop Visual operator to crop away all of the
    image EXCEPT for 50 pixels on the right side. Save this
    part of the image (50 x 480, if you used Medium Res) to
    the TEMP buffer.

7. Load the original image again.

8. Use Crop Visual to crop away the 50 pixels on the right
    side (leaving 702 x 480 in Medium Res).

9. Set the Compose/Replace/Landscape cycle gadget to Compose
    (ADPro 2.5 only).

10. Open the Backdrop Loader.

11. Set Type to Gray, Mode to Gradient, Width to 50 and Height
    to whatever the height of the image is.

12. Set the color of the two left rectangles to white (value
    255) and the two right rectangles to black (value 0).
    This will create a grayscale gradient spanning 50 pixels
    from white to black. Select OK.

13. The ADPro Composition Screen opens up. Select As Alpha.

14. When control returns, load the TEMP buffer.

15. The ADPro Composition Screen opens up. Make sure X and
    Y offsets are 0, Mix is 100, and Alpha is set to Alpha
    Memory.

16. Select Compose.

17. Save your finished image.

Why is this seamless? You've effectively rolled the image
into a cylinder with a 50 pixel overlap. Thanks to the Alpha
channel gradient, the left edge fades in as the right edge
fades out.

A similar procedure can be used to make the top and bottom
seamless, also.

If you find that 50 pixels looks rough on your textures, ad-
just accordingly: you can create a gradient up to 256 lines
wide without repeating a single color, and thus have a wide,
perfectly smooth fade from one edge to the other.

There's also a fairly easy way to do this in Toaster Paint,
if you don't mind trying to work around the 1/4 screen limi-
tation.

1.84   Diffuse And Specularity Interactions

```
-----------------------------------------------------------
          Diffuse And Specularity Interactions
-----------------------------------------------------------
```
QUESTION: How does Diffuse interact with Specularity and
shadows?

Here is a quick way to think about the different surface
attributes.

Picture a wooden ball. It's fully diffuse (light reflects
off the entire surface). Paint it with varnish.   It's now
less diffuse. It gets "generally" darker, yet has the same
color as before as you look at it where the light is direct-
ly perpendicular to the surface, but gets darker faster as
the angle of incidence to the light increases).   Now, buff
that ball a little, and you start to see a foggy highlight.
You have now increased the specularity. Polish the ball un-
til you get a tiny, hard highlight.   You've now increased
the gloss, yet the diffusity and color remain the same. Gen-
erally, the only time you'd reduce the diffuse setting on a
surface is if you're trying to make it look varnished or
shiny (shiny objects are never 100% diffuse). This goes hand
in hand with the specular setting which determines the kind,

size, and highlight strength the surface will have.

1.85   Using Additive Surfaces

```
--------------------------------------------------------------
             Using The Additive Surface Button
--------------------------------------------------------------
```
QUESTION: What is the Additive button on the Surface Panel
good for? What exactly does it do, and what would be a pos-
sible use of it?

Lightwave Layout page 28 explains it all.   It has been used
successfully to create static electric fields by setting the
object to black and applying a texture like Underwater with
a light blue color and setting Additive ON. The manual gives
another couple of uses for this setting.

1.86   Simple Clip Mapped Christmas Tree

```
--------------------------------------------------------------
             Simple Clip Mapped Christmas Tree
--------------------------------------------------------------
```
Christmas tree:

What you need is an image of a tree. Make yourself a christ-
mas tree shaped image, black on white. Using your favorite
software, throw it through some sort of noise filter so that
the black shape is still noticable but it has grey and white
holes all over it. The best way I can explain this "look" is
the way the shadow of a tree looks during the summer, with
the sun shining through the leaves. Try and leave it more
solid towards the center (to simulate the trunk and increas-
ed density of leaves)

You will use this as a clip map in LW by taking 2 flat poly-
gons and intersecting them at right angles.   You'll have an
extruded X shape. Clip Map your polygons with the image you
created and set the surface color to a dark green. Now,
when you view the tree at most angles (except from below or
above) it will look just like a tree. BTW, this only works
for trees at a distance from the camera... if it's going to
be close, you either need more than two polygons intersect-
ing, or you need to build a tree model... for this I'd sug-
gest maybe looking for an arexx macro to do this...

There is no snow on this tree, so you might want to use a
surface color map of the same image but colored so that
there's a brown trunk and green and white leaves... then you
might want to add some fractal noise as a diffuse map to
"dirty up" the tree a bit... making it look more realistic.
Under the clip map settings... make sure antialiasing and
pixel blending is off... you also might need to toggle nega-

tive image, depending on whether your original image was
black on white or white on black.

1.87   Making 2D Cutouts With Clip Maps

```
-------------------------------------------------------------
                Making 2D Cutouts Using Clip Maps
-------------------------------------------------------------
```
QUESTION: How do I import an image or brush into Layout and
convert it into a 2D cutout following the edges of the image
(like a tree) rather than rendering the whole polygon?

Make a version of your brush in a paint program that is pure
white where you want the tree to be, and pure black where it
isn't. Now, save your brush with the same name and file
extension .clp and use this brush as a Clip Map on a flat
polygon object with Negative Image toggled on and no anti-
aliasing or pixel blending (they cause problems with clip
maps). Use your original brush as a planar image map with
the same dimensions as the clip map and only the tree will
be rendered.

1.88   Good Defualt Environment Scene

```
-------------------------------------------------------------
                Good Default Environment Scene
-------------------------------------------------------------
```
QUESTION: I have tried setting up a default scene which in-
cludes a ground object, a sky object w/clouds, and 2 lights
that simulate sunlight. What are some suggested light set-
tings and positions for these objects?

Step 1: In Modeler make a polygon 8 Km square, centered at
         0,0,0. Change the surface name to "Ground" and save
         the object as "Grassy_Field".

Step 2: Move the square in Modeler so that the Y value is
         1000 meters. Flip the polygon. Change the surface
         name to "Sky" and save as "High_Stratus."

Step 3: Go to Layout, load these two objects. Set the
         Camera position to 0, 1.6, 0 (for eye level) and
         create a key. Change the grid size to 10 or so.

Step 4: Go to the Effects menu, and enter the following:
         Turn off Solid Backdrop,
         enter these values for the backdrop colours:

             Zenith: 15, 75, 125
             Sky: 190, 190, 200
             Ground: 190, 190, 200
             Nadir: 15, 75, 125

```
          Gradient Squeeze: 5, 5

          Turn on Backdrop Fog, and choose Non-Linear 1.
          Set the maximum fog distance to 15000.

Step 5:   For the grass, make these surface settings:

          Colour: 80, 154, 59.
          Colour Texture: Fractal Noise
          Texture size:   .2, .2, .2
          Texture Colour: 68, 91, 43
          Frequencies:    3
          Contrast:       1

          Bump Map Texture: Fractal Bumps
          Texture Size:     100, 100, 100
          Texture Amplitude: 50%
          Frequencies:       5

Step 6:   For the Sky, make these surface settings:

          Colour: 255, 255, 255
          Transparency: 50%
          Transparency Texture: Fractal Noise
          Texture Size: 300, 300, 1200
          Texture Value: 150%
          Frequencies:   5
          Contrast:      1.5
```

(Remember to SAVE OBJECTS to anchor these settings to the objects)

1.89   Creating Electric/Static Fields

```
-------------------------------------------------------------
           Creating Electric/Static Fields
-------------------------------------------------------------
```
QUESTION: What settings for the Marble texture creates a static electricty-like field? I've gotten the Underwater texture to look pretty good, but think a bit of Marble velocity could accent or generate a totally new effect.

Here are some settings and suggestions:
Copy object and size it slightly larger than the original and give it a new surface name like "static."   Use polygons and select half the object and name it "static1." Parent the object to original. Your original object probably has many surfaces, the slightly larger object only has two surfaces (for nice variations try slicing the object in to irregular shapes with surface names 'static2, static3... etc).

Settings depend highly on your object, which direction...etc

```
SURFACE 0,0,0 --> Texture = MARBLE
                  TEXTURE CENTER Y = -5.0
```

```
                             T-FALLOFF Y = 10%
                             T-VELOCITY X = .01, Y = .01, Z = .07
                             TEXTURE COLOR = 224 201 0
                             FREQ= 3
                             TURB= 0.5
                             V SPACE 0.5
                             V SHARP 6.0
```

```
LUMINOSITY 200%
ADDITIVE ON
EDGE = TRANSPARENT
SMOOTHING ON
```

Now, do the same for "static1" but when you get to Texture
velocity give it a negative direction.   As you can see by
having more then one surface we can give the illusion of bi-
directional travel. If the object had more surfaces we
could use an envelope to fade the texture in and out while
changing the velocity (X,Y,Z) for each location. This gives
the static energy discharge a little bit of presence.

1.90   Making Depressed Foot Prints

```
----------------------------------------------------------------
                   Making Depressed Foot Prints
----------------------------------------------------------------
```
I have used grey scale anims of foot prints as Bump and Dis-
placment Maps. Create the anim of the prints using Dpaint
brush options to create gradient fills. Make two prints for
left and right foot. Make simple brush anims of foot prints
and stamp them along as big a picture as your memory allows.
I   used the anim as a Bumb Map for wide shots and the Dis-
placment Map for zoomed in shots. Also I was creating an
invisable man. If your object making the prints is visible,
I would use the Displacment Map, allowing you to see the
print for positioning.

1.91   Creating Force Fields

```
----------------------------------------------------------------
                     Creating Force Fields
----------------------------------------------------------------
```
QUESTION: How did they create the electricity effect on Bab-
ylon 5 when a StarFury was disabled by a Minbari cruiser?

Mojo writes, in Lightwave Pro, that you use the Underwater
texture on a slightly larger version of the object you want
to have the electricty on. He mentions to change the
Surface Color to black, select a bluish tint for the Under-
water Color and make sure the object is Additive, which will
cause anything black to be transparent and anything that's
not (the water effect) to show up. You then parent this

larger version to the original.

1.92   Simulating Backlighting Glows


```
--------------------------------------------------------------
            Simulating Backlighting Glows Pre LW 4.0
--------------------------------------------------------------
```

QUESTION: Is it possible to make object surfaces become
lights?

Unfortunately, multiple light sources become computationally
intensive very quickly. Therefore, unless you're running LW
on a DEC Alpha or a Raptor, chances are you should avoid
area or diffuse lighting like the plague!

One trick to give you the effect you want, for backlit let-
ters for example, would be to use a Luminosity Map on the
background behind them to simulate the light shining on it.
You may also need to use a color map to desaturate the lit
region if the glow is supposed to be very bright.

1.93   Studying Grid Value vs Falloff


```
--------------------------------------------------------------
               Studying Grid Value vs Falloff
--------------------------------------------------------------
```

It should be understood that grid spacing values represent
the proportion of the texture size that the grid covers, ie,
0.5 is half the area, 0.75 is three quarters, 1.0 is all of
the area, or a solid texture. If this is true, going above
Line Size = 1 should not affect Falloff, since Falloff only
affects the VALUE of the texture, not any of the other para-
meters.

However, following is a table that seems to demonstrate other
wise. The Grid Texture was rendered once with a Grid Size of
1 and a Falloff of 50%, and once with a Grid Size of 2 and a
Falloff of 50%. No difference was seen. However, if you want
a texture to start falling off a few meters from the center
give it a texture value above 100%.   Look at the comparison
table.

(this one starts falling off VISUALLY at 1.5 meters)

Texture	Texture	Value at			
Value	Falloff	Center	1M	2M	3M
100%	50%	100%	50%	0%	0%
400%	50%	400%	200%	0%	0%

```
--------------------------------------------------------------
```

```
(this one STARTS falling off VISUALLY at 3 meters)

 100%        25%        100%     75%  50%  25%
 400%        25%        400%    300% 200% 100%


------------------------------------------------------------

(this one STARTS falling off VISUALLY at 2.25 meters)

  50%   33.3333%         50%   33.3% 16.7%  0%
 100%   33.3333%        100%   66.7% 33.3%  0%
 400%   33.3333%        400%  266.7% 133.3%  0%


------------------------------------------------------------
        (assume a grid texture with grid spacing of 1)
```

Notice that the falloff in all cases is ABSOLUTE.   That is,
a 50%/meter falloff will reduce 100% to 50% in 1 meter, and
400% to 200% in one meter. So the 50%/meter means "reduce by
50% OF the value", NOT "subtract 50% FROM the value."

1.94   Using Grid Falloff

```
------------------------------------------------------------
                    Using Grid Falloff
------------------------------------------------------------
```
The trick in working with the Grid Texture to make gradients
using Falloff is to not think of the texture as a grid, but
as a SOLID plane IF AND ONLY IF the grid line SIZE is set to
1 (100%). After that is done, Texture Size has NO effect on
it, so it doesn't matter what they are set to.

Use Automatic Size to get the length of the object you want
to apply a gradient to, end to end. The axis with the larg-
est value is usually the same axis for the falloff value.
The size value on this axis is also valuable in setting the
Texture Center value. Use it to place the start of falloff
at the far end of your object if its other end lies on Mod-
eler's origin (0, 0, 0). Otherwise, use one half the value
if the object is centered on 0, 0, 0. A negative value can
be used to move the texture's center to the opposite end in
these cases.

To calculate the Falloff Value, divide 100 by the length of
the object as given in Texture Size by Automatic Sizing.
This maps the falloff from 100% to 0% over the full lenth of
the object. If a shorter gradient is desired simply increase
the Falloff value; a longer gradient, decrease the value.

1.95   Realistic Lake Water And Waves

```
--------------------------------------------------------------
                 Realistic Lake Water And Waves
--------------------------------------------------------------
```

QUESTION: What is a good way to create good looking lakes?

Create a 1 meter square polygon, triple it, Array Clone it
into a 100 x 100 mesh of a couple thousand triangle polys,
and Merged Points. Displacement Map it using Ripples with 2
to 3 frequencies, an amplitude of 20-30%, and a wavelength
and speed to match the size of the object.   Using this
method allows you to SEE the actual effect of the mapping in
a wireframe preview.

Next, Surface Color it a lovely shade of blue, a fractal
noise texture color slightly darker that the main color, a
fractional velocity on the Y axis so that the shape of the
texture changes as it intersects the mesh, a 50-80% medium
speculatiry (no color highlights), and 100% diffusion.

Then apply a fractal noise Bump Map texture at 100-200%
amplitude at 1/10 - 1/20th the Surface Color fractal noise
texture size and with a Y axis velocity at 5 times.

Place a Point lihgt in front of the camera a couple 'hours'
above the water's surface with lens flares ON set to Central
Glow active only at 50-70%.

Renders show a nicely rolling, sparkely surface like a calm
lake with 1 to 2 foot waves.   The Bump Map is really the
texture that makes it work, simulating the random choppiness
of water while displacement ripples gives the gental undula-
tions of the slower larger waves.

1.96 Making Laser Beams

```
--------------------------------------------------------------
                  Making Laser And Light Beams
--------------------------------------------------------------
```
LIGHTBEAMS

Simply make a 1 meter long DISC with 32 "sides" along the X
axis. Select all the points of one end and STRETCH them
equally in both directions so that they form a much smaller
CIRCLE, giving you a truncated cone. CUT the two "end cap"
polygons and apply a surface to the remaining side polygons
something like "spotlight" and save or export this object as
"spotlight." Center the small end at 0, 0, 0.

In Layout,define your spotlight object's surface:

```
    Surface Color: (whatever color you want your lightbeam)
    Luminousity:  100%
    Luminousity Texture:  Grid -- Falloff: 100 on X axis
                                   Line Thinckness:  1
```

                                        Texture Value: 0%
                                        Additive: On
                                        Diffuse: 0%
                                        No Specularity
                                        Edge: Transparent
                                        Edge Threshold: 2

The Grid texture creates a smooth falloff for Luminousity,
getting darker until 0% luminous at the wide end of the
lightbeam. Additive is a neat way to fake transparency. Any
part of an object's surface that's BLACK is 100% transparent
to anything behind it. So, with the Grid texture creating a
gradient falloff to black, the lightbeam becomes progres-
sively transparent without having to set up the Transparency
Texture. The Edge setting of Transparent makes the sides of
the lightbeam fuzzy instead of hard.

Now PARENT the small end of this object to your light (type=
spotlight) and rotate it to match the beam's direction. Set
the light's cone angle and edge to 10 degrees each.

LASERS

Make a V E R Y   L O N G tube using the DISC Tool, default
16 sides. COPY and paste this down in the next layer and
STRETCH the diameter to twice as large as the original.
Select the first layer and surface the small tube beam as
"InsideLaser." Select the next layer and srface the larger
object as "OutsideLaser."   Save or export as "LaserBeam."

Define the inside surface using Surface Color Fractal Noise,
Luminousity 100%. Surface the outside using Transparency
Fractal Noise at 100% Value, Edge to Transparent, Thres-
hold = 2, Surface Color same as the inside color (or maybe
something just a bit different), and Luminousity at 100%.
Set each Fractal Noise velocity to a large setting so that
the texture moves a large distance from frame to frame on
whatever axis the tube was created.

1.97   Using An Image Map To Make Bricks

              Using An Image Map To Make Bricks

QUESTION: I need a 100 x 200 ft split-faced block wall (8"
x 16" cinder block with an uneven rough face).   How do I
create one?

What you are going to have to do is to create a "repeating"
bitmap to make the bricks. You can control how many times
the map repeats by adjusting its Texture Size in the Texture
control panel in the Surfaces menu.

Let's do the math: you have a wall that is 200 ft wide, and
blocks that are 16" wide so, there will be 150 bricks across

the face of this wall. The wall is 100' high and the bricks
are 8" tall so, there will be 150 bricks up the face of the
wall.

Let's say you create a nicely detailed bitmap that has 2
bricks across, and 2 bricks tall.   You don't have to worry
too much about the relative proportions of the bricks, but
they should be fairly close to what you want. It would look
something like this:

```
    -------+-------
           |
           |
    -------+------+
                  |
                  |
    -------------+
```

Make sure that when this map is butted up against itself on
all 4 edges that it tiles perfectly with no visible seam.
Keeping the mortar at the edges will help accomplish this.

Now, you have to position this on your wall. The trouble
here is that you're working with inches and feet and Layout
is stricly metric. This is no problem though -- you don't
have to do any conversion. Simply do this... apply your
bitmap to the wall, and choose Automatic Sizing". This will
take your 2 x 2 brick map and stretch it to cover the entire
wall. Then, go into the texture size, and you'll see some-
thing like so:

X 60.96
Y 30.48
Z   1.0

What you need to do is to divide the X and Y numbers by 75
(150 is the number of bricks we need, and half of that be-
cause our bitmap is 2 bricks wide and tall).   So, plug in
these values:

X 0.8128
Y 0.4064
Z 1.0

Your wall should now be completely covered with appropriately
sized bricks in perfect scale.

1.98   Making Neon Font Outlines

```
------------------------------------------------------------
                Making Neon Font Outlines
------------------------------------------------------------
```
QUESTION: I've been experimenting with creating glowing, ie.
neon-lit objects, by extruding 2 disks along a path.   What
I'd like to do is use some regular PS fonts. The problem is

how would I create a slightly larger copy of the text?   The
Size and Stretch functions will enlarge the font, but what
I really need is an outline?

The easiest way to do this is by doing a bevel operation on
the PS font. Make your letters with the Text command, then
bevel the flat faces. Use a negtive inset value to make the
bevel come out LARGER than the letters (as opposed to the
normal bevel's function, which is to make them smaller).
Make sure you still assign a shift value so it'll be easier
to select the polygons you'll want to keep.   Next, select
the polygons you don't want with Volume Include and Kill (k)
them (this may possibly make some 2-point polys you'll have
to delete from the Stats/2 sided panel).

The catch: this will only work if you need to enlarge some-
thing FLAT (like a normal bevel would be good for). The only
way to make a path for the extrusions would be to select the
outter points making up the bevel manually (in the correct
order).

1.99   Making Babylon 5-Like Nebulas

```
-------------------------------------------------------------
                Making Babylon 5-like Nebulas
-------------------------------------------------------------
```
QUESTION: Anyone know how Ron Thorton makes those BEAUTIFUL
Babylon 5 nebulas in LightWave?

One way is to paint the nebula in a 24-bit paint package
using a spray paint or some other tool that paints with soft
edges.

(Map it as a Luminosity and Transparency Cylinderical Map on
an object made from half of a 1000 Km diameter sphere that
has all but two rows of polygons above and below the
"equator" cut. Set the Width Tiling to 2 so that the full
width of the image fits into the 180 degree arc of the ob-
ject it's mapped onto. -- Editors)

1.100   Sand Storms Using Procedural Textures

```
-------------------------------------------------------------
              Sand Storms Using Procedural Textures
-------------------------------------------------------------
```
QUESTION: I'd like to make a storm of some kind with wind
blowing dust around and I don't know how to create this.

A moving fractal noise texture used as both a Color Map and
a Trasnparency Map should do the trick used on sphere sur-
rounding your pyramid. Depending on your camera placement,
you might want to use more than one. If the camera is placed

inside the sphere be sure and flip the polygons inward.

Study the cloud texture in the texture examples scene to get
ideas on how to do this.

1.101   Making A Desert Landscape

```
------------------------------------------------------------
                  Making A Desert Landscape
------------------------------------------------------------
```
QUESTION: I'm trying to make a desert-like landscape like
one I saw on an Aminet animation called Waves. It used Dis-
placement Mapping to give a flat plane a rippled surface.
I've fiddled with this, but I can't seem to get the hang of
it. How does Displacement Mapping work?

First Question... What are you using for your flat plane?
A single square poly WON'T work! You need a dense mesh of
triangle polys so that their vertices can be displaced by
your image map or procedural texture. To make one, make a 1
meter square flat poly, then triple it. Array Clone it to
make a mesh grid (100 x 100). Don't forget to MERGE POINTS!

Displacement Mapping moves the VERTICES of polygons, deform-
ing them to fit the luminance values of the image or proced-
ural being mapped. Without thousands of points, Displace-
ment Mapping can't work its deforming magic. Thus the reason
a single poly with only 4 points can't be deformed.

Here's a tip... after setting up a Displacement Map using
the RIPPLES procedural on this large 100 x 100 meter mesh of
polys with a pleasing "ripples in the sand" effect, "Save
Transformed" as another object. Now take this new "deformed
with ripples" object mesh and apply to IT a Displacement Map
of fractal noise on a large scale and amplitude in order to
create your dune structures, the ripples "riding the waves."

1.102   LightWave And Toaster Specific BBS's

```
------------------------------------------------------------
            LightWave And Toaster Specific BBS's
------------------------------------------------------------
```
Here are several BBS's that I call frequenty and are worth
every penny.

Ron Kramer's Obstical Illusion: (616) 791-2109 (Michigan)

The Lightwaved BBS: (510) 228-0886 (Florida)

NewTek's BBS: (913) 271-9299 (Kansas)

1.103   NewTek BBS Number

```
------------------------------------------------------------
                   NewTek's BBS Number
------------------------------------------------------------
QUESTION:   What's the number to the Newtek BBS?

Newtek BBS : 913-271-9297

(also mirrored as an Internet FTP via  ftp.newtek.com

login name = ftp,   login pswd = your email -- Editors)
```

1.104   Paths From An Extruded Object

```
------------------------------------------------------------
           Motion Path From An Extruded Object
------------------------------------------------------------
QUESTION: I know you can take a camera or object motion path
and create an object that follows that path, but is there  a
way to create an object first and then create a motion  path
for the camera that follows the shape of the object?  I want
to   create   the   object  first,   then   have   the camera move
through it.

If you create your object with a curve (ie via rail extrude)
the Path-To-Motion macro will take that curve and write  out
a motion file.
```

1.105   Saving A Scene Layout As One Object

```
------------------------------------------------------------
           Saving A Scene Layout As One Object
------------------------------------------------------------
QUESTION:   Does anyone know of a utility that will  save  a
Lightwave scene's objects as a single object?   If  not, how
can one save all the objects in a scene as one object, with-
out having to rebuild/reposition them manually in Modeler?

1: Load up the scene you want to save as a single object.

2: Go to the Objects menu, and for each object in the scene,
   use the SAVE TRANSFORMED function to save it under a sim-
   ple temporary name in a common directory.

3: Clear the scene, and enter Modeler.

4: Load each object you just saved from Layout into Modeler,
   in ONE layer.  Since you saved them from Layout with SAVE
   TRANSFORMED, the objects will load into modeller with the
   size, orientation, and placement they had in layout.
```

5: Save this new object out.

Note that this will affect any bitmap placements on object
surfaces, and may affect various textures as well. You will
likely have to reload the new object into Layout and inspect
and adjust some of the surfaces.

1.106   Saving Hollywood FX Objects

```
----------------------------------------------------------------
                  Saving Hollywood FX Objects
----------------------------------------------------------------
```
Concerning saving scenes from Hollywood FX, when you install
the program, it creates a "Work" directory in the Toaster
directory. It should be something similiar for the stand-
alone version.

In that Work directory, there are 3 directories: Images, Ob-
jects, and Scenes. The Images and Scene directories are ac-
cessible and filled at all times so you can access the scene
directory at any time. The Object directory is empty.

Hollywood FX accesses the objects as it needs them for each
individual scene it renders.   This means that the only ob-
jects that are in the Object directory are the ones that
Hollywood FX is using at that time. While rendering, Alt-M
out of the render and use a directory utility to look in the
HFX Object directory to get your objects.

Remember, after each render Hollywood FX deletes the objects
from the Object Directory. If you want to save every object
that Hollywood FX uses, you'll have to load each scene file
and start to render, Alt-M out of the render, then save the
temporary objects in use into a diefferent directory.   You
can then abort the render and start the next, etc.

1.107   The Internet LW Mailing List

```
----------------------------------------------------------------
                  Internet LightWave Mailing List
----------------------------------------------------------------
```
Sent an e-mail msg to:

listserv@netcom.com

with the following in the body of the msg:

SUBSCRIBE listname address

where:

 subscribe = the word subscribe,

```
  listname = lightwave-l ...for the LightWave list,
            toaster-l   ...for Toaster list,
   address = YOUR internet e-mail address.
```

1.108   Common Errors From Boolean Usage

```
----------------------------------------------------------------
                Common Errors From Boolean Usage
----------------------------------------------------------------
```
QUESTION: Have any of you been getting the error message:
Polygon Partitioning Error: Add Small Offset To Data And
Retry Again?   I get these A LOT when using the Boolean
Union funtion. It usually happens when dealing with polygon
counts in the thousands.

2 reasons and a tip:

Reason 1: Boolean functions REALLY don't like non-planar
           polygons, including degenerate polygons -- poly-
           gons in which more than one of the points occupy
           exactly the same coordinates.

Reason 2: Boolean functions aren't much happier with seper-
           ate polygons for which one polygon has one or
           more points occupying the same coordinates as one
           or more of the seperate (unmerged) points in the
           other polygon.

Merge Points in the area of the boolean operation for the
operation, then break the polygons into seperates again if
that's what your model calls for.

TIP: Select only those polygons that will be directly
      affected by the boolean operation. This will gen-
      erally speed up boolean ops tremendously, giving you
      that partitioning error without the wait. ;-)

1.109   Tips On Using Boolean Operations

```
----------------------------------------------------------------
                Tips On Using Boolean Operations
----------------------------------------------------------------
```
When using Boolean operators make sure you ALWAYS check for
doubled points. Some operators leave 2 points where there
was only one and some do not.   Subtract is one of the them
that does. Always Merge Points after useing Boolean opera-
tors just to be sure.

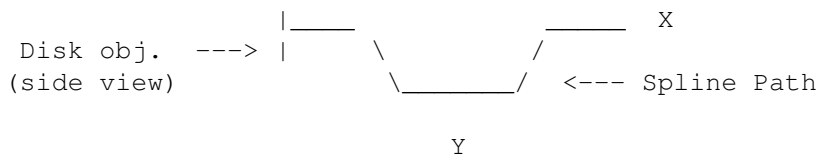## 1.110   Basics On Using Rail Extrude

```
-----------------------------------------------------------
                Basics On Using Rail Extrudes
-----------------------------------------------------------
```

QUESTION: I got LWPro magazine, and spotted the tutorial on
spline usage, but I didn't get as much out of it as I would
have liked. What are some tips on Splines and perhaps a real
application example?

Without getting too technical or detailed, here are some
examples:

Making Handle bars for a bicycle:

Use the Sketch tool in the objects menu to make a curve in a
handle bar shape, like this:

```
                      |____            _____   X
      Disk obj.  ---> |      \        /
      (side view)            _____/  <--- Spline Path

                          Y
```

Below the Sketch button, select Make.   Now that your spline
rail is made, go to the disk tool and make a flat disk about
1" in diameter on the X axis like above.   Be sure to make
this in another layer with the spline in a background layer
so that you can postion the center of the disk exactly where
the first starting point of the spline (indicated by the
diamond symbol when you use Polygon select at the bottom of
the screen).

Once every thing is in place, choose the Rail Extrusion tool
from the Multiply menu. For now, just try the default set-
tings and hit OK. The disk should have extruded along the
spline curve, creating smooth bends in the bar (disk).

Note: If the polygons are turned the wrong way in the fin-
ished product, you can flip them back or flip the disk be-
fore performing the extrusion. Also, for a more realistic
set of handle bars, try manualy entering the points into
position and then selecting the Curve button under the Tools
menu to create a spline from the selected points.

Try pulling the ends of the spline into the negative Z axis
and then perform the extrusion. If you do this, you'll have
to reposition the disk so that it's aligned with the spline.
The object that is to be extruded must be at the starting
point of the spline, and whatever angle the object has rela-
tive to the spline, it will be maintained throughout the ex-
trusion, so be sure to have it postioned properly.

With this technique in mind you could make the bicycle's
frame, a water slide (by extruding a U shaped polygon along
a winding spline), or a high banked turn for a race track
(by extruding a short and wide rectangle).

1.111   How To Make A Spring Object

```
---------------------------------------------------------------
                   How To Make A Spring Object
---------------------------------------------------------------
```
QUESTION: How can I create a spring object?

Rail Extrude is what you want. Make a spiraling spline curve
and in another layer with the spiral curve in the background
layer, make a small disc and orient it so that it points
along the path. Click Rail Extrude.

(Or, you could use this easier approach.   Make a small flat
1 mm circle poly on the XY axis and offset -40 mm on X.
Select Clone on the Multiply panel and under Numeric enter
Clones = 360, Angle = 3600, Y axis Offset of 20 mm, and all
other fields defaulted.   Click OK, and Make.   A perfect
spiral spring having 10 turns and 36 sections per turn will
be created -- Editors).

1.112   How To Make a Wood Screw

```
---------------------------------------------------------------
                   How To Make A Wood Screw
---------------------------------------------------------------
```
QUESTION: I'm trying to model a screw and was wondering if
anyone has any ideas on how to build the tapered part of it?
How would you go about making the threads that winds down to
a point?

Create a notch cross section using the Disc tool with only 3
sides so that it looks like "<".

Use the Lathe command with an offset equal to the height of
the notch, an end angle of a say 3600 degrees (10 rotations)

Use Taper to "wind it down"

1. Make a flat triangle (use disk with 3 sides and no depth)

2. Rotate it if needed so that one side is parallel with the
   axis of the screw.

3. Move the triangle away from center in 1D, 1/2 the width
   of the base of the screw.

4. Lathe 360 degrees with an offset of exactly the width (or
   less) of one side of the triangle. The offset determines
   the pitch of the screw. What you now have is, to coin a
   phrase, "one turn of the screw."

5. Clone as many as you need to make up the length of the
   screw, offset exactly half the length of one turn.

6. Taper.

This will make a wood screw. For a machine screw use a
trapezoid on it's side instead of a triangle and don't taper.

1.113 Making A Drill Bit Object

```
------------------------------------------------------------
                    Making A Drill Bit Object
------------------------------------------------------------
```
QUESTION: What's the easiest way to make a drill bit object?

Create a bit cross section by making a flat disc with 2 half
circle notches cutout on either side. Extrude it with lots
of segments, then use twist to make the notches spiral down
the length.

Finally, use a boolean subtract to cut a point on the tip.
Make sure to triple all non-planar polys before the boolean.

1.114 Using Toaster Arexx and Modeler Macros

```
------------------------------------------------------------
            Using Toaster And Modeler Arexx Scripts
------------------------------------------------------------
```
QUESTION: Can someone tell me how to use the Arexx port of
the Toaster and LightWave's Modeler?

What you need to do is doubleclick on the RexxMast icon
(for os/3.0).   It's probably best to just drag it into the
WBStartup drawer so that it executes on startup.   You can
find RexxMast in the WorkBench system drawer.

Most of the LW scripts are run from Modeler along with all
of the Modeler scripts. To do this you have several options.

1) Click and hold the Macro botton in Modeler's object menu.
   You will see a list of macros (arexx scripts).   You can
   pull the mouse down through the list untill you reach the
   one you want to run.

2) At the top of this list, you will see these options:
   Configure List, Configure Keys, Direct Command

   A) Configure List allows you to add/delete, along with a
      few more options) macros to and from the list mention-
      ed above.

   B) Configure Keys allows you to add and delete macros to
      and from you're F-keys. Simply click on one of >>
      buttons and a requester will pop up showing you all of
      the macros in the lwm directory.   Choose one and that

macro will now be assigned to that paricular F-key.
Very useful for macros that you use alot.

C) Direct Command allows you to execute a macro by
   clicking on the >> button and choosing a macro from
   the requester or possibly by entering a rexx command.
   The later I'm not sure about.

3) As far as the TPaint scripts, go into TPaint and hot key
   back to the WorkBench by hitting the left Amiga-M keys.
   Open a shell and type the follwoing:

        RX HD3:Toaster/Arexx_Examples/TPaint/TPBars.rexx
        ^   ^^^^^^^^^^^^^^^^^^^^^^^^^   ^
        | | |
Drive/Partition – Complete path to the script – Script name

Read the scripts in a text viewer before executing. Usually
the authors will have a discription of the script and some-
times instructions in the header.

1.115 Avoiding Bugs When Metaforming

                Avoiding Bugs When Metaforming

QUESTION: If I triple a extruded font and later metaform the
object, when I render why are there many strange errors on
the face sides? I want to build rounded letters.

There appears to be a bug in Metaform which flips polygon
surfaces under certain conditions. For example, when the
polygons get real small, or when the surface face is slight-
ly non-planar.

Try to avoid this problem by using un-tripled polygons only
during Metaform. This seems to help. It means you have to
use 4 point polygons only, but this is not difficult if you
plan from the beginning for it.

Tripling polygons prior to Metaform also increases object
"stiffness" and mutes the Metaform process, sometimes pro-
foundly. Better results are obtained when using only 4 point
polygons.

1.116 Metaforming A Phone Handset

                Metaforming A Phone Handset

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The documentation that accompanies LightWave 3.5 does not go
into too much detail regarding the function and use of the
"Metaform" subdivide tool in LightWave's Modeler. I have
created this step-by-step tutorial to illustrate the use of
this important, but underdocumented feature of the software.
By following this tutorial I hope that you will gain an un-
derstanding of the use of the metaform tool.

This tutorial assumes that you are very familiar with
Modeler 3.5 and have experience with creating points, poly-
gons, and modifying and manipulating objects.

The object that you'll create in following this tutorial is
the handset from an old-fashioned telephone. These hand-
sets were highly rounded, sculpted objects that would be
difficult, if not impossible, to properly model with the
standard lathe and extrude tools. The metaform subdivide
allows us to construct a very crude approximation of the
shape we want using simple-to-work shapes and tools, and
then creates the smoothly changing contours based on the
geometry of our original shape.

Step 1: To begin, create a rough outline of the general
         shape of one of the handset's ear/mouth pieces.
         (see~Figure~1)

         Looking at Figure 1, you'll see that I've used the
         minimum possible geometry. There is a point placed
         only wherever the curve of the final object will
         change direction.

Step 2: Lathe this shape but use only 8 segments. This will
         be adequate for the metaform tool to turn into a
         completely rounded shape and allows us to work with
         very simple object geometry.
         (see~Figure~2)

Step 3: Rotate this shape 22.5 degrees which will straight-
         en out the object so that we can easily add the
         handle.

Step 4: We need to make sure our geometry is as simple as
         possible. This means we must reduce the number of
         polygons as much as possible. Looking at Figure 3
         you will see that the top and bottom of the shape
         consist of 8 triangles meeting at a point in the
         center. This is a result of the lathing operation
         in Step 2. Using the right mouse button, lasso the
         top polygons then cut and paste them into another
         layer. Press "k" on the keyboard to kill (Remove)
         these polygons, leaving only the points. Select
         and delete the middle point and then construct 3
         polygons from the remaining points.
         (see~Figure~3)

         You need to make sure that the polygons you create

Step 5:   Repeat Step 4, but perform the operation on the
           lower 8 center polygons.   Lasso the polygons, cut
           them to another layer, kill the polygons, and
           delete the center point. Construct 3 new polygons
           and cut and paste them into the original object.

Step 6:   We need to create a hole to which we can attach the
           handle of the handset.   Metaform objects must con-
           sist of an external "skin" only -- there can be no
           "internal" polygons.   Therefore, we cannot simply
           make a handle and let it overlap into the ear/
           mouthpiece of the handset -- it must be attached to
           it and be part of the surface. The best way to make
           a hole is to remove a polygon from our shape. How-
           ever, if we were to remove an entire side, the
           handle attachement would be too large. Therefore,
           we are going to "slice" the object at a point to
           create a point at which we can cut the hole. Go to
           a new layer, and set your original layer to the
           background. Create a two point polygon that cuts
           through the object slightly below center.
           (see~Figure~4)

           Return to the original layer, and select the layer
           with the two-point polygon as the background layer.
           Use Drill in the Tools panel to "Slice" the object
           on the Z axis. At this point, it would be a good
           idea to Merge Points on the object so far.

Step 7:   Select the polygon on the top right-hand side and
           delete it.
           (see~Figure 5)

Step 8:   Rotate the entire object -12 degrees.

Step 9:   Move the entire object to the left.

Step 10:   Mirror the object.

Step 11:   Select the points around the "holes" that we creat-
           ed in Step 6.
           (see Figure 6)

           Note that there are 8 points selected. Copy these
           points and paste them in a new layer.

Step 12:   Create additional points to create the framework
           for a crude handle for our handset, which will join
           the ear and mouth piece.

Step 13:   Create polygons between these points to create the
           handle.

for metaforming contain no more than 4 vertices.
This is optimal. Cut the polygons you have created,
return to the original object, and paste them.

Remember that when picking points to create poly-
gons they must be selected in clockwise order if
the polygon's normal is to face you in the view you
are working in, and counter-clockwise if it is to
face away from you.

Step 14: Cut the handle and paste it into the original layer
which contains the ear and mouth pieces.
(see~Figure 7)

Merge the points. At this point, we have a good,
but crude, approximation of our final shape. It is
constructed entirely of 4 vertice polygons. It
would be a good idea at this point to check the
orientation of these polygons and flip any that are
facing the wrong way. Once you begin metaforming
this shape you will have too many polygons to deal
with in trying to fix normal directions then!

Step 15: In the Polygon panel, select Metaform under Sub-
divide. You should end up with something that looks
like.
(see Figure 8)

Step 16: If your object is going to be far from the camera,
you can skip this step. If your object is going to
be seen in close up, then I suggest that you repeat
the above Subdivide/Metaform operation again. This
will improve the smoothness and make the it more
realistic.

Step 17: Choose Polygon selection, go to the Display panel,
and select Stats.

At the bottom of the Statistics display, you will
see buttons marked "+" and "-" next to an item
called "Non-Planar." The metaform function has a
tendency to create non-planar polygons, which can
cause rendering errors. Pressing the "+" button
here will select all non-planar polygons in the ob-
ject. Then you can go to the Polygon panel and
choose Triple to divide these non-planar polygons
into triangles.

Step 18: Apply surfaces and save your object.

I hope that this tutorial has helped you realize the poten-
tial of the metaform tool.

1.117 Metaforming Organic Forms

```
-----------------------------------------------------------------
            Metaforming Organic Forms
-----------------------------------------------------------------
QUESTION:  I have the old Motion Man object, but I also need
```

to create other types of living creatures. I've been working
with rail extrusions, multiple RE's, patches, lathing, etc.,
and can't achieve the nice flowing curved shapes of a living
creature. What tool am I missing that can do the job?

SUGGESTION:

Use METAFORM, and make sure everything is made of 4 point
polys on your first subdivion pass. Also, make sure your
polygons are SINGLE SIDED, with points merged after opera-
tions like extrude, etc., and that there are no internal
polygons left in the interior of the object(s) you create.

Metaform's smooth curves and easy interface make creating
believable organic models comparativly easier (and better
looking) than using tools like CSG Booleans.

TIP: "Constructing creatures with bi-lateral geometry"

Working on creatures in separte parts is a good time-saving
idea. I like to start with the head first, which helps me
get a feel for what the rest of the body should look like.
It's always a good idea to save any changes in a seprate
file as you go. Once you have a head, you can use it over
and over in different metaform projects. Working in scale
is always a good idea and helps if you can find real-world
measurments for your objects.

All you need now is one arm and one leg, created in the same
4 point manner. I like to trade off between doing these
parts so that it saves me from going mad and lets me take a
fresh look at the other parts when I go back to them. Make
sure to save each revision as you go in case you need to go
back if the software gets cranky and messes with your
object. For example, if Merge Points merges TOO MANY points,
then you may have accidently ruined your object for Meta-
form. To check, copy the metaformed object and paste into
an empty layer and give it one pass with Metaform. If it
looks weird, you may need to start fresh (re-boot) and load
up you last saved version. This is the safest way I've found
around this problem.

TIP: Putting it together

Use mirror to make a copy for the appendages on each side of
your meta-object and position them in the rough positions
you want. The only object you need at this point would be a
chest area, which everything is connected to. All it really
is, is a box that has been subdivided by other boxes on its
surface. Cut out the polys between where your arms, legs,
and head will attach. There should be NO polygons between
the attachment!

Make sure the point number between the objects match, so
that you have a fully attached part. Use WELD or merge
points to connect the parts. Some manipulation of your ob-
jects will be always be required, no matter how well you

pre-plan. Save your work and then test render a single pass
metaform or your new object to look for rendering errors.
Parts that are not fully attached will have a sharp looking
line around the joined area. This should help you hunt down
the offending area, so you can fix it later.

TIP: Muscles and surface details

A humanoid chest has pecs and abdominal muscles. These can
be easily created by using BEVEL (set data options to create
four point polys first!) if its only one polygon, or EXTRUDE
if its a group of polygons that you need to either push to
pull from the meta_object's surface. Make SURE to KILL ("k"
key) all internal polygons when you entrude. Merge points
after such operations, and before you start moving points
around.

Test render to see if the angle of your bevel and the dis-
tance away from your "chest" made the proper curves you
desired. Its hard to second guess just how metaform will
create a smoothed object, but it does get easier with
practice.

Remember to name your surfaces as you go.   Metaform makes
far too many polygons to be able to manipulate effeciently
later on, should you choose to wait to surface your finished
object.

Due to the curves that are created by metaform, the surfaces
you define will be pulled and stretched in ways you may not
prefer. You will have to use the new hide tools to help you
clean up and perfect your surface names to fit the curves
better since your original object was made from box-like
shapes.

TIP: FINE TUNING YOUR META_OBJECT WITH BONES

If you want a higher polygon count for animation with bones,
set the data options for polygon creation to quadrangular.
Select metaform, and your object will be smoothed without
the strange "spiderwebbing" that metaform seems to do on its
second subdivision pass. This cleans up the form for better
kinematic motion without inducing weird rendering artifacts,
which are especially noticeable with shadow mapped lights.

When you've reached the level of polygon density you desire,
simply tripple your four point polys so that you have the
needed triangles to animate properly with bones.

It's a good idea to test render the metaformed object, since
the smoothing operation of Metaform can be hard to predict,
and it might take some pushing and pulling of points (or re-
construction) to get the look you want. Remember to save as
you go, and have fun!

1.118 Making A Crane Bird With Spline Patches

```
--------------------------------------------------------------
          Making A Crane Bird With Spline Patches
--------------------------------------------------------------
```
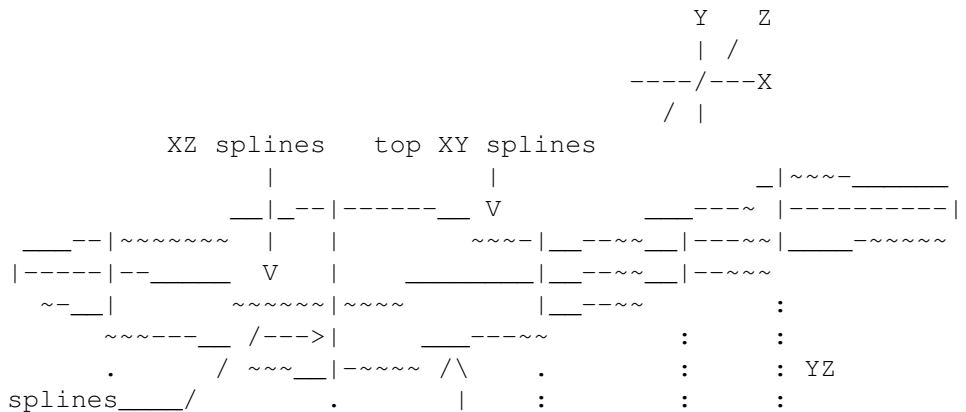
QUESTION: How tough was it to make the crane from spline
patches?   Would there be enough room for a quick tutorial?

Reader's Digest version:

Make XY and XZ outlines of your object (use a BG image as a
guide) by making Points roughly equally spaced around the
perimeters. In my XZ view the outline was symetrical on the
X so only half was drawn. These points were also 'deformed'
on Y to roughly follow the center line of mass through the
XY outline.

Select the points that define a significant shape.   In my
case I selected only the points outlining the tail, rear
half of the body, front half, rear half of the neck, front
half, and lastly the head and beak. Make each set of points
into Curves, the end point of one becoming the start point
for the next. IMPORTANT: the starting and ending points of
the entire top half of an outline MUST NOT be the same
points for the lower half of the outline. They must be sep-
erate points, though very close together, thus in my case
the tips of the beak and tail had three individual points,
one for each spline (top XY, bot XY and XZ)

Using the YZ view (looking down the X), add a point (or more
if the YZ outline of the desired object requires them) be-
tween the starting points of each set of TWO splines (top XY
and XZ, then bot XY and XZ). Use the XY view to make sure
these new points line up with the verticle line formed by
each spline's starting points. Select the starting point for
the first top XY spline, then the newly added mid-points be-
tween it and the starting point of the corresponding XZ
spline and make them into a NEW Curve. Do this for each set
of splines so that you end up with a large grid of inter-
secting/JOINED (shared end point) splines defining the shape
of the object, somewhat as shown:

```
                                      Y   Z
                                      | /
                                  ----/---X
                                    / |

        XZ splines    top XY splines
            |              |                    _|~~~-_____
          __|_--|------__ V          ___---~  |----------|
 ___--|~~~~~~~  |    |        ~~~-|__--~~__|--~~|____-~~~~~
|-----|--_____   V   |    _____|__--~~__|--~~~
  ~-__|         ~~~~~~|~~~~        |__--~~          :
    ~~~---__  /--->|      ___---~~       :       :
        .      /  ~~~__|-~~~~ /\    .       :       : YZ
splines____/        .        |    :       :       :
```

```
        :               : bot XY splines     :     :
 -----:-------------:-----------:--------:-----:-----------
 tail :  rear half  : front half :  rear  :front: head
      :             :           : neck  : neck: & beak
```

Now, select the 4 splines defining the contour of each major
shape and click on Patch (Multiply), see below. Setup the
requester. Click on UNDO if the results aren't satisfying,
repeating until a smooth mesh is EVENLY spaced on the set of
splines. Make note of the settings and enter them in for
the next set of four splines. The KEY is to get all the new
points created ON one set of splines to meet up "exactly"
with the last patch so that a MERGE POINTS function can
unify the polys where their edges meet on a spline.

```
                      Patch 1      2
                                   |
                    --|--------___ V
  new mesh points    1 -->|         ~~~~|<--- 3
  must coincide with      |    4 _____|_
  existing points on    ~~|~~~~~~ 4        |<--- 3
  splines 1, 3, 4.    1 -->|         ___---~~
                    __|---~~~~~ ^
                              |   Patch 2
                              2
```

When all sets of splines have been patched correctly
(checking the polygon normals as you go), select only the
splines (Display/Stats) cut and paste 'em to a new layer and
save them if you haven't already.

Merge Points using Automatic first. Go back and Merge them
again using Absolute, setting the value to an appropriate
distance based on the size of the object. Use the Volume
enclosure to limit the merges as smaller distances will be
needed as the mesh converges on small sections (like the
beak and tail in my example).

If the object is symetrical on an axis (like my example of
half a body side looking down on the XZ) then mirror the
other half and merge points (Auto) again.

Wa La... Spline Patched object!

1.119 Overcoming Self-Crossing Bevels

```
------------------------------------------------------------
            Overcoming Self-Crossing Bevels
------------------------------------------------------------
```
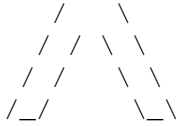QUESTION: I'm in the middle of a large flying-logo animation
and having a problem modeling the main part of the logo.
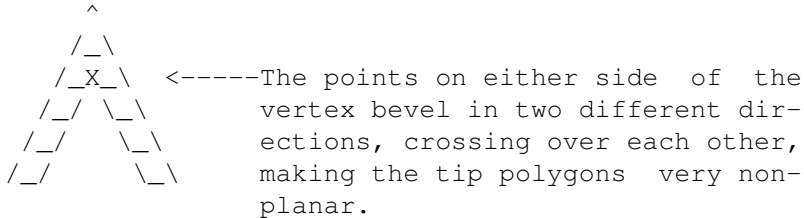When Beveling acute angles like this:

```
          ^
         / \
```

```
             /    \
            / / \ \
           / /   \ \
          /_/     \_\
```

 ... it looks like this:

```
              ^
             /_\
            /_X_\  <-----The points on either side  of  the
           /_/ \_\        vertex bevel in two different dir-
          /_/   \_\        ections, crossing over each other,
         /_/     \_\        making the tip polygons  very non-
                            planar.
```

Is there any way to fix this?

In descending order of difficulty:

* Edit the overlapping points of the bevel by hand.   Or be-
  fore beveling:
*   Move some points to round off the sharp vertices.
*   Move any points close to a vertex away from the vertex
      to allow more room for the bevel to clear itself.

* Delete any points close to a vertex.

Your best best with complex shapes is to bevel outwards.
This means setting the Shift and Inset to NEGATIVE numbers
to generate a bevel AWAY from the selected poly rather than
impinging on it.

You do have to mess around to get the right face polys back
again, but it's not too terribily difficult. An outer bevel
will have none of the same problems creating self-crossings.
4.0 Modeler has a new option to generate outter bevels since
they are so useful.

1.120 Understanding Non-Planar Polygons


```
------------------------------------------------------------
             Understanding Non-Planar Polygons
------------------------------------------------------------
```
QUESTION: What exactly are non-planar polygons? Why do they
pop up when bending or stretching objects?   The manual does
not go into detail about non-planar poly's and why they are
created exactly.

According to February 1994's issue of VTU, and some experi-
mentation:

A non-planar polygon has 4 or more points that do not make a
flat surface. If you have 3 points in a polygon, no matter

where the points are you will have a flat surface unless it
is degenerated by having more than one point occupying the
same location.

Some good rules to follow as you build objects:

1) Merge points as you build and join each piece if you use
   booleans, cut, paste, mirror, etc.

2) Also always check with the stats menu as you build for
   non-planar and degenerate polygons, especially if you're
   using drag, twist, taper, stretch tools, etc.

3) Always triple the non-planar polygons. Unless you want to
   cut it or rebuild it.

4) Building a clean object means faster render times, less
   RAM usage, and less time figuring out the problem.

The tools mentioned here are merely examples to give you an
idea of the type of operations that cause these non-planar
polys. Hope this clears things up a bit for you!

1.121   What Are Detail Polygons?

```
-------------------------------------------------------------
                 What Are Detail Polygons?
-------------------------------------------------------------
```
QUESTION: In the LW object file description Allen Hastings
posted, there's a mention of Detail polygons.   I've never
heard of them before.   The manual says nothing about them,
either. Anyone know what they are and do?

Detail polygons are a hold over from Allen's earlier program
Videoscape 3D.

Detail polygons are polygons which are 'attached' to other
polygons such that they always render after the polygons
they are attached to. This made sure that the Z buffer did
not wipe these out during its distance calculations. They're
useful for things like putting markings on things like the
sides of an aircraft fuselage or on a road sign.

Detail polygons are a remnant of VideoScape, LightWave's
predecessor. It's best to think of them as a workaround that
hasn't been needed for a long time now.   LW still loads
objects that have them, though.   An example is 3D:Objects/
Computer/FloppyDisk (I think that's one of the objects that
at some point came with LW).

1.122   What's The Maximum Points Per Polygon?

```
------------------------------------------------------------
                  Polygon Maximum Points
------------------------------------------------------------
```
QUESTION: What is the limit to the number of points and
polygons that an object can have?   The manual does not make
this clear.

You can have up to 65,535 (2^16 - 1) points and polygons in
one object.   At one time there was a limit of 200 vertices
you could have in one polygon, but the manual now says,
"There is no limit to the number of vertices a polygon may
have. However, we recommend that single polygons be limited
to no more than 16,000 vertices."   I'd stick with 200 as a
rule of thumb anyway.

1.123 Melting Font Logo Treatment

```
------------------------------------------------------------
                Melting Font Logo Treatment
------------------------------------------------------------
```
QUESTION: I would like to melt a gold surfaced logo and was
going to take it into Modeler and attempt to disect and de-
form it into another object (equal polygon count) and try to
morph them. Any other suggestions?

Your idea is good, but a lot of work.   You could achieve
almost the same effect much more easily by simply using two
objects, one of the logo -- the other of the melted pool.
Have the logo drop slowly through the floor as the object of
the melted pool grows larger under the logo (use the same
surface with fractal reflections and move the texture down
the logo and have the mottling expand outward as the pool
grows). As ice melts it doesn't change its form much, other
than shrinking (melting takes place primarily at the bottom
where the puddle is growing).   You could even shrink the
logo slightly as it melts. Much easier than morphing into a
melted version of the logo.

1.124 Advise On PAR Video Capture

```
------------------------------------------------------------
                 Advise On PAR Video Capture
------------------------------------------------------------
```
QUESTION: Consider I only have S-VHS equipment, I have
trouble getting my PAR to playback captured S-VHS video at a
decent quality and I fear Betacam footage won't fare any
better.   What is the secret to getting the PAR to playback
clean video?

There are two things you can do to make sure the video you
record onto the PAR is the highest quality:

1) Start with good quality source material, free from noise.
   Starting with BetaCam is a good way to go, since anything
   done to a professional level with that kind of equipment
   will be free of the noise and composite artifacts that
   makes the PAR work harder to compress the video.

2) Get the fastest hard drive you can afford for the PAR. A
   Micropolis 1.7 Gb should allow you to capture video at a
   high Q and Block limit setting.

There are other ways to do what you want. You could capture
the video as "position only" or rough-work frames for use in
positioning things in LightWave, and then render the scene
out with a black or colored background that can then be lum-
inance or chroma-keyed over the original video source. This
would totally eliminate any recording problems with the PAR
because you would not be using the PAR version of the video
to produce the final job.   To do this, you would not only
need to rent two BetaCam decks, you'd also need some type of
chroma-key equipment to combine the PAR animation with the
original source video. However, you'd get the best possible
final quality that way.

1.125   Understanding PAR Q And Block Settings

```
------------------------------------------------------------
          Understanding PAR Q And Block Settings
------------------------------------------------------------
```
QUESTION: Does anybody know what level of video quality you
can record to the PAR with a TBCIV? I only have S-VHS and
have trouble getting super clean video out of the PAR. If I
raise the Q level and Block setting to the point where a
single frame looks great, when I try to capture a stream of
video, I get the "Block Setting Exceeded" message.

Here's the problem, when you are recording an animation from
Lightwave to the PAR, the PAR software has the time to try
to maximize the Q-Level setting to fit your block size on a
frame by frame basis. When you are trying to digitize video,
the PAR has only 1/30th of a second to digitize and store
each frame. Therefore, it can only try one quality setting,
and that one quality setting has to fit the entire recording
for good and bad frames alike.

Super clean video (ie. very little signal noise) will allow
you to set a very high quality setting when digitizing.
Dirty (noisy) video will force you to use a very low quality
setting. The reason? The hardware does not have the ability
to discriminate between noise and detail.   The compression
algorithm used (JPEG) is set up to maximize detail retention
and loose the most on large flat areas of slowly changing
colour. Lots of noise in the signal makes JPEG "think"
there is lots of detail. Your compression goes into the
toilet and the number of blocks it takes to store each frame

on the PAR hard drive exceeds the block limit that you set.
Clean video compresses very well, so you can set a higher
quality level and still meet the block limit for storing the
frames.

There are a couple of ways to help the PAR with marginal
video.   One way is to "compress" the dynamic range of the
video by playing with the TBC IV's proc-amp settings.   By
raising the black pedstal and lowering the brightness you're
compressing the contrast range (dynamic range) of the video
signal. This has the effect of minimizing noise and detail,
and makes the signal slightly easier to compress.   You can
regain the full dynamic range by processing the frames
through ADPro or Imagemaster to regain image contrast before
you use the frames as a series of backdrop images in a LW
rendering. This will cause a slight banding in the image
(depending on how severly you killed the contrast to begin
with) but this is less objectionable than the JPEG artifacts
you'd get by lowering the PAR's Q-factor to record the same
signal at full dynamic range.

Another way to help the PAR out is by filtering (softening)
the video before it gets to the TBC IV and the PAR with an
external video processing box. You'll loose image sharpness,
but again, this is less objectionable than JPEG artifacts.

The best way is to just have super clean video to begin with.
A good camera, good tape, and betacam equipment should do the
trick here.

1.126   Making Explosion Image Sequences

```
------------------------------------------------------------
                Making Explosion Image Sequences
------------------------------------------------------------
```
Here's a poor mans way to make "digitized" explosions.

Paint about 5 frames of an explosion in Brilliance. DPaint,
Toaster Paint, Alpha Paint, or Black & Decker Paint works
well, too.

These 5 images are just just "key frames" to make a 90 frame
explosion created using Morph Plus to make 'tweens'.   True,
it's not the BEST soulition but it is _A_ solution.

Painting 3 frames of buring fire and morphing them into a 60
frame loop is another application of this technique.

1.127   Making Real Explosions For LW Mapping

```
------------------------------------------------------------
                Making Real Explosions For LW Mapping
```

Here are some ways to make miniture explosions for highspeed
filming that can be used as image sequences for LW effects.

Try a baloon with some Acytelene inside it (NOT TOO MUCH)
get a long fire cracker wick and some string to secure it
(acytelene floats). This is actually an implosion/concusion
type detonation which is what a large spaceship would do.
If you don't happen to have a ready supply of Acytelene,
Calcium Carbide in water produces Acytelene gas. It's avail-
able from many camping gear stores for use in lamps.

Use the magnesium innards of a flashbulb and hang it from
a black ceiling and ignite it electrically while filming in
very high speed from below. This technique, very similar to
the explosion technique in Star Wars, works very well and
doesn't require a pyro license (to my knowledge).

One part Potassium Chlorate (KCLO3) to 3 or 4 parts 4x powd-
ered sugar make a violet/purple fast burning flame with LOTS
of white smoke.
Pure Benzoyl Peroxide (the stuff in Clearasil) burns like a
miniture petroleum fueled explosion or oil fire with LOTS of
black sooty smoke and yellow orange rolling flames.

DISLCAIMER:

Professional explosion effects are an exact science. Don't
do this at home, whether you are an adult or not. Call a
pyrotechnic engineer, they're in the yellow pages. Anyone
doing pyro effects for stage shows can setup something PRE-
DICTABLE. These guys have all kinds of great tools. One
candidate is the flash pot driven by condensed air.   They
have special containers, look like big hydraulic pumps. The
powder is electrically ignited on the top, the next instant
the cylinder shoots air up into the flame creating a roll-
ing fireball.

1.128   Pixel vs Object Aspect Ratios

                Pixel vs Object Aspect Ratios

QUESTION: After reading the thread on the whole aspect ratio
debate and modeling a flat plane to fit the camera/video as-
pect ratio, I've got one question: How did the 1.346:1 as-
pect ratio get calculated? What's it based on in the "real
world?"

It comes from the real-world width-to-height ratio of a
single framestore or Toaster RGB IFF pixel.

When using a VIDEO image in LightWave, this aspect ratio has
to be accounted for to maintain the proper aspect ratio of
the frame of video. If you were to model a panel that is

exactly 752mm x 480mm (RGB pixel dimensions) and automatic
size an image having 752 x 480 pixels onto that panel, the
panel would cause the image to be distorted horizontally when
rendered since the panel does not fill the dimensions of the
screen due to it's construction using square units and not
units corresponding to the shape of the image's pixels. One
non-square pixel would be rendered in the shape of a square
millimeter. That right there is your problem, the metric
dimensions in LightWave are perfectly square, but the image
being mapped isn't.

The extra work of creating objects with the 1.346:1 ratio in
mind is ONLY necessary when mapping captured video/still
images onto them.

For example:

In modeler, make a box with the following settings in meters

```
              Low             High            Segments
    X       -1.346          1.346              1
    Y       -1.0            1.0                1
    Z        0.0 *          0.0                1
```

* If you want depth for this box and to make that depth the
  same as the width, enter the same values as for X

Surface this box as "Screen" (or your choice), and save it.

To position it (using the flat box example, with no depth),
set the object's Z position in Layout as 3.2 - the same as
the camera's Zoom factor. Make a keyframe, and you're set.

Now, if you had made the box with the same depth as it has
width, you would have to position it at 3.2 meters plus half
of the depth of 1.346 meters, or 3.2 + .673 = 3.873, to get
the front face of the box to exactly fill the screen.

In this way, you can make a 3D transition from one source to
another by starting the animated 3D transistion effect on
the same frame that you cut to the animation from source 1
and ending the transition on the same frame that you cut to
source 2.

1.129   Arexx Script To Render Multiple Scenes

```
-------------------------------------------------------------
          Arexx Script To Render Multiple Scenes
-------------------------------------------------------------
```
Here is a program I wrote to allow batch rendering of
LightWave scenes.

```
 /* This program batch renders user specified LightWave*/
 /* scene files.  By Dan Bloomfield */
```

```
address 'LightWaveARexx.port'
say 'How many scenes do you want to batch render? '
pull SceneNumber
do Loop=1 to SceneNumber
say 'What is the name of Scene number 'Loop''
pull SceneName.Loop
end
say 'Specify directory path for saved frames '
pull DirPath
say 'Now Batch Rendering'
do Loop=1 to SceneNumber
'LoadScene Scenes/'SceneName.Loop
'SaveImages 'DirPath'/'SceneName.Loop
'Render 1'
end
say 'Batch Render done. Rendered 'SceneNumber 'files.'
exit
```

Save the above script as "BatchRender"

To launch this program from a shell just make sure ARexx is
active and type:

rx BatchRender

To render Framestores instead of RGB files just substitute
the 'SaveFrames' command for the 'SaveImages' command.

1.130   LockedChannels Usage For Modeler Arexx

```
-----------------------------------------------------------------
         LockedChannels Usage For Modeler Arexx
-----------------------------------------------------------------
```
QUESTION: Could a programmer describe how 'LockedChannels'
is implemented?   What are the codes for XYZ, HPB, ScaleXYZ?

The "channels" in LockedChannels refers to the XYZ and HPB
buttons in the Mouse section of the Layout interface.   The
<int> following LockedChannels contains bit fields for each
of these. From within ARexx, the value of the bit fields can
be tested by the BITAND() function like this:

```
   a = readln( file )
   if word( a, 1 ) = "LockedChannels" then do
      channels = d2c( word( a, 2 ))
      if bitand( channels, n ) ~= 0 then
      /* channel n is locked */
```

The table of values for <n> is:

```
   '0001'x  Move X
   '0002'x  Move Y
   '0004'x  Move Z
   '0008'x  Rotate H
   '0010'x  Rotate P
```

```
'0020'x  Rotate B
'0040'x  Size/Stretch X
'0080'x  Size/Stretch Y
'0100'x  Size/Stretch Z
'0200'x  Move Pivot Pt X
'0400'x  Move Pivot Pt Y
'0800'x  Move Pivot Pt Z
```

(The notation '0001'x is the ARexx way to write the packed
binary image of a number using hex digits. ARexx ordinarily
stores numbers, like everything else, as text strings.)

1.131 Setting Up GigaMem For LW

```
----------------------------------------------------------------
                    Setting Up GigaMem For LW
----------------------------------------------------------------
```
(Gigamem must be properly customized for Lightwave so that
you don't get those "not enough memory," "no memory for Z or
RGB buffers," etc. messages)

If Gigamem doesn't work on your system, you don't have a
functioning MMU. If it does, then you will need to customize
it for Lightwave and Modeler as follows: Go into Advanced
Settings for both of these two applications and make sure
the settings are:

```
buffer     4.0 <-- this varies depending on your real memory
cache      300 <-- this varies depending on your real memory
attribute  0   <-- this is the default
mask       1   <-- this is the default
minsize    10  <-- this setting is the critical one!!!
```

Your buffer and cache settings may vary due to the exact
amount of real memory on your specific machine (they affect
performance) but the other settings of attribute, mask and
minsize MUST be set as above for both Modeler and Lightwave.

P.S. There is another virtual memory manager on AMINET for
     anyone who does not have GIGAMEM called VMM and it now
     works with an '030. Some have reported that it works
     much better than GigaMem, too.

1.132 VT4000 Software On An A2000?

```
----------------------------------------------------------------
                    VT4000 Software On An A2000?
----------------------------------------------------------------
```
QUESTION: Can the Toaster 4000 (3.0) system be loaded onto
an old A2000 with the 2.0 card?

No! The VT4000 software for the 4000 card ONLY works on a

A4000 system with the VT4000 card. NewTek DOES have the
newer 3.x version of the Toaster software for the A2000
with the 2.0 card. Should be quite reasonable to get the
upgrade, now that 4.0 is shipping!

1.133   Self-Crossing Bevels Conclusion

```
-----------------------------------------------------------
              Self-Crossing Bevels Conclusion
-----------------------------------------------------------
```
In a couple of previous posts by JG and SF, they suggested
bevelling OUT to avoid the problem on sharp convex portions
of an object's outline. This works (I'm somewhat reluctant
to debate the point with these guys) however, if the object
also has sharp concave areas, it will cause the same sort of
crossed up polygons in those areas.

Ah, but there's a big difference - the crossed polygons that
occur in concave areas when beveling outward are hidden in-
side the object. Unless the letters are transparent, the
object will look perfect when rendered. I agree with JG and
SF that outside beveling is the way to go, with thick fonts
as well as thin.

I would also like to follow up on the beveled font smoothing
angle issue. Beveled fonts are a great example of why I put
in an adjustable smoothing angle in the first place. There's
no need to bother with separate surface names for faces vs.
bevels (although that's not a bad idea for other reasons),
or point-doubling along the borders of the faces, just to
prevent smoothing from the faces to the bevels.   Instead,
just set the max. smoothing angle to 40 degrees or so. Some
people complained that such an angle might prevent smoothing
on the curving sides of letters, but you'd have to be using
a really crude font for that to happen. In most fonts, the
angle between the segments making up a curve will be more
like 15 degrees or less.   In situations where more extreme
angles are found (such as the indent on the right side of a
capital "B"), you really want a sharp crease in the shading,
so lowering the smoothing angle will help there too.
-AH

1.134   How Does Adaptive Sampling Work?

```
-----------------------------------------------------------
              How Does Adaptive Sampling Work?
-----------------------------------------------------------
```
LW does appear to use all three colors in the edge detection
during adaptive sampling, but the red must vary by twice the
threshold, and the blue by four times the threshold. If any
of the three colors exceeds its limit, the pixel is anti-
aliased.

This was figured out experimentally by renderring a scene
with nothing in it but a diagonal polygon with a color grad-
ient on it (and a reticule) against a black background, one
each for red, green, blue, and yellow. Note was taken of
where the AA stopped and checked the color value of the
gradient at that point. The numbers came out almost exactly
to threshold for green, 2x for red, and 4x for blue.

1.135   Solid Drill vs. Boolean Subtract

```
-------------------------------------------------------------
                Solid Drill vs. Boolean Subtract
-------------------------------------------------------------
```
QUESTION: What are the main differences between Solid Drill
Tunnel and Boolean-Subtract? From what I read, it seems that
only the surface names affected are different.

Solid Drill only creates a hole in existing polygons, no NEW
polygons are created. Boolean Subtract creates new interior
polygons. It is like the difference between cutting into a
hollow object (drill) and a solid object (subtract).

1.136   Dual Surfaces Using Object Morphs

```
-------------------------------------------------------------
            Mixed Dual Surfaces Using Object Morphs
-------------------------------------------------------------
```
QUESTION: How do I add multiple textures to a surface in
LightWave when they have to be created using the same
surface channel like Color or Diffusion?

One way to combine two (and only two) textures is to set up
a morph from an object to a copy of the same object with
different surfaces names using Surface Morphing turned ON
and the Morph Envelope set to 50%.

1.137   Basics On Using The Patch Function

```
-------------------------------------------------------------
              Basics On Using The Patch Function
-------------------------------------------------------------
```
QUESTION: I'm having problems getting the PATCH command in
Modeler to work. Anyone have any quick tips that might point
me in the right direction?

You must have a completely enclosed area bounded by three or
four connected spline curves. To connect spline curves,
either start a curve from a point on a pre-existing curve or
select a point on each curve and use Merge or Weld.

Curves are connected if they share a point, but it doesn't
have to be the start or end point. If you use the sketch
command to create curves, they'll sometimes look like they
share points, but if you zoom in far enough you'll find that
they don't. Make sure the curves completely enclose an area
and directly select the curves before using patch. The re-
questor that pops up allows you to specify the number of
polys generated (ie. a 10 x 10 grid would have 100 polys).
Patches defined by 4 curves will generally render smoother
than those defined by only three.

1.138 Simple Patch Help

```
------------------------------------------------------------
                    Simple Patch Help
------------------------------------------------------------
```
The easiest way to learn how patching works is by creating 4
points in one window as if they were the four corners of a
square. After creating all 4 points, deselect all of them.
Next, starting in the upper left corner and working clock-
wise, select 2 points and hit Control-P (or the Make Curve
button). After you make the first two into a Curve, make
sure they're deselected and select the upper right point and
the lower right and repeat. Do this until you have four
curves which all will share end points.

Once you have your four curves, practice selecting them
and using the PATCH button (Control-F) to patch them. Try
undoing and changing the parameters and repatching.

1.139 Mores Basics On Using Patch

```
------------------------------------------------------------
                 More Basics On Using Patch
------------------------------------------------------------
```
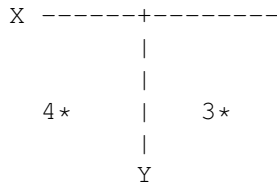Patches work with spline curves. Look at it this way, a
spline is actually a piece of bent metal that boat makers
used to use to tie wet pieces of wood to, leaving them tied
like that for a few days. The tension of the ropes pulling
on the wood towards the curved metal (Spline) would event-
ually make the wood take the shape of the spline.

So, in Modeler from left to right make four points (X axis).
With them highlighted, go to the Tools menu and select Make
under the Curves section. This will make the Spline Curve
out of these points.

```
            |
     1*     |    2*
            |
            |
```
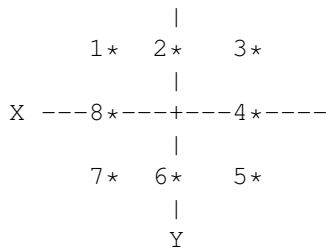
```
    X ------+--------
           |
           |
     4*    |    3*
           |
           Y


     (Front View)
```

Now, if you select Polygon from the bottom of the screen you
should see the spline curve highlighted. Deselect all points
and go back to the Tool menu. Select points 1 & 2 and click
Make (Curve). Select points 2 & 3 and click Make.   Select
points 3 & 4 and click Make. Select points 4 & 1 and click
Make. Now you have an enclosed square of spline curves. Even
though they look straight they are considered spline curves.

If you now select Polygon from the bottom menu, you should
see the splines highlighted. With all highlighted, select
Patch from the multiply menu. A requestor will pop up. Just
click OK. You should see those splines turned into a wire-
frame mesh.

It's time to expirement. Do the exact same thing as above
only add a middle point to each set of points like below.

```
             |
        1*  2*   3*
             |
    X ---8*---+---4*----
             |
        7*  6*   5*
             |
             Y
```

Deslect all points and go to the Tools menu.   Select the
points like before only in threes. Select points 1, 2, & 3
then click Make, etc.

With Points on the bottom menu still slected, use the Drag
tool in the Modify menu and drag the middle points back into
the Z axis. Now choose Polygon from the bottom menu and make
sure that all of the splines are highlighted. Go to the
Multiply menu and Patch these just as before. You should've
gotten a wavey wireframe mesh this time. What's happening
is that the splines are forcing the mesh (defined by the
Patch requester) to take the shape of the curves!

Try using half circles next time, or use the sketch tool to
draw the splines and then patch them! The thing to remember
is that the splines have to ENCLOSE a volume of space, ie.
be connected end-to-end, for this to work.   You can only
patch only 4 splines at one time.