POWER TIPS PRO ™

for Lightwave ™

volume 1

Lightwave 3D 4.0

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NewTek BBS Number
The Internet LW Mailing List
LightWave And Toaster Specific BBS's

The material and information contained herein has been heavily   edited
from each author's original posted e-mail form. They and the compilers
ARE NOT responsible for the results of any information contained here-
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!

LightWave is a registered trademark of NewTek, Inc.

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.

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 register   their copy of PTP.

Dean and Ronnie 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

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?

ANSWER:
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.

How To Use PAR Clips In LW

QUESTION:
How do you import PAR clips as image sequences in LightWave?

ANSWER:
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.

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.

Selective Shadow Map Casting

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

Making Light House Light Beams

QUESTION:
I'm trying to make a beam of light that rotates for a light-
house. I made a cylinder and tried using a transparency
image map to create a gradient so the light would fade in
the distance, but this hasn't worked right.   How's it done?

ANSWER:
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!

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   aspect   ratio,
I've got one question: How did the 1.346:1 aspect ratio get
calculated?   What's it based on in the   "real world?"

ANSWER:
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 horizonally 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.

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?   I
get these   A   LOT   when using the Boolean Union funtion.   It
usually happens when dealing with high polygon counts.
                    ANSWER:
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.   ;-)

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.

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.

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?

ANSWER:
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.

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?)

ANSWER:
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).

Tips On Making Objects Walk

QUESTION:
I've 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 below ground.   When
giving multiple parented objects such as this a walking   mo-
tion path, it seems that the feet slide as the object   takes
a step.   How do I overcome these problems?

ANSWER:
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.

Making Displacement Mapped Canyons

QUESTION:
What is a good method of creating canyon cliffs?

ANSWER:
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.

Moving Fingers Using Bones

QUESTION:
My character a living tree, is supposed to have 3 seperately
moveable fingers, but each one of the bones affects   all   3!
I've turned Limited Range ON, decreasing 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 one surface?

ANSWER:
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.

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?

ANSWER:
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).

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?

ANSWER:
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.

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 ir-
relevant unless you use anti-aliasing where it has to   anti-
alias between the segments, also.   What's the truth?

ANSWER:
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
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."

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:

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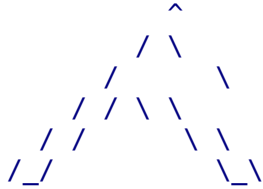
 ... it looks like this:
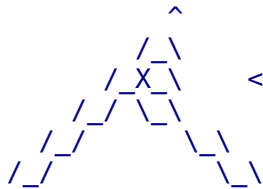
```
                    ^
                   /_\
                  /_X_\    <-----The points on either side    of     the
                 /_/ \_\             vertex bevel in two different dir-
                /_/     \_\           ections, crossing over each other,
               /_/       \_\     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

Is there any way to fix this?

ANSWER:
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 terribly 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.

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

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.

ANSWER:
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.

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.

A Procedural Texture Water Fountain

QUESTION:
I have a fountain on top of a pyrimid and want to make flow-
ing water spray from the top.   What's the best way to create
one?   Particles?

ANSWER:
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.

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.

ANSWER:
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.

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.

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?

ANSWER:
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.

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.

Simulating Search Light Reflectors

QUESTION:
How   difficult   would   it be to add a flare effect that sim-
ulates   a   reflector based on light sources such as a flash-
light,   car headlights, or helicopter searchlights?   For in-
stance,   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.

ANSWER:
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.

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 descent quality
and I fear Betacam footage won't fare any better. What's the
secret to getting the PAR to playback clean video?

ANSWER:
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.

VT4000 Software On An A2000?

QUESTION:
Can the Toaster 4000 (3.0) system be loaded   onto   an   A2000
with the 2.0 card?

ANSWER:
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!

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.

ANSWER:
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!

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 'lightbeam
trick,' but I want the beam to be 'broken' as if dust was in
the air.   How can I do this?

ANSWER:
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 (with
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.

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.

ANSWER:
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).

Making A Bell Curve Reveal Graph

QUESTION:
How would I go about making the line of a bell shaped   curve
graph reveal itself from left to right?

ANSWER:
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.

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.

ANSWER:
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.

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?

ANSWER:
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.

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?

ANSWER:
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.

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?

ANSWER:
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.

How To Make A Spring Object

QUESTION:
How can I create a spring object?

ANSWER:
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).

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.

ANSWER:
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)

Calculating Image Size For Print

QUESTION:
How do I go about figuring out the correct resolution to render at for specific print sizes?

ANSWER:
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 resolution 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 going 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, generally 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

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   have
tried using a Transparency Map, but it makes the whole   sur-
face transparent where it's white.   What's the trick?

ANSWER:
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.

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.

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.

ANSWER:
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.

Morphing Particle Volumes

QUESTION:
Is it possible to create an object, make its shape into par-
ticles, 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, part-
icle morphing?

ANSWER:
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)

Making Animated Tank Treads

QUESTION:
I need to make tank treads move.   What's the best way to   do this?

ANSWER:
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.

Diffuse And Specularity Interactions

QUESTION:
How does Diffuse interact with Specularity and shadows?

ANSWER:
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.

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?

ANSWER:
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.

Basics On Using Rail Extrudes

QUESTION:
I got LWPro magazine, and read 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?

ANSWER:
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
```
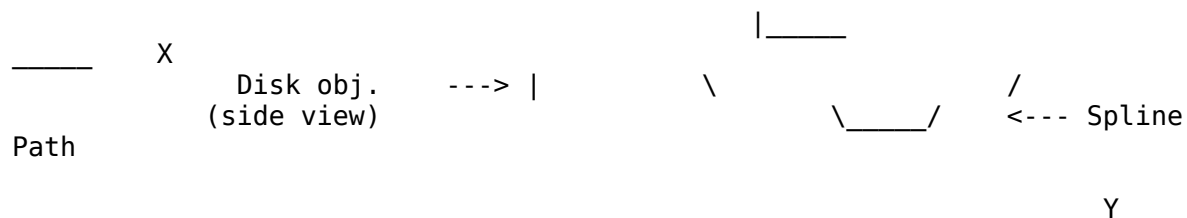
Below the Sketch button, select Make.   Now that your spline
rail is made, go to the disk tool and make a flat disk about
1" in diameter on the X axis like above.   Be   sure   to make
this in another layer with the spline in a   background layer
so that you can postion the center of the disk exactly 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).

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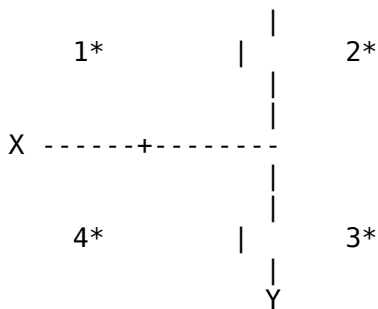
```
                         |
           1*            |      2*
                         |
                         |
       X ------+--------
                         |
                         |
           4*            |      3*
                         |
                         Y


           (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
```
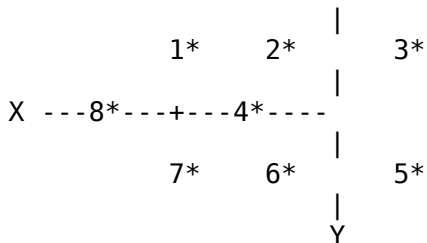
Deslect all points and go to the   Tools   menu.   Select   the

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.

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 possible use of
it?

ANSWER:
It's 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.

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.

ANSWER:
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.

Aress 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.

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?

ANSWER:
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.

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.

ANSWER:
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.

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.

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?

ANSWER:
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
liguid 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.

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?

ANSWER:
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.

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

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?

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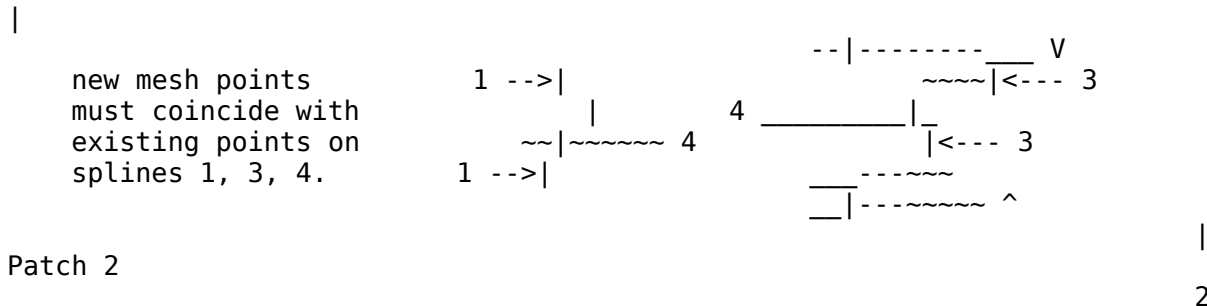
When   all   sets   of   splines   have   been   patched   correctly
(checking the polygon normals as you go),   select   only   the
splines (Display/Stats) cut and paste 'em to a new layer and
save them if you haven't already.

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!

Displacement Map Envelopes

QUESTION:
What I would like to do is morph one object with a Displace-
ment 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?

ANSWER:
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.

Good Default Environment Scene

QUESTION:
I have tried setting up a default   scene   which   includes   a
ground object, a sky object w/clouds, and 2 lights that sim-
ulate sunlight.   What are some suggested light settings and
positions for these objects?

                                      ANSWER:

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)
```

Making A Drill Bit Object

QUESTION:
What's the easiest way to make a drill bit object?

ANSWER:
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.

Creating Electric/Static Fields

QUESTION:
What settings for the Marble texture creates a static   elec-
tricty-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.

ANSWER:
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.

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.

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.

Creating Force Fields

QUESTION:
How did they create the electricity effect on Babylon 5 when
a StarFury was disabled by a Minbari cruiser?

ANSWER:
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.

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.

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.

Simulating Backlighting Glows Pre LW 4.0

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

ANSWER:
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.

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."

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.

Realistic Lake Water And Waves

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

ANSWER:
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.

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.

Using Toaster And Modeler Arexx Scripts

QUESTION:
Can someone tell me how to use the Arexx port of the Toaster
and LightWave's Modeler?
 ANSWER:
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.

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.

Using An Image Map To Make Bricks

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

ANSWER:
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:

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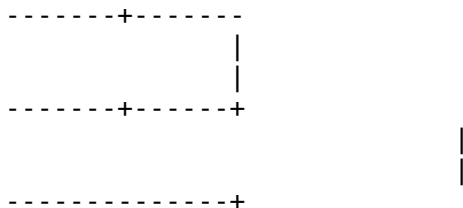
Make sure that when this map is butted up against itself   on
all 4 edges that it tiles perfectly with   no   visible   seam.
Keeping the mortar at the edges will help accomplish this.

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.

Wraping A Flat Plane Into A Sphere

QUESTION:
I saw a cool demo 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?

ANSWER:
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.

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.

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.

ANSWER:
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.

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 deform it in-
to another object (equal polygon count) and try to morph it.
Any other suggestions?

ANSWER:
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.

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?

ANSWER:
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!

Metaforming A Phone Handset

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                          S7J 0C2 FidoNet 1:140/90

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 or above and have   experience   creating   points,
polygons, 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.

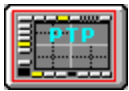Figure 1

                  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.

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

Figure 2

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.

            You need to make sure that the polygons you   create
            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.
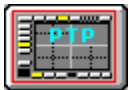
Figure 3

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.

            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.

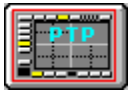Step 7:   Select the polygon on the top right-hand   side   and
            delete it.

Step 8:   Rotate the entire object -12 degrees.

Step 9:   Move the entire object to the left.

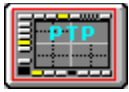Step 10: Mirror the object.

Step 11: Select the points around the "holes" that we creat-
            ed in Step 6.   Note: there are 8 points selected.
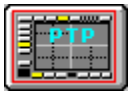   Copy these points and paste them in a new layer.

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.

            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.
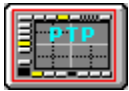
            Merge the points.   At this point, we have   a   good,
            but crude, approximation of our final shape.   It is
            constructed entirely   of   4   vertice   polygons.
It
            would be a good idea at this   point   to   check   the

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 what's shown in the Figure 8 popup window.


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 poly-
gons,   which   can cause rendering errors.   Pressing
the   "+"   button here will   select   all   non-
planar
polygons in the object.   Then   you   can   go   to
the
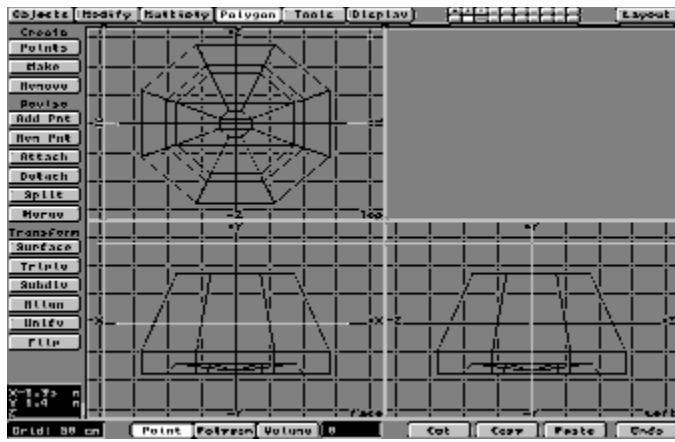Polygon panel and choose Triple to divide them into
triangles.
Step 18: Apply surfaces and save your object.
I   hope that this tutorial has helped you realize the
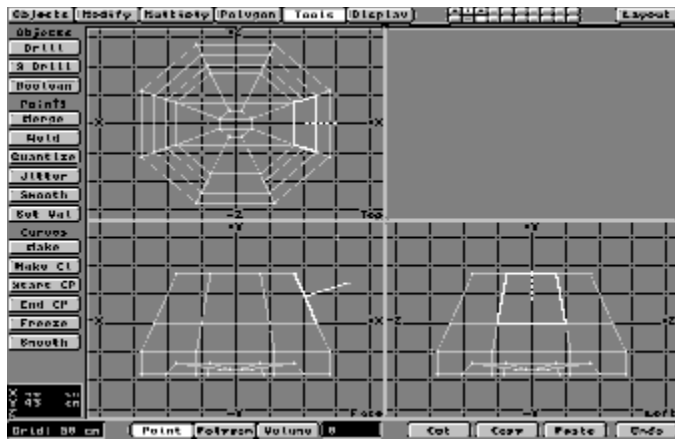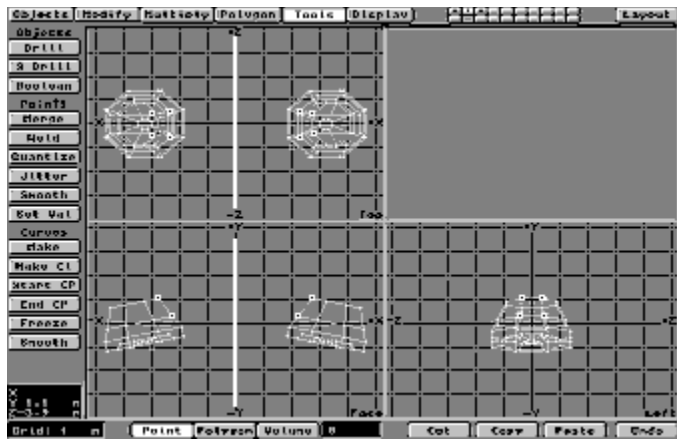poten-
tial of the metaform tool.
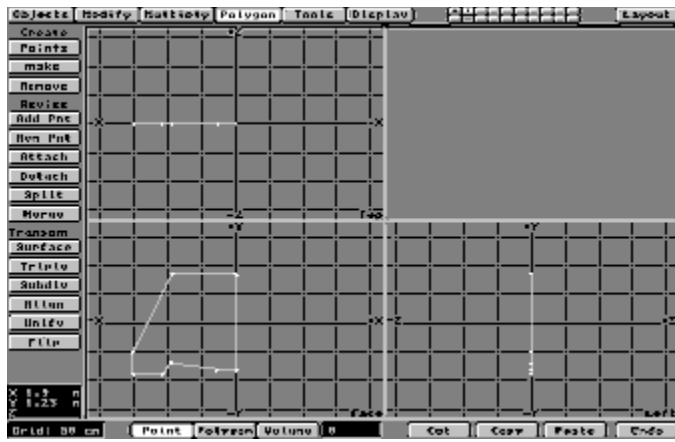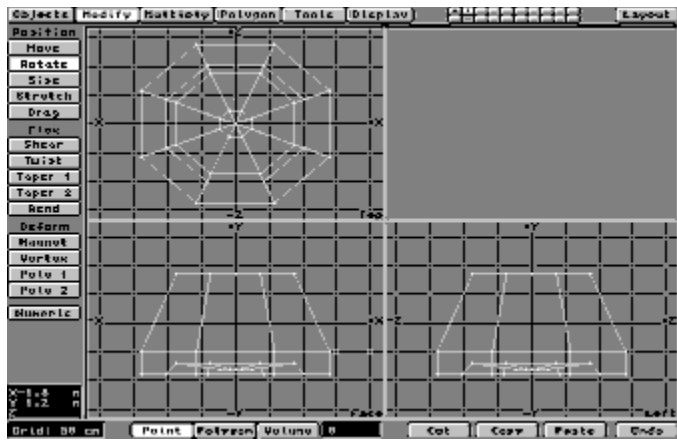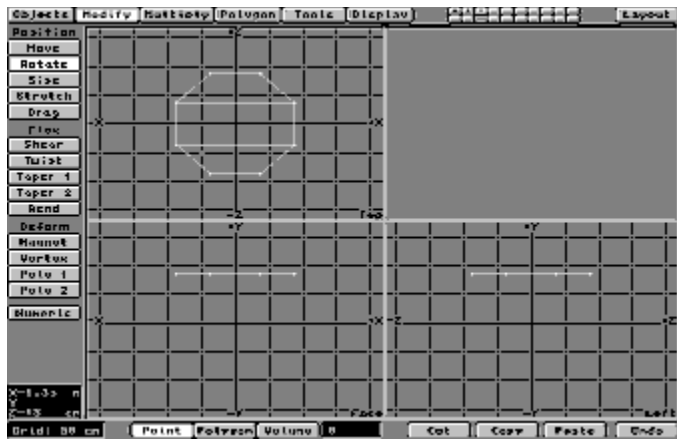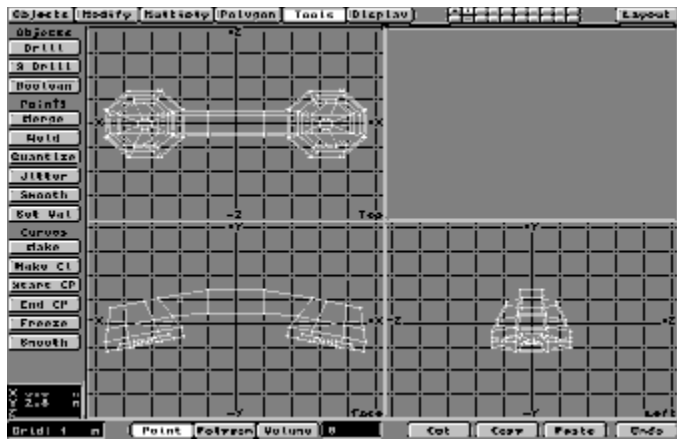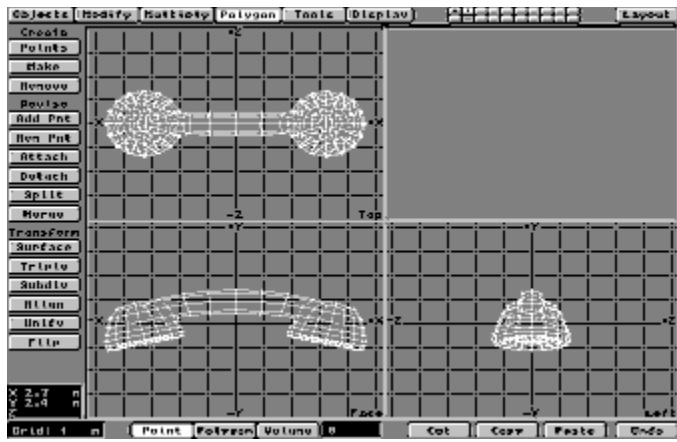
Making Neon Font Outlines

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?

ANSWER:
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).

NewTek In Cyberspace

QUESTION:
What are the Newtek BBS and Internet sites?

ANSWER:

```
                    Newtek BBS:    913-271-9297
           Internet FTP site:    ftp.newtek.com
              World Wide Web:     http:www.newtek.com
```

Motion Path From An Extruded Object

QUESTION:
I know you can take a camera or object motion path and create
an object that follows the 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.

ANSWER:
First, 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.

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?

ANSWER:
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.

Internet LightWave Maillist and Newsgroup

To SUBSCRIBE TO the MALLIST: Sent an e-mail msg to

listserv@webcom.com

with the following in the body of the msg:

SUBSCRIBE <listname>

where: <listname> = lightwave-l ...for the LightWave list,
                                      toaster-l   ...for Toaster
list,

TO READ THE NEWSGROUP: Got to
comp.graphics.packages.lightwave
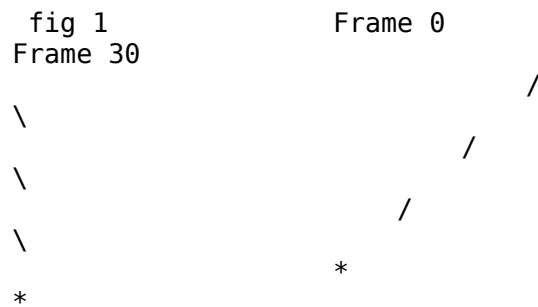
Smooth Repetitive Object Motions

QUESTION:
I've 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
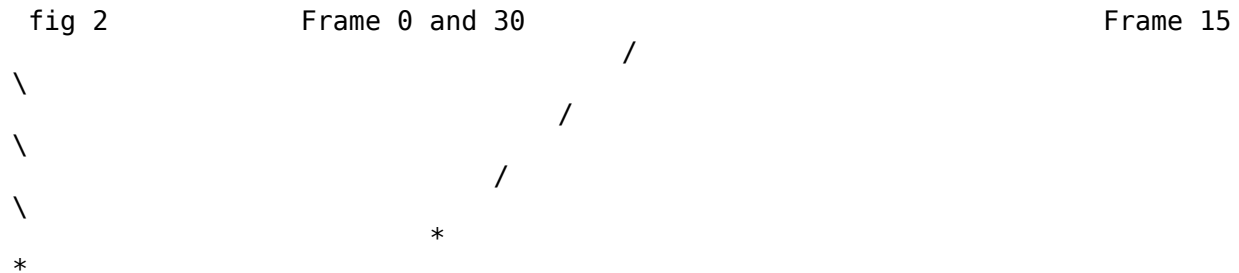it to be smooth.   How do I do this?

ANSWER:
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)

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 without having
to rebuild/reposition them manually in Modeler?
         ANSWER:
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.

Making Babylon 5-like Nebulas

QUESTION:
Anyone know how Ron Thorton makes those BEAUTIFUL   Babylon 5
nebulas in LightWave?

ANSWER:
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)

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.

ANSWER:
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.

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)

LockedChannels Usage For Modeler Arexx

QUESTION:
Could   a programmer describe how 'LockedChannels' is imple-
mented?   What are the codes for XYZ, HPB, ScaleXYZ?

ANSWER:
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.)

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.

ANSWER:
A moving fractal noise texture used as both a Color Map   and
a Trasnsparency 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.

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.

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?

ANSWER:
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).

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 Displacement Map-
ping 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?

ANSWER:
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."

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?

ANSWER:
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.

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.

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?

ANSWER:
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%.