

**d2i**

Ernesto Poveda 7-6-1995

**COLLABORATORS**

	<i>TITLE :</i> d2i		
<i>ACTION</i>	<i>NAME</i>	<i>DATE</i>	<i>SIGNATURE</i>
WRITTEN BY	Ernesto Poveda 7-6-1995	June 25, 2022	

**REVISION HISTORY**

NUMBER	DATE	DESCRIPTION	NAME

# Contents

<b>1</b>	<b>d2i</b>	<b>1</b>
1.1	main . . . . .	1
1.2	Table of Contents . . . . .	1
1.3	Table of Contents . . . . .	13
1.4	GOLD . . . . .	13
1.5	REFRACTION INDEX . . . . .	14
1.6	GLASS . . . . .	14
1.7	FORMS EDITOR . . . . .	15
1.8	A Coke (TM) Can . . . . .	16
1.9	Building a Water Splash . . . . .	20
1.10	A Complex Boat Hull . . . . .	22
1.11	DETAIL EDITOR . . . . .	24
1.12	What are Imagine objects? . . . . .	24
1.13	II. Looking at Stuff in the Detail Editor . . . . .	26
1.14	III. Moving Stuff in the Detail Editor . . . . .	29
1.15	IV. Harvesting and Sorting with Pick . . . . .	35
1.16	V. Hierarchies and Complex objects . . . . .	38
1.17	VII. Pick, Add, Drag. Pick, Add, Drag. Geez, how boring! . . . . .	39
1.18	VIII. Spraypaint and Picture Frames . . . . .	41
1.19	IX. A Mode for Every Season . . . . .	42
1.20	COLOR RGB . . . . .	46
1.21	BOTTLE WINE GLASS LIQUID . . . . .	56
1.22	LINEAR FLYING LOGO ENTRANCES . . . . .	56
1.23	ROPE BRAID BREAD . . . . .	57
1.24	HANDLE . . . . .	57
1.25	RING . . . . .	58
1.26	TEAR DROP . . . . .	58
1.27	STAR . . . . .	59
1.28	FOG . . . . .	60
1.29	FOG LIGHTS . . . . .	60

---

---

1.30 SPACESHIPS PLANETS . . . . .	60
1.31 GEMSTONES REFRACTION INDEX . . . . .	61
1.32 SHELLS SNAIL . . . . .	62
1.33 GOLD . . . . .	62
1.34 WOODEN TABLE . . . . .	62
1.35 SHADOWS . . . . .	63
1.36 CARPETS FLOORS . . . . .	64
1.37 WOOD . . . . .	64
1.38 LIGHTBULB . . . . .	65
1.39 FIRE CANDLE FLAME . . . . .	65
1.40 STARFIELD STARS . . . . .	66
1.41 PANELS SPACESHIP . . . . .	67
1.42 BARK MARBLE STONE . . . . .	67
1.43 BUBBLE SOAP . . . . .	68
1.44 TRANSPORTER EFFECTS LOGO ELECTRICITY . . . . .	69
1.45 FIRE FLAMES . . . . .	69
1.46 CAMERA SIZES FOCUS LENS . . . . .	69
1.47 CLOUDS . . . . .	70
1.48 WATER DROPS . . . . .	70
1.49 WRINKLES FOLDS DRAPES . . . . .	71
1.50 SPONGE . . . . .	71
1.51 HELMET SHINY COPPER . . . . .	72
1.52 FOOTBALL LEATHER . . . . .	72
1.53 LATTICIZE LATTICES WIREFRAME . . . . .	72
1.54 BUBBLE SOAP . . . . .	73
1.55 GOLD METALS . . . . .	73
1.56 GLASS . . . . .	74
1.57 SPACESHIPS BORG WIREFRAME LATTICE . . . . .	74
1.58 FORMS EDITOR THUMBS . . . . .	75
1.59 LATTICE PIPES LAYERS . . . . .	77
1.60 GLASS . . . . .	78
1.61 REFRACTION INDEX . . . . .	78
1.62 MIRRORS . . . . .	79
1.63 METALS GOLD . . . . .	80
1.64 ORGANIC BARK STONE . . . . .	81
1.65 FOG . . . . .	81
1.66 LIGHTS TEXTURES GLOBAL EFFECTS . . . . .	82
1.67 ANTIALIASING . . . . .	82
1.68 INVERSE KINEMATICS BONES . . . . .	82

---

---

1.69	TEXTURES LIGHTS EFFECTS . . . . .	83
1.70	SMOKE . . . . .	84
1.71	STATES ROBOT BONES IK . . . . .	85
1.72	SOLAR CORONA . . . . .	85
1.73	BONES . . . . .	86
1.74	DEPTH-OF-FIELD DOF . . . . .	90
1.75	PISTON CYLINDER IK STATES . . . . .	91
1.76	PARTICLES PINNATE . . . . .	91
1.77	SHELLS SNAIL . . . . .	92
1.78	CLOUDS VISTA . . . . .	93
1.79	SOFT SHADOWS LIGHTS . . . . .	93
1.80	SEASHELLS . . . . .	95
1.81	SPOTLIGHTS BEAMS . . . . .	97
1.82	STARFIELD STARS . . . . .	99
1.83	MOEBIUS STRIP . . . . .	99
1.84	EYES FOLLOWING . . . . .	100
1.85	PARTICLES . . . . .	101
1.86	FLAG WAVING . . . . .	101
1.87	GLASS HOLLOW . . . . .	102
1.88	LENSES . . . . .	102
1.89	FIRE TORCH . . . . .	103
1.90	GRASS LAWN SWAY EFFECT . . . . .	104
1.91	LASER PHASER EFFECT . . . . .	105
1.92	CLOUDS . . . . .	105
1.93	TEXT GROWING WALL TERMINATOR . . . . .	106
1.94	INVERSE KINEMATICS . . . . .	106
1.95	NEBULA FOG . . . . .	108
1.96	ANTENNA SATELLITE DISHES . . . . .	108
1.97	FOG . . . . .	109
1.98	HALO LIGHTS LENSFLARE FOG . . . . .	109
1.99	PARTICLES MAPPING TEXTURES . . . . .	110
1.100	SMOKE . . . . .	111
1.101	LIGHTS NEGATIVE SHADOWS . . . . .	112
1.102	WATERFALLS FIRE . . . . .	112
1.103	SUN SOLAR FLARES . . . . .	114
1.104	SIRDS ZBUFFER STEREO 3D . . . . .	114
1.105	LASERS . . . . .	115
1.106	PUDDLES WATER . . . . .	115
1.107	STARFIELD STARS . . . . .	117

---

---

1.108STARS FLY-THRU WARP . . . . .	117
1.109LIGHTS VISIBLE BEAMS . . . . .	118
1.110PHOTONS PHASERS LASER BEAMS . . . . .	118
1.111NEBULA . . . . .	120
1.112WAND MAGIC SPARKLES . . . . .	120
1.113CANDLE . . . . .	121
1.114DISCO BALL . . . . .	122
1.115SMOKE CIGARETTES . . . . .	123
1.116FORMS EDITOR . . . . .	125

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# Chapter 1

## d2i

### 1.1 main

=====  
Dare to Imagine  
=====

Compiled by Shane Davison  
(daviso@cs.uregina.ca)

This is a compilation of almost all the tutorials and fun things to try from the archives of the Imagine Mailing List. I have carefully read each and every archive since the start of the IML to the present day (Feb. 14, 1995) and extracted this valuable information in the process. The authors of the messages deserve full credit for the great tips and hints contained within and, if you use any part of this compilation elsewhere, please credit me for the time and effort to put it together.

Source text begins with an asterisk and is one of Subject, Date, or From. The archive number in [] follows the date. The order is chronological.

Note: I have snipped but not modified the original text.

Enjoy!

This \*compilation\* is (C) Copyright 1995 by Shane Davison.  
The \*amigaguide\* & \*html\* versions are (C) Copyright 1995 by Ernesto Poveda.  
It can be distributed freely as long as our names are included.  
Please contact the author(compilation) for use of a specific message.

Please go to Alphabetical Index now!!

Please go to topics now!!

### 1.2 Table of Contents

---

## KEYWORD INDEX

-----oOOo-----

## ANTENNA

: How to do Antenna Satellite Dishes.

## ANTIALIASING

: More speed, less quality. Only Trace mode!

## BALL

: Nice Disco Ball tutorial.

## BARK

: Wrinkle.itx to do a marble stone.

## BARK

: More Wrinkle, but more organic effect.

## BEAMS

: Good mode to do a SpotLight Beam.

## BEAMS

: Visible light, great underwater effect.

## BEAMS

: A Star Trek photon torpedo.

## BONES

: Short Inverse Kinematics tutorial.

## BONES

: CONSTRAIN tutorial with 3 axis.

## BONES

: Bones example. Anim Bones also included :)

## BORG

: The Borg Ship. !?

## BOTTLE

: Attributes to do a good wine-bottle-green glass & wine.

## BRAID

: A tutorial to do braid ( useful to do bread or rope).

## BREAD

: A tutorial to do braid ( useful to do bread or rope).

## BUBBLE SOAP

: Attributes to do a Soap bubble & a complete BoubleBath :D (= ↔ Soren)

## BUBBLE SOAP

: A diferent approach to the same topic. (=Lesk)



---

CAMERA  
: How to set a realistic focus.

CANDLE  
: Same as text info of FIREBALL texture to make a candle flame.

CANDLE  
: A candle flame with some textures that can be animated!

CARPETS  
: A good way to make carpet floors ( use bumps & roughness).

CIGARETTES  
: Ideas on how to make chaotic cigarette smoke.

CLOUDS  
: Mike's Clouds tutorial. Making some cluds with FilNoiz2.itx & ←  
ground.

CLOUDS  
: More clouds, this with brushmaps & spheres.

CLOUDS  
: Clouds using the 'crumpled' texture.

COLOR  
: Lotsa rgb values for a zillion of diferent colors !!

COPPER  
: How to get a good 'used' look for a helmet obj.

CORONA  
: Animated Solar corona using Im3.0 new fog Textures.

CYLINDER  
: Piston Cylinder with states, bones & kinematics.

DOF  
: Simple way to use Depth of Field at Action Editor.

DETAIL EDITOR  
: Introductory Detail Editor Tutorial by Steven Worley.

DISCO  
: Nice Disco Ball tutorial.

DISHES  
: How to do Antenna Satellite Dishes.

DRAPES  
: Let's see the process to do a draped table cloth....

EFFECT  
: Sway.ifx to do some grass effect.

EFFECT  
: How to do a laser phaser firing effect.

---

## EFFECTS

: Electric Field effect with a logo.

## EFFECTS

: EFFECTS.TXT & lite textures short explained.

## EFFECTS

: Some textures listed here. No more.

## ELECTRICITY

: Electric Field effect with a logo.

## ENTRANCES

: Logo Entrances. Here's another fun linear texture trick.

## EYES

: Eyes that follow and point the camera.

## FIRE

: Same as text info of FIREBALL texture to make a candle flame.

## FIRE

: How to do Re-entry flames fast tutorial.

## FIRE

: Here is a small tip for making open fire, a torch for example.

## FIRE

: Seamless Waterfalls & Fire.

## FLAG

: Flag Waving.

## FLAME

: Same as text info of FIREBALL texture to make a candle flame.

## FLAMES

: How to do Re-entry flames fast tutorial.

## FLARES

: Simple but great-looking sun.

## FLOORS

: A good way to make carpet floors ( use bumps & roughness).

## FLYING

: Logo Entrances. Here's another fun linear texture trick.

## FLY-THRU

: How to create a simple yet effective warp-drive.

## FOCUS

: How to set a realistic focus.

## FOG

: Using global fog, a Wall O Fog easily controled.

---

FOG  
: Foggy Lights.

FOG  
: Imagine v3.0 bug with fog objects.

FOG  
: Small Nebula.itx example.

FOG  
: Using Fog Objects to create an atmospheric location.

FOG  
: Halo around light in Imagine (3 methods).

FOLDS  
: Let's see the process to do a draped table cloth....

FOLLOWING  
: Eyes that follow and point the camera.

FOOTBALL  
: Pebbled & Leather textures used to do a football.

FORMS EDITOR  
: 3 tutorial object with the Forms Editor.

FORMS tutor  
: Forms Editor tutorial with some examples.

GEMSTONES  
: Opal, Amber, Garnet & Cubic Zirconia.

GLASS  
: Attributes to do a good wine-bottle-green glass & wine.

GLASS  
: Glass attributes and variations of the theme.

GLASS  
: A transparent opinion about glass attribute.

GLASS  
: Default Glass attributes.

GLASS  
: Hollow glass, perfect for drinks.

GLOBAL  
: EFFECTS.TXT & lite textures short explained.

GOLD  
: Metal attributes by M. Halvorsen.

GOLD  
: Gold attributes.

---

---

GOLD  
: More Gold attributes.

GOLD  
: Well, that's cool, isn't it?

GRASS  
: Sway.ifx to do some grass effect.

GROUND  
: Mike's Clouds tutorial. Making some cluds with FilNoiz2.itx & ←  
ground.

GROWING  
: Text extruding from a plane.

HALO  
: Halo around light in Imagine (3 methods).

HANDLE  
: An instant bicycle handle tutorial :)

HELMET  
: How to get a good 'used' look for a helmet obj.

HOLLOW  
: Hollow glass, perfect for drinks.

IK  
: CONSTRAIN tutorial with 3 axis.

IK  
: Piston Cylinder with states, bones & kinematics.

INDEX  
: Opal, Amber, Garnet & Cubic Zirconia.

INDEX  
: Air, Ice, Alchohol, Water, Glass, Quartz, Salt & Diamond.

INDEX  
: Some useful Refraction Indexes.

INVERSE  
: Short Inverse Kinematics & bones tutorial.

INVERSE  
: More about Inverse kinematics.

KINEMATICS  
: Short Inverse Kinematics & bones tutorial.

KINEMATICS  
: More about Inverse kinematics.

LASER

---

: A Star Trek photon torpedo.

LASER

: How to do a laser phaser firing effect.

LASERS

: Laser effect simulating an irregular dusty atmosphere.

LATTICE

: The Borg Ship. !?

LATTICE

: How to do objects that appear as wireframe when render.

LATTICE

: DeathStar.itx to do wireframe objects.

LATTICES

: How to do objects that appear as wireframe when render.

LAWN

: Sway.ifx to do some grass effect.

LAYERS

: DeathStar.itx to do wireframe objects.

LEATHER

: Pebbled & Leather textures used to do a football.

LENS

: How to set a realistic focus.

LENSES

: This is just an extract about doing lens with Imagine.

LENSFLARE

: Halo around light in Imagine (3 methods).

LIGHTS

: Visible light, great underwater effect.

LIGHTS

: EFFECTS.TXT & lite textures short explained.

LIGHTS

: Some textures listed here. No more.

LIGHTS

: Foggy Lights.

LIGHTS

: Halo around light in Imagine (3 methods).

LIGHTS

: Soft Shadows.

LIGHTS

---

---

: Simulating Shadows in Scanline Mode.

LIGHTBULB

: Settings for a LightBulb.

LINEAR

: Logo Entrances. Here's another fun linear texture trick.

LIQUID

: Attributes to do a good wine-bottle-green glass & wine.

LOGO

: Electric Field effect with a logo.

LOGO

: Logo Entrances. Here's another fun linear texture trick.

MAGIC

: How to do a magic wand that emanates sparkles.

MAPPING

: Particle mapping ( brush tracking).

MARBLE

: Wrinkle.itx to do a marble stone.

METALS

: More Gold attributes.

METALS

: Well, that's cool, isn't it?

MIRRORS

: Some attributes that give a nice mirror polish.

MOEBIUS

: Two ways of doing a Moebius strip.

NEBULA

: Small Nebula.itx example.

NEBULA

: A good way of doing a back-shot Nebula.

NEGATIVE

: Simulating Shadows in Scanline Mode.

ORGANIC

: More Wrinkle, but more organic effect.

PANELS

: How to do a spaceship multicolored panels.

PARTICLES

: Particle mapping ( brush tracking).

PARTICLES

---

---

: Bouncing particle logo fall.

PARTICLES

: Some explanations about Particle.ifx of Action Ed.

PHASER

: How to do a laser phaser firing effect.

PHASERS

: A Star Trek photon torpedo.

PHOTONS

: A Star Trek photon torpedo.

PINNATE

: Bouncing particle logo fall.

PIPES

: DeathStar.itx to do wireframe objects.

PISTON

: Piston Cylinder with states, bones & kinematics.

PLANETS

: Pastell.itx used to make some nice planets.

PUDDLES

: You know, the kind of puddle of a thick solution such as ←  
mercury...

REFRACTION

: Opal, Amber, Garnet & Cubic Zirconia.

REFRACTION

: Air, Ice, Alcohol, Water, Glass, Quartz, Salt & Diamond.

REFRACTION

: Some useful Refraction Indexes.

RGB

: Lotsa rgb values for a zillion of diferent colors !!

RING

: This tutorial will give you a good ring object.

ROBOT

: CONSTRAIN tutorial with 3 axis.

ROPE

: A tutorial to do braid ( useful to do bread or rope).

SATELLITE

: How to do Antenna Satellite Dishes.

SEASHELLS

: 3d sea-shell: scallop, but a bit planar...

---

---

SHADOWS  
: Soft Shadows.

SHADOWS  
: Simulating Shadows in Scanline Mode.

SHADOWS  
: Shadow Object attributes.

SHELLS  
: Snail Shells made easy.

SHELLS  
: Snail Shell a bit more complex.

SHINY  
: How to get a good 'used' look for a helmet obj.

SIRDS  
: 3d Stereographic pictures with Imagine.

SIZES  
: How to set a realistic focus.

SMOKE  
: Ideas on how to make chaotic cigarette smoke.

SMOKE  
: Smoke objects with Nebula.itx.

SMOKE  
: Smoke with particles. Looks great.

SNAIL  
: Snail Shells made easy.

SNAIL  
: Snail Shell a bit more complex.

SOFT  
: Soft Shadows.

SOLAR  
: Animated Solar corona using Im3.0 new fog Textures.

SOLAR  
: Simple but great-looking sun.

SPACESHIP  
: How to do a spaceship multicolored panels.

SPACESHIPS  
: The Borg Ship. !?

SPACESHIPS  
: Pastell.itx used to make some nice planets.

---



---

SPARKLES  
: How to do a magic wand that emanates sparkles.

SPONGE  
: Well, an obscure use of Peened.itx

SPOTLIGHTS  
: Good mode to do a SpotLight Beam.

STAR  
: A tute to get a star for your own.

STARFIELD  
: Starfield done with a sphere & confetti.itx

STARFIELD  
: Fast Starfield object with confetti.itx

STARFIELD  
: 2 ways of doing another starfield.

STARS  
: How to create a simple yet effective warp-drive.

STARS  
: Starfield done with a sphere & confetti.itx

STARS  
: Fast Starfield object with confetti.itx

STARS  
: 2 ways of doing another starfield.

STATES  
: CONSTRAIN tutorial with 3 axis.

STATES  
: Piston Cylinder with states, bones & kinematics.

STEREO  
: 3d Stereogramic pictures with Imagine.

STONE  
: Wrinkle.itx to do a marble stone.

STONE  
: More Wrinkle, but more organic effect.

STRIP  
: Two ways of doing a Moebius strip.

SUN  
: Simple but great-looking sun.

SWAY  
: Sway.ifx to do some grass effect.

---

---

TABLE  
: To design an old, unpolished wooden table top use this settings ↔  
.

TEAR  
: A design of a tear drop.

TERMINATOR  
: Text extruding from a plane.

TEXT  
: Text extruding from a plane.

TEXTURES  
: EFFECTS.TXT & lite textures short explained.

TEXTURES  
: Some textures listed here. No more.

TEXTURES  
: Particle mapping ( brush tracking).

THUMBS  
: Forms Editor tutorial with some examples.

TORCH  
: Here is a small tip for making open fire, a torch for example.

TRANSPORTER  
: Electric Field effect with a logo.

VISIBLE  
: Visible light, great underwater effect.

VISTA  
: More clouds, this with brushmaps & spheres.

WALL  
: Text extruding from a plane.

WAND  
: How to do a magic wand that emanates sparkles.

WARP  
: How to create a simple yet effective warp-drive.

WATER DROPS  
: Water drops without using textures. Real drops.

WATER  
: You know, the kind of puddle of a thick solution such as ↔  
mercury...

WATERFALLS  
: Seamless Waterfalls & Fire.

WAVING

---

: Flag Waving.

WINE

: Attributes to do a good wine-bottle-green glass & wine.

WIREFRAME

: The Borg Ship. !?

WIREFRAME

: How to do objects that appear as wireframe when render.

WOOD

: Settings for a good looking wood.

WOODEN

: To design an old, unpolished wooden table top use this settings ←

.

WRINKLES

: Let's see the process to do a draped table cloth....

ZBUFFER

: 3d Stereographic pictures with Imagine.

/\* END \*/

## 1.3 Table of Contents

TOPICS INDEX

-----oOOo-----

Err.... Well..... I will add this page soon.... :)

->

Return to Alphabet

<-

## 1.4 GOLD

\* Subject: metal attributes by M. Halvorsen

\* Date: Thu, 31 Jan 91 11:34:19 PST [0]

\* From: "\"davis@soomee\""@rust.enet.dec.com

I make the object color Red 205, Green 205 and Blue 80.  
 Refelctive settings are Red 180, Green 160 and Blue 125  
 I use hardness at 255 and specular 255 on all guns Red  
 Green and Blue.

\* Subject: Re: metal attributes by M. Halvorsen

\* Date: Fri, 01 Feb 91 09:11:23 EST [1]

\* From: Mark Thompson <mark@westford.ccur.com>

specular R = 255, G = 255, B = 160 should yield more realistic results.

```
->
Return to Alphabet
<-
```

## 1.5 REFRACTION INDEX

```
* Subject: Glass
* Date: Wed, 13 Feb 91 16:05:09 EST [1]
* From: spworley@ATHENA.MIT.EDU
```

Air	1.02
Ice	1.309
Alcohol	1.329
Water	1.333
Glass	1.50
Quartz & salt	1.644
Diamond	2.417

```
->
Return to Alphabet
<-
```

## 1.6 GLASS

```
* Subject: Glass
* Date: Wed, 13 Feb 91 16:05:09 EST [1]
* From: spworley@ATHENA.MIT.EDU
```

Also, glass has a SLIGHT bluish tinge, so I use RGB=250,250,255. Cherry Jello might be 240, 140, 140.

Glass is a real light reflector - It has very bright, tight highlights. I crank specular up to 255,255,255, and hardness up to 255.

The color that you set glass determines the shade Imagine will give to non-perfect glass - ie glass without transparency set at 255 255 255.

Black ( 0 0 0 ) works well, since then the color doesn't cover up the image. You can experiment, though.

One last important attribute of glass is reflection. Glass reflects light a little bit, so should be slightly reflective. Too reflective, and the transmitted image gets overpowered. Think of a window- you see though it quite clearly without seeing much reflection. At night, when there is little light coming though, you can see the mirror-like qualities of the glass. Transparency should

almost always dominate. Good value for reflection are in the range 30-60, and again, I use a SLIGHT blue tint.

Steve's cool transparent ball-

```
Color =0 0 0
Transp= 250 250 255
Reflec= 49 49 53
Specular= 150 150 150
hardness= 255 255 255
rough=0
shininess=0 (CRITICAL)
Index=1.08
```

```
        ->
Return to Alphabet
        <-
```

## 1.7 FORMS EDITOR

```
        * Subject: Forms Tutorial Part III
* Date: Wed, 29 May 91 13:17:15 EDT [6]
* From: spworley@ATHENA.MIT.EDU
```

As a final demonstration of how the Form Editor is used, I'll describe three tutorial objects you can make. You are EXTREMELY advised to sit down and make these objects. Reading the tutorial is fine, but moving the mouse around is the best way to learn how to make these sorts of things yourself.

There are some screen grabs of some key steps in these tutorials in a file called Form\_Tutorial.lzh on hubcap.clemson.edu in the /pub/amiga/incoming/IMAGINE/MISC directory. These screen grabs show the step by step evolution of the examples, as well as a couple of rendered examples. You might want to get these (especially for the last example) but you're welcome to wing it by using the text alone. The file also has a copy of this text in it, so you won't have to separate this mail message out if you're getting it on the mailing list. If you don't know what FTP is, ask a local computer wizard and hope you have access. :-)

- I. A Coke (TM) Can
  - II. Building a Water Splash
  - III. A Complex Boat Hull
- Steve Worley 5/28/91

---

Steven Worley

spworley@athena.mit.edu

---

Because I was erked when my brush and texture tutorials were posted on Compuserve sans credit, I include the following:

---

The text contained within this document as well as the associated computer files are (C) Copyright 1991 by Steven P. Worley. They be distributed freely under the following conditions: 1) The entire text, including this copyright notice, is kept entire and 2) Steven Worley is duly credited as being the author. The author reserves all other rights to this text.

->  
Return to Alphabet  
<-

## 1.8 A Coke (TM) Can

---

### A Coke (TM) Can

---

The Detail Editor has a powerful tool called sweep that can create simple radially symmetric objects like a soda can or a candlestick holder. However, the Forms editor can one-up sweep pretty easily.

Our goal is to create an object in the shape of a standard 12 ounce soda can with all the details like the hollow on the bottom and the little metal ridge on the top. The Forms Editor can create objects like this with no trouble, and do it faster and much easier than using the Detail Editor to spin a line outline of the can would take.

Enter the Form Editor, and make a new form (in the Object menu) with 4 slices and 20 points. A can at first approximation is just a cylinder. We need many points around the radius to get a nice smooth circle cross-section, but only a few slices to define the rectangular vertical cross-section. For this example, we'll never muck with the 20-point circle cross section.

The cylinder is obviously radially symmetric, so we will probably want to turn on 90-degree symmetry from the symmetry pull-down menu. The points that you manipulate in the front and right views will now move their corresponding siblings, keeping the object radially symmetric.

To make a quick and dirty cylinder, move each point in the vertical cross sections so that they are on the same Z line- they should stack vertically on top of each other. I like manipulating the right hand cross section in the Front view. Remember, the symmetry mode will move the other three points for you. You can use the perspective view to see what effect you're having on the form. You might look at the screen-grab called can\_one to see how the first simple model should look. Again, these screen-grabs have to be downloaded from the FTP site [hubcap.clemson.edu](http://hubcap.clemson.edu).

What do we get? Well, our horizontal cross section is unchanged, its still a nice circle. We don't want to muck with it. Our horizontal cross section is a nice straight vertical line. If you think about it, this should give us an object in the form of a tube. If you look at your perspective view and don't see a tube, something is wrong. Look

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at the can\_one picture again to see what the problem is.

There are two problems with this tube. First, the sides are a bit wavy, since each point was moved manually and they might not be exactly on the same vertical line. Second, if we really want to make a Coke can, we should at least get the proportions and scale right so we don't have to squash and stretch things later to get it to look reasonable.

To fix the wavy line problem, we just use "lock" mode from the select menu. Remember, this will make any point we move jump to grid intersections, so if we move the points around by the same Z line they'll all line up on the same grid line.

We should also figure out how to get the right can proportions. If you get out a ruler, you'll find a standard Coke can is 12.2 cm tall and the main body is 3.25 cm in radius. It is difficult to accurately change the radius of our form, but we can make every other measurement use the default radius of 100 Imagine Units as a reference. Hence, there are 3.25 cm in 100 Imagine Units, so the can should be 375 units high. If we change the grid spacing to 25, our can should be fifteen grids high. It is easy to automatically set the height of our object, because the points will leap to the right position when we move them to the correct (coarse) point. You might want to turn on "coordinate" mode from the display menu to help identify where you are moving your points.

It might occur to you that we also don't want a tube, we want a solid cylinder, with ends. This is easy to make, we'll just take the top cross section point and move it to the Z axis to enclose the top and move the bottom point to the Z axis to enclose the bottom. This gives us the rectangular cross-section we need to form a cylinder.

We'll make our can so that the axis is at the very bottom, at 0, 0, 0, and the can rises to a height of 375 in the Z direction.

To actually change our rough tube to this properly proportioned, capped cylinder, set the grid size to 25, turn on lock, and move the top right point in the FRONT view to the 0, 0, 375 grid intersection. The other views should show the corresponding points moving up as well. Move the second point to form the outside top edge of the can, to 100, 0, 375. The third point forms the side, at 100, 0, 0, and the last point will define the bottom, and should go to 0, 0, 0.

Your can should look like the picture can\_two.

Ok, this DOES indeed look like a nice cylinder. So how do we get the nice details like the top rim, and the dent on the bottom, and the narrower "lip ridge" just below the top rim? I said that it was easy to add detail once you had a basic, crude form. Let's make the bottom dent of the can. Turn `_off_ lock`, so that we can move the points freely to whatever location we want. We want to add some points to the vertical cross sections so we have more control over the shape of the can.

Select 'Add' from the mode menu. Now, whenever you click on a point, a new point will appear at the midpoint of the line below it. We want to

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add a point to the very bottom line segment (Which is currently the horizontal line making the bottom of the can). Just click on the bottom outer point and a new point should appear on the bottom horizontal line. Enter 'Edit' mode from the mode menu, and you'll find this new point is just as easy to manipulate as the originals.

To form the bottom dent, we want to move the very last point on our Z centerline UP to make a cavity. The point should be moved about a third of a cm, or 10 units. You might want to turn on 'coordinates' from the display menu to help measure the distance. Once you move the point up, you'll see the dent in the perspective view if you move it so you can view the bottom of the can. The new point that we added can be moved up to make the bottom dent more bowl-like instead of a cone.

The trick to adding detail is to identify where you want to add a new feature. If you want to add a new dent or bulge, a new point added at the location you want can be moved in or out to make the feature. If you need to line things up, judicious use of changing the grid size and using 'lock' will let you place the points accurately. Note that the Forms editor LACKS the transformation requester that you find in the Detail Editor, so you can't just type in coordinates for critical points. You have to use grid size and lock to accurately place objects.

OK, we know how to add details. Now how do you take the measurements off of the can? There are a few ways- you could judge by eye, you could take a ruler and measure everything, or you can try sneaky tricks. If you fake it by eye, your model is obviously going to be somewhat inaccurate, even if you use a can sitting right next to you as a model. Measuring distances works quite well, though. I used a finely measured rule and a sheet of graph paper to transcribe the shape of all the ridges and bumps. Inputting these coordinates to Imagine involves using the Coordinates display and matching points.

However, there is a quick and dirty trick you can use, though this probably isn't applicable to most objects you model. Zoom the front view so that it takes up the whole screen. Center your can in your display by using the "set center" command in the Display menu and clicking at the center of your object. Now, zoom in or out until the size of the outline on your monitor approximates the real size of a Coke can. Take a real can, and press it against your monitor, then eye it. Use the radius as the determining factor, not the height. Now repeatedly use the "set zoom" command from the display menu and muck with the zoom to get the screen can size as close as you can to the real can size when you press it against the monitor. On my 1950 monitor a zoom of 1.05 worked well, but it will vary from monitor to monitor.

Once you match sizes, you can actually press the can against the screen with one hand, and move points to match the can outline with the other. [You'll look like a fool if anyone else is around, too!] However silly this seems, I found it the easiest way to input the shape of the can. When I sat with a ruler and some graph paper, my paper diagram turned out to be less accurate as the screen method and took much more time.

A rehash on adding the fine details: You have a rough outline. To



refine it, just pick the area you want to refine, add a new point on that line, and drag it where you want it. I found that getting a highly accurate cross-section (using 17 points) took less than 3 minutes with the admittedly stupid screen trick. Using a ruler I spent 10 minutes measuring and converting before I even moved the mouse.

When you're done, you should have an outline similar to mine, which is shown in the picture `can_three`.

Take a look at your object in the perspective mode with the window zoomed to full screen, and solid display mode on. Rotate the view up and down. Nice, huh?

What about the top hole, and the tab? The tab is easy to add in the Detail Editor, by extruding a flat outline. If you expected to make it as an integral part of the can form, I'm sorry to say you were expecting a bit much. The Form Editor likes to make single-piece objects, and you can see how the tab is really a separate part of the can "form." This doesn't prevent you from making a separate tab object and sticking it on, and this is exactly what I did.

The hole, on the other hand, is pretty easy to include using the Form Editor! If the hole is facing towards us as if we were going to take a drink, the hole is obviously non-radially symmetric, and it is not front-back symmetric. It IS left-right symmetric. Turn the symmetry from the radial '90-degree' to 'right'. Now, in the FRONT view, move the top point (that is now on the Z axis) straight OUT about a third of the way to the outer radius. This is the WIDTH of the hole on top.

In the RIGHT view, move the left-top point (which is the front-top on the can) about 90% of the way to the can rim. Leave the right-top point where it is. The finished can form can be seen in picture `can_four`.

See what we've done? Moving the points away from the center made a hole. We made the front-to-back cross section asymmetric to one side, so the hole location is moved. Look in the perspective view. Play around with moving the hole around and turning symmetry on and off.

Why did this make the asymmetric hole? Remember how the form is generated? Each cross-section is interpolated from the 4 defined cross sections. The front cross section blends to the right, which then blends to the back, then to the left, then back to the front. This is very hard to describe, but play with the points and you'll see the kind of control you have.

Note that the hole is an oval, which is not quite true for a can. The Forms editor really won't let you do much more unless you want to start mucking with radius modulation, but that's for the next example.

This completed can object can be loaded into the Detail editor, at which point it becomes a normal object. You can move individual points, apply brush maps, attributes, textures, and manipulate it in any way you would a normal object. After manipulation in the Detail Editor, the objects are generally not reloadable back into the to the Forms editor. Using the Detail editor, you might make and attach the can tab, or move individual points on the top hole to

make the ellipse to match a real can's hole more accurately.

A final rendered view of a can generated using this tutorial can be seen in the HAM image 'Craftsman', where you can see two separate versions of the can. The carved wood Coke logo was an experiment that turned out well. The Coke logo itself was made with wire cutters, a real can, Digiview, and an hour's touchup in DPaint III.

The can could have also been generated in the Detail editor by using the powerful "Sweep" mold function. However, sweep certainly does not provide the interactive updates that the Forms Editor does, and can only make completely symmetric objects. The next examples will show how much more powerful the Form Editor is when it makes very non-lathed objects.

->  
Return to Alphabet  
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## 1.9 Building a Water Splash

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### Building a Water Splash

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Think of a ball dropping into a pool, and how a corona of water spurts out around it. The splash is vaguely symmetric, and is certainly not a group of primitive cylinders and tori merged together.

Building a splash like this using the Forms Editor is obscenely easy, much easier than the Coke can! It is even simple to animate the splash!

If we want to make a crude splash model, we should first envision what a cross section of such a splash would look like. The picture splash\_one is a 10 second DPaint line drawing of how I see water would splash up and away at the peak of the splash. The center is disturbed but mostly flat, and there is a steep "wall" of water at a certain radius pointing out and up. It curls a bit at the top, with a bulge at the peak, and slopes back IN and down. Outside the wall the water is less disturbed. The wall is the 'shock wave' and is expanding (and falling) with time.

It is very, very easy to make a primitive version of this in the forms editor. We pretty obviously want our main axis that our slices are centered around to be vertical. Start a new form, with 30 points and 10 slices, which should give us enough detail to rough something out.

Initially, we'll want to make the splash symmetric. Later, we can add asymmetric details, but for now we want the coarse primitive to be radially symmetric, since it will define the basic structure of the form. Use the '90-degree' mode in the Symmetry menu.

The initial spherical horizontal cross section is completely useless

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for our purposes. Pick a height at which you want to base the splash (the bottom point of the cross section is a logical choice) and when you're building the splash, imagine that it is sitting on top of this water. It will give us a good reference point.

Pull the top point of the cross section way out and down to the water level. Keep the bottom point in at the center, and also at the water level. The inbetween points should be moved into a crude outline of the sloping water wall that we envisioned. My initial model is shown in the picture splash\_two. It took about a minute to build.

Look at the perspective view. A bit bland, but it is certainly on the right track. Add a few points to the cross section at the top of the water wave to give it a more complex, bulging appearance. You might want to add some points near the base, especially on the inside, and make the water near the wave a bit more ragged.

Now what? Our coarse form was trivial to make, but is far to artificial. Let's jazz it up! Turn OFF symmetry, and muck around with ALL FOUR cross sections. You can increase the height of the wave in one, make the water a little rougher in another, make the peak on one a bit more curved... give them character. DON'T make huge changes like adding a second wave (you're welcome to try!) but certainly make them a bit different from each other. Think of adding a 25% noise level. You might keep an eye on the perspective view, as well- it will show you how the Forms Editor copes with blending these different shapes together.

Now what? A little more variation? There's no reason the splash has to be a perfect circle, or even an oval, is there? Of course not. The TOP display shows what the HORIZONTAL cross section of our splash looks like. Right now it's a nice circle. Now, our splash really should be pretty circular when looked from above, but not perfectly... Go ahead and muck with the shape, and again, watch the perspective view to see what happens. You might want to leave SOLID mode on, especially with a fast machine, since the wireframe of such a non-structured object is often very confusing.

You can move the radial points any way you like. I suggest that you only move them generally in and out, or the splash will get somewhat lopsided. Also, avoid having sharp spikes. You can see how easy it is to make our splash look like the Statue of Liberty's crown. 2 or 3 point bulges look very nice, major details formed with just 1 point are sharp and look like knives. Not very appropriate for a soft water splash!

My final splash is shown in the picture splash\_three. A rendered version with three different splashes is called Ocean\_Sunset. Ocean\_Sunset is actually a still from the current version an anim I'm working on. It has the dolphins jumping around, the water moving with wind-driven waves, and eventually will have a ship slowly steaming along with a nice wake and smoke. The animation of the splashes still need a lot of tweeking, but it's getting better. This is still a work in progress, but it looks nice even now.

What about animation? I said it was easy to animate, but how? Well, let's think of what the animation SHOULD look like, then figure how to implement it. How does a splash evolve? The big wall of water starts

at the center of the circle and moves outward at a pretty constant speed. It grows in height, curls over, and crashes down as it progresses. If we make maybe 4 or 5 splashes, one for each stage of the splashes growth, we can just move from one to the other. How? Morph! Morph is easy to forget when you're dealing with complex objects like splashes. Since morph requires its objects to have the same structure, different complex objects often won't work with each other. However, if we use the same basic starting form for each of the splashes (same # points and slices) we can have Imagine smoothly interpolate from one form to the next.

Considering the fact that creating the splash took maybe 5 minutes, you can see that making an entire animated splash is a 15 minute task. You don't even have to make new splashes, just modify old ones! When animated, you might add frills like separate objects for flying water droplets, and have them follow parabolic arcs. The Form Editor won't let you make detached objects like that, so you'll have to make them as separate objects that fly out, as opposed to pinch off and fly away... You might also use two different splash forms superimposed to give the splash a more complex character. The splash we built is still a bit plain.

This example should impress how easy it is to make complex shapes with an amazing amount of speed and control. Asteroid-maker, indeed!

->  
Return to Alphabet  
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## 1.10 A Complex Boat Hull

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### A Complex Boat Hull

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Making a boat hull might not seem very easy. If we want to use the Form editor, shouldn't there be some sort of near-radial symmetry? It turns out that you can really push the Forms Editor around in ways Impulse hoped we'd discover.

A boat hull is a pretty simple object, right? Well, sorta. If you wanted to build one in the Detail editor, you'd make an outline the shape of an iron (as in for pressing clothes), then you'd extrude it and use slice to make the bottom.

Well, this would work, but it's a pretty cheesy boat hull, no matter how good your iron outline was. Even if you were a good modeler, made a series of outlines and used skin to blend them, you are going to get a hull that is boxy as opposed to a nice graceful curve.

Think of a big ocean-going vessel, not a cheeseball rowboat. The prow is sharp, to cut into the water, and it angles down and back. The body of the hull is fairly straight, and the stern rounds off smoothly with a flat face as opposed to the prow's sharp point. At no point,

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however, does the hull look like it was constructed of different sections. To reduce drag, the shape smoothly changes both from the top view (a teardrop with a squashed bottom?) and the side view. It has one axis of symmetry (left/right).

How could we ever model this in the Detail Editor? Not easily, and certainly not in one piece.

Well, fine. But how could we ever model this in the Forms Editor, either? It certainly is not very obvious.

A big hint of how we would design a form for the hull lies in where we place the center, the radial point, of our cross sections. We also have to decide whether the slices should be coming out horizontally (like the axis was a vertical mast) or at right angles. The choice is not obvious.

If the axis is horizontal, then the radial sections would tend to form a dome over the hull. If you made the radii of the overhead portion negative (There is no problem doing this!) we could just make a double-thickness of hull. This is messy, but workable.

The second option is to use a vertical axis, which gives us the benefit of a simpler object since there is no "dome" to add extra needless points. We want to make a new form object with an XY cross section. Select 3 slices and 7 points and we'll make a very simple version of the hull and work from there.

The question is where to put the center of our (vertical) axis. There are three places on the hull where there is a sudden change in cross-section -- the bow, and the two stern corners. If we want to make these changes fairly sudden, we probably want to define each one of them as one of our 4 cross sections. The interpolated cross sections by definition are interpolated, so there's no major change in shape. Thus, we want the bow to be in line with one of the four cross sections, as well as in line with the two stern corners. This makes our choice easy- the only place we can do this is the very back of the boat, along the (port-starboard) centerline.

Now that we've decided where to put the axis, how do we want to define the cross sections? Well, we want something that is left-right symmetric, and NOT front-back symmetric, so we should turn on left-right symmetry.

We want to change the default nearly-closed spherical cross section to something more resembling an open gravy dish. Move the very top point(s) way out and down some. The front cross section point (the left one in the Right view) should be moved the most. The back cross section point should be moved down, but not out very much. Remember that the stern is very close to the axis, and does not have much detail.

The Front view should look somewhat like a big "U", and the Right view should look like a sideways stretched "U" with one end (the bow) sloping back and the other pretty vertical.

The horizontal cross section (top view) should look (reasonably) like

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a boat viewed from above. The front should be pointed, the back should be fairly blunt, but rounding off to the sides.

Describing the shape of these forms is harder than describing a Coke can. Look at the picture hull\_one to see what my crude shape looks like.

You can see in the perspective view that this basic form has a little hull-like character. It is sharp in front, and has a blunt rear. You can add extra points to each of the views to make a smoother form with more details. My final boat hull is shown in picture hull\_two. To get an idea of how complex the real object is, there is a picture of the same hull shown in the detail editor in picture hull\_three.

->  
Return to Alphabet  
<-

## 1.11 DETAIL EDITOR

\* Subject: Introductory Detail Tutorial  
\* Date: Tue, 11 Jun 91 23:49:06 EDT [7]  
\* From: spworley@ATHENA.MIT.EDU

An Introduction to the Detail Editor  
Last Revised 6/11/91  
By Steven Worley

I.

- What are Imagine objects?
  - II.
  - Looking at Stuff in the Detail Editor
  - III.
  - Moving Stuff in the Detail Editor
  - IV.
  - Harvesting and Sorting with Pick
  - V.
  - Hierarchies and Complex objects
  - VII.
  - Pick, Add, Drag. Pick, Add, Drag. Geez, how boring!
  - VIII.
  - Spraypaint and Picture Frames
  - IX.
  - A Mode for Every Season

->

Return to Alphabet  
<-

## 1.12 What are Imagine objects?

I. What are Imagine objects?

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When a computer program wants to draw a 3D object, it must have some way of internally representing it. Some modelers store each object as a bunch of 2 dimensional polygons- a 3D object is formed from a whole bunch of these polygons pasted together. A cube might be defined as six 2D squares arranged in a group. Since our final picture just has to LOOK like it is solid, defining the outer surface is usually all we need to do to make it seem as if the objects ARE solid.

Any object can be defined as a bunch of flat polygons. Curved surfaces like a sphere can use a lot of polygons in order to approximate the surface closely; certain computer tricks (including a very important one called Phong shading) can smooth out the surface even more. Most of the 3D objects, or models, that you've ever seen in any 3D computer graphic were defined as polygons. Sometimes advanced programs define surfaces with a mathematical equation, or by a certain type of curve, and sometimes a computer model will have certain objects it "knows" how they should look (like a mathematically defined sphere or cone) but most use polygons for definition, Imagine included.

All objects in Imagine are defined as a bunch of triangles. Nothing more. It is particularly easy for a computer to decide what a triangle would look like when viewed as a 3D image. Any more complex polygon (like a square or octagon) can be broken down into a bunch of triangles pretty easily. Having only one "shape" to deal with is actually a convenience for us, as we don't have to worry about questions of what type of polygons a certain object is made of, or how to convert one type of polygon into another. The computer likes dealing only with triangles because it can optimize it's renderer, the program that actually draws the pictures, to expect and deal with just one shape simple instead of 246 different ones.

Although an object is made of only triangles (called FACES) it has points and edges which define where these faces go. If you think of a simple triangle, it has 3 defining points at the corners, three edges connecting these points, and one face which actually makes up the body of the triangle. Imagine can better deal with the objects by defining these sub-parts, and it allows us to manipulate the objects much more easily.

Every object has a number of defined POINTS. Imagine understands an EDGE to be a line segment that connects any two of these points. A face is defined by naming the three edges that make it up. Instead of storing nine numbers for each triangle (the X,Y,Z location of each corner) it just names the edges, which in turn name the points. This reduces the size of a description of an object considerably. It also helps in editing objects, since if you move a point, each face that it is part of will adjust itself to include the new location of the point. The other alternative would be to have each face manually manipulated individually, which is obviously a big pain.

Think of a square. Imagine would store a square as two triangles that share one edge together. The square would actually contain FIVE edges (the four sides and the diagonal) and FOUR points (one at each of the corners.) It would have two faces, or triangles. A cube is stored as twelve faces, formed by eighteen edges, which are in turn defined by

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eight points.

This definition of objects actually gives us some extra leeway in how we define our model. Imagine doesn't require your object to be connected at all; that is, your object could be two completely separate surfaces that never touch. You might want an object to be a flying logo. The letters don't actually touch and form one solid object; they are independent from each other. Imagine doesn't care; you can call any collection of points, edges, and faces an object. Imagine also gives you tools for splitting off part of an object (like a letter) or joining two parts together.

Since this is a computer model and not a physical one, we can violate physics and have objects self-intersect. You might overlap two spheres half-way and join them together to form one object. You'll only see the outer surface when you render the new double-sphere object.

There actually are two objects that Imagine does not define as a group of points, edges, and faces: a perfect sphere and an infinite plane. These are the only exceptions to the normal definition of objects in Imagine. Well, OK, there's another. An axis containing NO points can still be manipulated as an object. It certainly won't show up in a render, but sometimes it's nice to use a lone axis as an invisible object in certain cases. You can also use the axis as the start of a brand new object.

There are certain "Editors" in Imagine that allow us to view and manipulate objects in different ways. Some editors let you place objects in scenes, or define how the objects change with time. The Detail Editor is where objects are usually created and modified. It allows low-level editing of objects; you can add points and faces by hand, move them, delete old ones and in general be as picky as you like in adjusting every point.

Defining objects point-by-point is obviously not very suited to complex objects, sometimes with THOUSANDS of points. There are more powerful controls that let you modify your object in more global ways. You can add pre-made 'primitive' objects like a cylinder or a torus (doughnut shape.) These primitive objects have the points, edges, and faces that define it already defined. There are certain tools that let you draw an outline, say the profile of a chess pawn, which is converted to a three-dimensional 'spun' object, as if it was chiseled out on a lathe. Other tools let you slice off parts of your object using knives that you can build yourself. In general, object creation is done with these powerful tools, and picky touch-ups are the only time you grab and move individual points. A sculptor does not glue sand grains together!

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Return to Alphabet  
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## 1.13 II. Looking at Stuff in the Detail Editor

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## II. Looking at Stuff in the Detail Editor

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The Detail Editor is the program that lets you manipulate and modify objects in Imagine. Like the other editors (and any Amiga program, for that matter) Imagine gets input and directions from you by either moving the mouse and clicking it's buttons, or by typing on the keyboard. Most advanced options use pull-down menus to select the function you want to perform. An important trick, especially when you start using Imagine a lot, is keyboard-equivalents. This lets you select menu items via the keyboard, by pressing the right Amiga key along with another letter or number. All of the keyboard equivalents can be selected via pull-down menus, although not all menu items have keyboard equivalents. You'll find that learning the most used commands' keyboard equivalents can save a LOT of time. Its quick and easy to punch right-Amiga-o to zoom your view out; pulling the menu down repeatedly is a pain. A few other commands (especially moving, rotating, and scaling objects) use the keyboard to indicate what you want to do (move, rotate, or scale) while simultaneously using the mouse to control the extent of the transformation.

You can get into it from any point in Imagine by selecting the menu item 'Detail Editor' from the Project pull-down menu. The screen should then split into four smaller windows with a thin status line at the bottom of the screen and another at the top.

When you start up the Detail Editor, you'll see what is known as a "Quad-View." Are four windows labeled "top", "front", "right", and "perspective", which are different ways of viewing the object you are manipulating. It is difficult to manipulate 3D objects with a 2D mouse and a 2D screen, and the tri-view is a compromise that makes the best of these unfortunate 2D restrictions.

The top, right, and front views show you the wire-frame skeleton of the object you're editing. A wire-frame is a view of your object with each edge shown as a line segment. Faces are NOT shown, so the object looks like it's built from pieces of wire that join at the outside edges of the object, hence the name wireframe. Wireframes have two advantages; they are much faster to draw than "solid" models, and since you can see into the object, you can manipulate points and edges on the interior of the object that you wouldn't normally see.

The top, right and front views are just that- a wireframe view of your object shown from the three orthogonal (right angle) directions. There is also a small axis at the bottom left corner of each view that shows the world's X,Y,Z coordinate system. In Imagine, the X,Y,Z is defined just like it is in mathematics- X is left to right, Y is in to out, and Z is down to up. Some 3D programs define Z to be in-and-out, so note Imagine's difference.

There is an absolute "world" coordinate system defined by these axes. You can select "Coordinates" from the Display menu, which will continually display the coordinates of the mouse pointer in the world's X, Y, and Z system. The units that it measures in are arbitrary, but it is often convenient to call them "Imagine Units."

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Objects tend to be on the order of 10 to 100 Imagine Units in size, since this is a comfortable scale to deal with when we design scenes to be rendered.

There is a grid shown in the three main windows. This grid is used to give you a sense of scale, and can be turned on or off in the Display menu. The spacing between the lines can be set by choosing "Grid Size", also from the Display window. The default is 20, which is a reasonable starting size. Some commands let you use the grid to snap objects to precise locations- these are the most common reasons you want to change the grid size.

The fourth window (with no grid in it) is called the "perspective" window, which allows you to view your object from any direction. You can also change modes to view your object as a wireframe or as a "solid" model, where the faces become opaque so that you cannot see through your object. In this window, you CANNOT manipulate your objects- it is a view only.

Each of the four windows can be quickly zoomed to take up the full screen very easily by merely clicking on the tall narrow box to the left of each view that contains the name of the window. The window will expand to take up the entire screen, allowing you to have a better view of whatever you're working on. To zoom back to the quad-view, just click on the name to the left again. To go immediately from a full screen display of one view to a full screen display of another, you just click the name of the new view to the right. Being able to see all four views at once is often an advantage, but so is seeing a larger, more detailed view. This method allows you to quickly and easily change how you look at your model.

Just to get a sense of how this works, pull down the menu item 'Functions' and select 'Add primitive'. Click on the 'Torus' button and click on 'OK' to accept the default parameters. All this did was make a pre-defined object that we can look at when we manipulate the views.

You should see an object in all four of the windows. This is the same object, just viewed from different directions. Remember the three main views (Top, Front, and Right) all show a WIREFRAME view from their respective directions, so the inside of the doughnut might look very complex.

Perspective, the remaining view, also shows a wireframe view of the doughnut. You can change the view by manipulating the two white sliding boxes on the top and left of the window. The bottom white slider lets you view from different directions AROUND the object. If the slider is in the middle, you're looking at the front. If it's 3/4 of the way to the right, you're looking at the right hand side, and if it's all the way in either direction, you're looking at the back. The vertical slider on the right controls the ANGLE you're looking at the object from. Centered is a level perspective, all the way up gives you a straight-down view, and all the way down gives you a straight-up view. By combining these two sliders you can look at your object from any direction.

You can change the perspective view by selecting 'wireframe' or

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'solid' from the Display pull-down menu. Solid takes longer to show your object, but removes the points that are hidden, getting rid of the X-ray wireframe view. A final way of changing the perspective view is by selecting 'shaded' from the Mode pull-down menu and zooming the perspective view to the full screen. This shades the object in false black and white colors which sometimes lets you see the shape of the object more clearly.

There are a few commands that let you change your absolute vantage of your object. You can zoom your view (on all windows) in and out by using 'zoom in' and 'zoom out' from the View menu. This lets you see more of your object at once, or just a certain portion. Each zoom in or out will double or halve the scale respectively. You can also select a numerical zoom by selecting 'set zoom' in the View menu, which allows more precise magnification levels by simply typing in a number. Zoom in and zoom out are often used, so knowing the keyboard equivalents of right-Amiga-i and right-Amiga-o can save a lot of time.

To scroll the views around, you can click in one of the three main views, then use the arrow keys to move the view in whatever direction you like. You'll notice that if you change one view, the others will change as well- all of the views are linked so they show the same volume of space. You can also scroll the view by telling Imagine where you want the view centered. You select 'Re-center' from the View menu and click on where you want the new center of your view to be. Usually you click right in the middle of the object or area you're interested in. The keyboard equivalent of right-Amiga-. (period) is very convenient.

The display that Imagine shows you is very important, as it is your interface in dealing with everything in the program. One important option is found in the Display menu; it is called "interlace". Interlace will change the screen resolution which the display uses. An interlaced screen is 400 pixels high, whereas a non-interlaced screen is only 200. Unfortunately, the interlaced display will flicker on many Amigas. An Amiga 3000 or a "flicker-fixer" equipped Amiga will be able to use interlaced mode without the flicker. The interlaced mode allows much more detail and more precise location of points, so it is by far the preferred mode to work in. Even if you do have a flickering display, it is probably worth the annoyance to have the extra resolution.

A couple ways to reduce the flicker if you have it: you can muck with the monitor's contrast and brightness, or you can change the screen colors using the imagine.config file (see my Project tutorial). My favorite solution is wearing sunglasses- it works very well indeed, and you look cool while using your computer.

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Return to Alphabet  
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## 1.14 III. Moving Stuff in the Detail Editor

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### III. Moving Stuff in the Detail Editor

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Knowing how to move your views around is important, as when you're manipulating an object you'll find yourself changing your viewpoints around constantly. There is a whole new set of commands for moving the OBJECTS in the editor around.

In order to manipulate an object, we either have to load an existing one or start one from scratch. Imagine comes with several simple pre-built objects called 'primitives' that are very convenient to use as starting points for creating your own objects. Talking about these primitives doesn't really belong at this point in the tutorial, but it would be nice to be able to have something to look at and manipulate as each of the viewing and manipulation commands are presented.

To make a primitive object, select 'add' in the Edit menu, and 'primitive' in the sub-menu. There are six simple shapes that Imagine will automatically create for you. They are a sphere, a cylinder, a cone, a disk, a plane, and a torus. When you select one, Imagine will ask how many points the object should have.

With primitives like a sphere, the more points that define it, the smoother its appearance is going to be when rendered. Remember that even curved surfaces are made from triangles, and the surface becomes better defined with each point added. However, an object with more points than are necessary can become a burden; drawing the object in the editor takes more time, and although the final rendered picture will be higher quality with extra points, it will also take longer. Thus, when you add new primitive objects, Imagine asks what level of detail you would like.

For example, the sphere primitive asks how many circle sections and how many vertical sections will make it up. The default is a reasonable number of defining points. If you were looking for a higher quality sphere because you were going to zoom in very closely to it, you might use extra points. If the object is going to sit in the background and not be examined closely, you might select fewer points. Most of the time, the defaults serve as a nice compromise, but you are much more likely to simplify the object as opposed to increase the default level of detail. The plane primitive in particular lends itself to simplification- most of the time you can bear with defining the simplest plane possible (2 triangles) as opposed to the overburdened default of a grid of 200 triangles.

Each primitive lets you define the numbers of points that define it; the parameters that you can vary are all pretty self-explanatory. For example, the cylinder lets you define how many points are to form the circle around the rim, and also how many sections the body of the tube should be defined as. Other options (available for some primitives) are simple flags that define whether to close the ends of the cylinder (to create a hollow tube versus a log) or to 'stagger points' in some models. Staggering points increases the smoothness of curves- you should almost always leave it on. Note that the disk and the plane are actually flat objects- the others all have depth. All objects also

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let you define their size; this is quite straightforward.

When you have loaded an object or added a primitive, you'll notice that you can see each point and edge in the wireframe. In addition, you'll see an AXIS, usually near the center of the object. In Imagine, EVERY OBJECT HAS IT'S OWN INDEPENDENT AXIS. An object's axis helps Imagine determine which way an object is facing, how it is scaled, and even what it's position is. Imagine doesn't understand what the objects ARE; it doesn't realize that a complex object like an airplane should orient itself with wheels down instead of balanced sideways on a wingtip. The axis actually defines the object's position; if you ask Imagine to move an object, Imagine really just moves the axis, and the object's points, edges, and faces are dragged along with it. When you rotate an object, the rotation occurs around the object's axis, as opposed to the world's absolute reference system. Scalings, where you change the size of the object, also use the object axis as a basis.

When you want to manipulate a certain object, you have to tell Imagine which one (or ones!) that you're interested in, since you might have a dozen different object loaded at once. The way of choosing an object so you can manipulate it is just by clicking on it's axis. The object will turn a pretty blue color (or sometimes purple- more later!) which indicates that the object is chosen- any manipulation commands will be done on this one object. The object is said to be "picked", and Imagine knows that you want to apply commands to this object as opposed to another.

Once you've picked an object, the most common manipulations are to move it around, rotate it, or scale it. These basic commands are often used, so Impulse has made it pretty easy to do. When you have a selected an object, you type the letter 'm' for move. The object will disappear (!) and be replaced by a big yellow "bounding box" which encloses the volume where your object was. This bounding box represents the size, shape, position, and orientation of your object. Since the box is so simple to draw, Imagine can update it in realtime as you manipulate it, allowing you to position it quickly and easily.

After selecting the object and pressing "m", Imagine knows you want to move the object. Putting the cursor in any of the three main views, pressing the left mouse button and then dragging the mouse will drag your object in the direction you move. You do not have to click on the yellow box; anywhere in the view is fine. You can keep moving the object as long as you like; you can let go of the mouse button, move the pointer to another position in any of the three views, and continue moving the object. You are also welcome to zoom in and out, make one view full-screen, or re-center your views at any time. When you are finally done moving your object, pressing the space bar will accept the change and your object will be displayed as a wireframe in it's new location. If you've made a mistake, you can press the ESC key instead of the space bar. This also exits the move mode, but the object's position is unchanged from where it was before you started to move it. This is obviously useful for fixing mistakes or changing your mind.

Two other commands work much like move: rotate and scale. If you select your object and press "r", you will rotate your object, and you'll see the yellow bounding box spin as you drag the mouse with the

button down. You can also change spin axes (to pitch or bank the object, as opposed to yawing it) by pressing "x", "y", or "z" to define which axis you want to rotate around. All rotation is done around the OBJECT'S axis.

Scaling is done by selecting "s" and dragging the mouse. Again, scaling is done relative to the OBJECT's axis. If the axis is in the center of the object, the object will grow in all directions. If it is at the bottom, the object will grow up and out, but not down.

Each of these three commands (move, scale, and rotate) can be called either when you've picked an object or during any other move, scale, or rotate command. For example, you might pick an object, press "m" to move the object, position it in a new place, press "r" to spin it, then "s" to scale it. You do not have to press the space bar after every change; only after you are finally satisfied with the new location, size, and orientation of your object do you want to press the space bar to accept the changes you've made. Aborting by using the ESC key will remove all of the changes (movements, rotations, and scalings) that you've made.

These manipulation commands are easy to use, and they have other controls that make certain manipulations even easier. At the bottom of the screen, there is a status bar that will highlight which mode you're in. If you are moving, the "M" in the "M=Move" at the bottom of the screen will be highlighted, and the "R" and "S" highlight when you're rotating or scaling.

The "x", "y", and "z" commands that allow you to change rotation axes also work in moving and scaling. They act in these two modes as toggles- when you start a move, you are free to move it in all three directions, X, Y, and Z. You might want to restrict a direction of motion, though, if for example you are moving a table along a floor and you didn't want to accidentally lift the table into the air as you moved it left and right. Pressing the "x", "y", and "z" keys will toggle the allowable directions on and off, so pressing "z" will anchor the table's height, and pressing "z" again will allow you to lift it up if you change your mind. This also works in the scaling mode; if you want to make an object narrower without changing its height, you might toggle "z" and scale the object down. With the "z" toggle off, the object will maintain it's Z height, but will shrink in the X and Y directions. At any time, the display at the bottom of the screen shows the letters "X-Y-Z" and highlights the directions that are "active" or changeable.

A related shortcut is using the capital letters "X", "Y", and "Z", which set the toggles to allow movement and scaling in one direction only. If you wanted to lift a table straight up, you just type "Z" and the table will be free to move up and down, but not in the X or Y directions. This method of setting the toggles overrides whatever position they were set in before, but you can use the individual toggles afterwards to set whatever freedoms you like.

Imagine gives you even more flexibility if you want to use it. Whenever you move, rotate, and scale an object, it is based on a certain coordinate system. The default is to use the standard coordinate system- the set of axes that is fixed in place and shown at

the bottom left of the three main views. This is called the "world" coordinate system. However, each object has it's own "local" coordinate system, defined by it's own axis. Imagine allows you to use a local coordinate system instead of the world system if you like.

For example, if you have an object in the shape of a plane, the local coordinate system probably has the Y axis (going front to back) in line with the main fuselage of the plane. Using "r" to rotate the plane, you can easily position it so that it is angled up like it is climbing into the sky. If you then wanted to move it in a straight line along it's "flight path", the direction it's pointing, you could select move, and try to judge by eye the new position in the direction in front of the plane. If, instead, you select local mode (by using "l") and restrict motion along the Y direction by typing "Y", the plane will move smoothly along the line it's pointed along. In the world coordinate system, it's moving in both the Y and Z directions, but in it's local coordinate system, it's moving only in it's Y direction.

To switch between coordinate systems, you just type "l" and "w" whenever you want to change. The current coordinate system has L or W highlighted at the bottom display just like the X-Y-Z indicators. Many times the local and world coordinate systems will be the same, so one is equivalent to the other.

One final option when you're manipulating objects allows you to manipulate the axis of the object independently. If you want to move, scale, or rotate an object's axis [without simultaneously affecting the object!] you can use "M", "R", and "S", the capital letter versions of the object manipulation commands, to affect only the axis. There are some occasions you might want to do this for fancy tricks, but most of the time, you just want to move the axis around just so that it lies near the center of your object.

The standard commands to move, rotate, and scale objects have been streamlined for ease of use since they are performed so often. Sometimes, however, they are somewhat lacking, especially when you need precise control over how your object is to be manipulated. For the precise control of object manipulation, Imagine has a special command called "Transform" which allows you to numerically control your object as opposed to judging by eye.

The transform command works much like the standard interactive commands in that you first select your object (by clicking on it's axis) and then telling Imagine what to do to it. To enter the transform command, you click on the object (it becomes blue or purple) and pull down the menu item "transform" from the Object menu. A small requester will appear. You have six options you can choose from: translate, rotate, scale, position, alignment, and size. You also enter X, Y, and Z arguments.

Translate takes the X, Y and Z arguments and moves (translates) the object that distance.

Rotate will rotate the object around the axis you specify by an amount (in degrees) you specify in X, Y and Z. Performing more than one rotation at once is legal, but it is easy to make mistakes in final

orientation. If you rotate around more than one axis at once, the Z rotation is performed, then the X rotation, then the Y rotation.

Scale will scale your object by a certain factor. To double the size, just enter 2 in each of the X, Y, and Z boxes. A negative number is completely legal, and if one or three of the scalings is negative, you'll actually get a scaled mirror image of your original object.

Position is like Translate in that it moves your object. Instead of moving a certain distance, however, it moves to absolute world coordinates.

Alignment is also absolute; it will rotate your object in whatever way necessary to align in the direction you specify, regardless of the original orientation. Setting X, Y, Z all to zero will make the object line up exactly with the world axes.

Size is again absolute. It uses the axis size as a benchmark, and will scale the object (and it's axis) to an absolute size. The "default" size that all axes start out at is 32 Imagine Units, so entering an XYZ size of 32 32 32 will bring most objects back to their virgin sizes.

To use any of these sub-commands, just click on the box next to it's name and type in the appropriate X, Y, and Z arguments in the boxes to the right. Selecting "OK" will perform the manipulations, "cancel" will abort without affecting your object.

You have the option to use world or local coordinates, just as in the interactive commands; just click on either box to decide. The default is the world system. You can also manipulate only the axis (like the capital letter commands in interactive manipulation) by selecting "transform axis only."

Most manipulations use the interactive controls, and the transformation requester is used only for accurate, measured changes.

One problem that you may run into after an interactive or a transformed manipulation is a "dirty" screen. Imagine erases the old object from before your move or scale or rotate, and draws it in the new position. However, to save time, it will not redraw any other wireframe object that was in view. This means that the areas where the old object intersected any other object in the view will be blank; part of the other object will be erased. If you want to check to see if this is the case, you can select "Redraw" from the Display menu, which will redraw all of the objects, eliminating the problem. One case where this is almost necessary is when you have multiple copies of an object at the same place. If you move one copy, the other isn't redrawn. Since it was in the exact same location as the old, erased, object, it looks like it has disappeared! This is easy to fix with redraw. It is another oft-used command, so knowing the keyboard equivalent of right-Amiga-r is handy.

A problem you'll run into when manipulating complex objects is the sheer time it takes to redraw the wireframe model (in three views). Imagine has a way to speed the display of these objects- it shows the bounding box of the object (like the one shown in interactive



manipulation) instead of the wireframe. You LOOSE the detailed view of your object, but you can still see the position, size, and orientation. To make an object "quickdraw" in this mode, you can use three commands in the Functions menu. "Quickdraw all" will make all of the objects display in quickdraw mode. "Quickdraw none" will make all objects display the normal wireframe. "Quickdraw pick" will make your picked (blue or purple highlighted) object display in quickdraw mode. These quickdraw boxes are very handy, and since they can be toggled at any time in the Detail Editor, it makes sense to use them when screen updates start to get too slow.

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Return to Alphabet  
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## 1.15 IV. Harvesting and Sorting with Pick

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### IV. Harvesting and Sorting with Pick

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Since you can have many objects loaded at once, there has to be a way for you to tell Imagine what object or objects you want to deal with. You've done this already, by clicking on an object's axis, and watching it turn color. This shows that the picked object is ready to be manipulated on.

What if we want to manipulate more than one object at a time? A standard way to "multi-pick" things (like icons in AmigaDos, or objects in Imagine) is to use the shift key. By holding the shift key as you click on objects, Imagine knows you want ALL of them picked, not just the latest one. In fact, if you press the shift key, the display line at the top of the screen will change to show how many objects are picked. Commands will affect all of the picked objects, not just one. In the case of moving, scaling, and rotating more than one object, the FIRST picked object's axis defines the basis of all the manipulations, as well as the local coordinate system for manipulating all of the objects.

There are easier way to pick many objects than by repeatedly clicking on each object's axis. Imagine allows you to change how objects are picked by the "Pick Method" submenu in the Modes menu. The default is "click", which means that when you click directly on an object's axis, it will become picked. Other methods of picking can be chosen from the pick method submenu. If you use "drag box", instead of clicking on the object axes, you should press and hold the mouse button while dragging the mouse. A large box will follow your mouse, and when you release the button, an object within the box will become picked. If you press and hold the shift key when you release the mouse button, ALL of the objects within the box will become picked.

Lasso is similar, but more versatile. You press and hold the button while drawing a large circle or oval or squiggly shape. When you release the button, an object within the region you've drawn will

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become picked. Again, you can hold the shift key to pick ALL of the objects within.

A final option in the pick method submenu is called "Lock". Lock isn't a method of picking; it really has more to do with when moving picked objects. Lock is a flag; you can toggle it on and off by selecting it from its submenu. When Lock is on, any moved object will snap to the nearest grid location when released. This is automatic and is easier than using the one-time "Snap to Grid" (described later, I promise!) again and again when you're trying to get precise placement.

Two other utility commands can be found in the Pick/Select menu. "Pick all" will pick ALL of the objects in your workspace. "Unpick Last" will allow you to remove the last object you picked from your set of picked objects. This is handy when you pick one too many objects and you want to unpick the last one you chose.

It is easy to pick objects or sets of objects using the different pick methods. There is actually another powerful way to change what object or objects are picked; it is called "select." There is a very, very important difference between a "picked" object and a "selected" object; you've been using pick to highlight objects and manipulate them. Select is sort of a pick-wanna-be.

One problem that can occur is when two object axes are directly on top of each other. If you click on the common axis location, one of the objects will become picked. (The first one that was created or loaded into the Editor). If you click again, the same object will remain picked and the second object will just sit there. If you hold the shift key and click on the common axis again, the second object WILL be picked, but now BOTH objects are picked. If you want to pick just the second object and not the first, you can either MOVE one object just to uncover the other axis, or you can use select.

There is a solution when picking (or unpicking) objects becomes awkward (or impossible!). SELECT allows you to control what objects are picked by allowing you to add and remove objects from your set of picked objects one at a time.

Think of buying lunch at a cafeteria, and you pick which food you want to eat. One way of "picking" food to add to your tray is by having the lunch worker point to each of the cafeteria's food bins, and saying "No, the next one, the next one, the next one- yes! That one!" as the worker points to the foods in turn. As the worker selects item after item, you can choose to PICK the item he's pointing to at any time. The analogy extends; What if your arms are full of cafeteria food and you want to put some back? Your arms are busy holding all the food; you can't easily grab an item and put it down. You can, however, ask a friend to "unpick" the item for you. If your friend has trouble with big words (like the names of food), he can just point at each food in your arms in turn until he points to the granola yogurt you want to put down. You then say "Yes, yes! Get rid of that!"

This is exactly what select allows you to do. Your arms are full with picked objects. You can't just click on an object to "unpick" it because Imagine thinks you're just making sure you have it picked. You also might have problems indicating the right object to pick, as in

the case of two objects on top of one another. The major difference between the the cafeteria and Imagine is that your mentally challenged friend is also the cafeteria worker, and will point to both types of objects for you.

Select works by allowing you to highlight different objects in a controlled way. A "selected" object might be picked or not; A normal object is white, a selected object is orange, a picked object is blue, and a picked AND selected object is purple.

Only one object is ever be selected at once, which is helpful in reducing confusion. The commands for selecting objects are completely different from those of PICKing objects; the whole point of select is that sometimes the methods used to pick objects are awkward, and select gives you an alternative way to pick them.

The easiest and most common method of selecting an object is by using two commands, "Select next" and "Select previous", both found in the Pick/Select menu. Using "Select next" repeatedly will cycle through all of the objects in the order that they were created or loaded. This command does NOT care whether the object is picked or not; it will select all objects one at a time. "Select next" is often a command you want to repeat, so knowing the keyboard shortcut of right-amiga-n is almost necessary. By repeatedly using select next, ANY object can be selected because Select next will eventually reach it. "Select previous", right-amiga-p, will select objects in the opposite order, in case you overshoot with select next. One convenience is that when an object becomes selected, your view will jump to center the object on the screen, always allowing you to see what you just selected.

When an object is selected, there are certain commands that will cause it to become picked or un-picked. The most common command is called "pick select", which can be found in the Pick/Select menu. When you use this menu option, the selected object will become picked. If the selected object is picked and you want to un-pick it, you can use "unpick select" from the pick/select menu to unpick it.

"Select next" is kinda klunky, especially if you know exactly what object you want to select. One quick command that is sometimes useful is "Home", which selects the very first object you created or loaded into the Editor.

Two other useful commands to quickly select specific objects are "Find by Name" and "Find requester", both found in the Functions menu. "Find by Name" allows you to type in an object's name (assigned in the Attributes requester, more later) and your view will shift to center on the object you named. In addition, the object becomes selected, allowing you to pick-select or unpick-select it. The "Find by Requester" does the same thing except it displays the names of all of the currently loaded objects, and you just click on the name you want to select. This requester is also useful because it tells you the size (# of points, edges, and faces) of each object, which is an excellent judge of object complexity. It's also fun to say "Cool! My tomato has 1,821 points!"

Return to Alphabet  
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## 1.16 V. Hierarchies and Complex objects

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### V. Hierarchies and Complex objects

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With complex models, sometimes you don't want to make one huge, mungo object to represent the entire model. You might want to make a forest object that has 20 trees in it, and it seems silly to carve the whole thing out of one block. Or, you might be building an object that is logically a bunch of separate parts, like a clock with a face, a pendulum, two hands, and a frame.

Another important ability you might want is to be able to give different parts of a complex object different attributes, or colors. Imagine lets you color and define the look of your objects in different ways, and you can even tell it to make different parts of the same object look different. But when you're building something like a window, the glass panes are considerably different than the wood frames; it is easier to define each as a separate object then somehow group them together.

There is a function that lets you do exactly this- group objects together. When you have a model that you want to make (and keep!) in separate sections, Imagine allows you to establish a group of objects which will stay together. It allows you to treat the group as an entire ensemble (if you want to move everything, or apply a command to the whole set), or you can pick out one particular object and deal with it independently.

Grouping is very easy to do. If you want to group two objects together, you click on one object, then press the shift key and click on the other. Remember that this is just the method of picking more than one object at once. When you have multi-picked the objects, you select "group" from the Object menu. A purple line will appear joining the axes of the objects. The first object that was selected becomes the "parent" of the group. If you group more than two objects, the purple "group" lines all run from each "child" object to the parent object. This lets you see which axis to click on to pick the entire group. Sometimes it is nice to assign a lone axis as the parent of a group, especially when no part of a group really doesn't lend itself to being a parent.

Splitting a group back into it's component parts is also easy; just pick the group by clicking on the parent. The entire group will become picked, and selecting "Ungroup" from the Object menu will split the group. The purple joining lines will disappear, and each child will be independent again.

Once a group is made, it can be treated almost identically to an ungrouped object. You can pick it (by clicking on the parent) and the

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entire group will become highlighted. You can then move, scale, or rotate the entire group as a whole. If you click on a CHILD object, the child will be picked, but not the group. You can then move, scale, or rotate it independently of the group, assign it individual attributes, or perform a command on it independently of the rest of the group. Even when you move the child object around, it will STAY grouped; you must use "ungroup" to ungroup objects. There are modes where you can pick parents separate from their children; this is described in the next section.

In addition, you can make groups of groups. Or groups of groups of groups. This is done exactly the same as before; you can pick one group, multi-pick a second, and group them. Having these multi-layer groups is sometimes very useful. One excellent example would be in modeling a human figure. You might make a finger group that contains all of the knuckles, a hand group including a palm, four finger groups, and a thumb group, an arm group consisting of a hand group, a wrist, a forearm, and an elbow, and a body group consisting of a head group, a torso, two leg groups, and two arm groups. This kind of nested grouping is called a "hierarchy", where the body is the great-granddaddy of a knuckle. One great advantage is obvious when you want to move an arm. You pick the arm, and rotate it around the shoulder. All of the arm's children follow it, so the arm moves as a whole. You do NOT have to move 15 knuckles, a palm, a wrist, a forearm, and so on. If you want to adjust a finger, you can manipulate it and the knuckles will move together, but the arm will be unaffected. If you move the main parent body group, everything follows along as if the body were just one solid object, as opposed to dozens of parts. Hierarchies are obviously suited for complex models.

Groups are useful when you have sub-parts of an object you want to keep together. Sometimes grouping simple objects is still useful even if there is no hierarchy to follow, since the individual objects are free to move apart from the parent, and can easily be assigned different attributes.

For example, if you're designing a human face, you might cause the eyeballs in the head to be an additional grouped object as opposed to just molded into the main face. Later, if you wanted to change the eye (make it a different color, or replace it with a different type of eye (chrome eyeballs! Cool!)) you can easily select the eye and change or replace it. This advantage compounds the other advantages of grouping; you can later animate the eyes looking in different directions, and you can easily change the attributes or texture of the eye while leaving the face undisturbed.

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Return to Alphabet  
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## 1.17 VII. Pick, Add, Drag. Pick, Add, Drag. Geez, how boring!

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VII. Pick, Add, Drag. Pick, Add, Drag. Geez, how boring!

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There are some useful commands that act on picked objects other than just moving, rotating, and scaling. Two of the most obvious are "Load" and "Save". Load will load a new object in from disk- it will give you a file requester which you can choose the filename from. The most common place to put objects are in your "objects" subdirectory in your project directory. See the Project Editor tutorial for the complete Imagine file structure.

An important suggestion; use descriptive names and extensions. I talked about this a lot in my Project tutorial, but it's worth repeating. "Obj1" is going to mean nothing to you an hour from now. "tablecloth.iob" tells you that this is an Imagine object of a tablecloth- a useful description. Some suggested file extensions:

```
.iob      Imagine Object. Loads into the Detail Editor
.iout     Imagine Object which is a faceless outline
.ifm      Imagine Form. Loads into the Form or Detail Editor
.iff      Amiga picture or brush (standard)
.ham      Amiga picture or brush in Hold-And-Modify format
.iff24    24-bit Amiga picture of brush. Highest quality.
.spth     Imagine spline path
.lpth     Imagine line path
```

Save will take the picked object or group and save it onto disk. Note that GROUPS will save as one big group, as long as you have the whole group picked by clicking on the parent. You can give the saved object or group any name you want, and you'll probably want use an extension of ".iob". If you pick a child of a group and save it, you save ONLY that object (and its children), and NOT the entire group it belongs to.

Another command you can apply to picked objects is "Snap to Grid" from the Functions menu. It operates on all picked objects, moving each of them so that their axis lies on top of the nearest grid intersection. This is very useful in trying to line up objects or for precise positioning. This is much like a one-time "Lock".

There are a few other utility object commands. "Cut", "Copy", and "Paste" are found in the Object menu. "Cut" will remove your object from the Imagine world and store it in memory. When you select "Paste", the object will be re-inserted into the world at the same place it was prior to the cut. In fact, the object is STILL retained in memory, so you can move the restored object around and use "Paste" again to get a second copy to manipulate. You can repeat "Paste" as many times as you like to get copies of objects. "Copy" is like cut, except the object is not removed from the world after being copied to memory. You can use "Paste" to add multiple copies to the world.

Since the pasted objects are all put in the same location, often you'll have to move one copy to get to the next. Judicious use of "Redraw" can help in showing exactly what copies are still floating around.

An incredibly useful command for making complex objects is called "Join", which can be found in the Functions menu. If you pick two or

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more objects, join will assemble them into one single object. The new conglomerate object will have use the axis of the first object that was picked, and will contain all of the points, edges, and faces of all of the joined objects. Joined objects are difficult to unjoin later, so only use it when you WANT a solid object. Join is used constantly- you might build a car with the body sides, and "join" on a side mirror, then join the roof on, then join the floor. Remember the advantages of groups though; you probably DON'T want to join the tires to the car; if you group them you can rotate them later, as well as define the chrome hubcap separately from the car's paint and the rubber tire.

"Merge" is also found in the Functions menu. It is more of a utility command. It will remove any duplicate faces, edges or points in your object. Especially after you JOIN objects, you might have a lot of points lying on top of one another. Merge removes these extra, unneeded points, speeding rendering and even display in the editors. Merge also helps Phong shading; more about Phong shading in the soon to come Attribute Tutorial.

Delete is pretty obvious command. It can also be found in the Functions menu. When you use delete, every picked object will be removed from the world. This command is used a lot to get rid of cruft and deadwood, so knowing the keyboard shortcut of right-amiga-d is useful.

As with all of the editors, Imagine has one level of "Undo", which can be selected from the Project menu. When using dangerous commands like Delete, being able to recover from the command is important. Undo will work with almost any command. You can also undo an undo, reinstating a command you decided you wanted anyway.

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Return to Alphabet  
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## 1.18 VIII. Spraypaint and Picture Frames

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### VIII. Spraypaint and Picture Frames

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The low-level commands to create and manipulate objects are sufficient to create any model you can think of. An additional level of control you have is the ability to define the surface color and attributes of your object. A flat plane might be made of two triangles, but depending on how you set the attributes of the plane, it might render as a pane of glass, a reflective mirror, a wood tabletop, a piece of graph paper, or a picture of your grandmother. Defining the surface characteristics of objects gives them their character. Luckily, Imagine gives you excellent control of these attributes.

Every object has a set of attributes that can be modified. In a group, every object can have different attributes from the parent; when you select a group, you only modify the parent's attributes. To change any

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attributes, just pick an object and select "Attributes" from the Object menu. A requester will appear, and you can select different properties to change. In addition, you can place brush maps and textures on the object, as well as add or change the object's name.

Choosing and setting attributes is immensely important to make your objects look good. Setting textures and especially brushmaps give you near-infinite control on what your object's surface looks like. I have written full tutorials on both the use of texture and brushmaps, and plan to write one on setting attributes. The choices in the attributes requester are so important that they deserve a tutorial unto themselves. I haven't written the attribute tutorial as of today (6/11/91), but look for it by the end of July.

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Return to Alphabet  
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## 1.19 IX. A Mode for Every Season

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### IX. A Mode for Every Season

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The basic commands to pick, move, and view the world and everything in it are very important, as they are used constantly. The actual work you perform in building objects depends on the user changing the view and manipulating the objects almost without thought.

No matter how good we are at manipulating objects and changing the view, using these commands will never BUILD an object for us. To do this, Imagine has different MODES that it performs different actions in. Some modes allow us to manipulate objects and groups, as we have been doing already. Other modes let us pick and manipulate not objects, but the POINTS of an object, or the edges, or the faces. Still other modes let us drag points around in different ways. Some let us add NEW points, edges, and faces. (Aha! So that's how we can build our own objects!)

These modes are easy to change; you can just pull down the Mode menu and select which mode you would like to be in. The current mode is always displayed in the status line at the top of the screen; this is often handy when you get confused about what you're doing. The keyboard equivalents for changing the current mode all use right-Amiga and a digit; this makes the keypad become a "mode selector" if you don't want to use the pull-down menus and have stuff it takes to remember which digit is which mode. Personally, I don't have the stuff, so I bear with the pulldown menu rather than strain my poor brain.

The default mode is "Pick Groups", which means that whenever you click on a group, it will be picked. (Simple!) If you want to pick individual objects, EVEN IF THEY ARE THE PARENT OF A GROUP, there is a mode called "Pick Objects." Just select it from the mode menu, and

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now when you click on any object (in a group or not, child or parent) it will be selected. You can obviously multi-select it using the shift key. When you are dealing with ungrouped objects, "Pick groups" and "Pick objects" work identically.

Different modes let you deal with the different parts of an object. Up until this time, we've always dealt with entire objects at a time. We could rotate, scale, and move them, add them, group them, and delete them, though we could not affect their basic structure. The remaining modes all work on PARTS of objects, not objects themselves. One important note is that to even enter these other modes, you must have selected at least one object (or group) for the new modes to act upon.

You'll also find that I consistently lied to you in most of the previous sections. I always referred to picking objects as opposed to picking anything else. ALL of the pick and select commands except Find work equally well in picking faces, edges, or points as opposed to just objects or groups. Most other commands like Delete will work on the parts of an object as well.

One new mode is "Pick points." If you pick an object or group and enter the "pick points" mode, the object will turn white (the object is NOT picked anymore!) and its points will all become visible (they will show up as small squares.) Now you are in a different mode; you are no longer picking and selecting OBJECTS, you are dealing exclusively with points. You can then click on the points which will turn orange as you pick them. You can use the shift key to multi-pick, or the lasso and drag box to grab many points at once. You can also select points, and use all of the selection tools to help you get any subset of points you want. Selected points are green, picked points are orange, and picked and selected points are yellow.

When you're picking points, edges, or faces, Imagine will work ONLY with the points, edges, or faces in the object that was picked before you chose the "pick points (or edges or faces)" mode. This prevents you from confusing one object's points with another's. When you scroll around your view or redraw the screen, the other objects won't even be updated, so don't get scared if they seem to disappear. When you re-enter pick objects or pick groups mode, all of the objects will re-appear.

Just because you can pick something doesn't mean you can perform every command on them. In the case of points, you can delete your picked points, or use the transformation requester to translate them; interactive dragging is actually another mode of its own, though. When you delete a point, you delete any edges and faces that that point help form. You cannot do things to selected points that make no sense (like grouping them, or saving them to a file)- that's just weird.

You can perform some other commands that aren't applicable to objects as a whole, however. For example, a very useful command is called "split." It takes the selected points, removes them from the original object, and gives them their own axis. In effect, the original object is split into two parts defined by the points you picked. Any connecting faces or edges are deleted (two objects do NOT share!). This might be very useful when you have a logo and want to

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pull one letter out of the object to do something special with it.

One command that is unique to pick points mode is "taut", which is found in the Functions menu. If you select three or more points and select "taut", the middle points will jump to the line segment defined by the first and last points. This command might be useful to line up a bunch of points in a straight line quickly. Taut does NOT work with anything other than picked points.

Picked points can be manipulated with the Transform command. The picked points can be translated, scaled, rotated, and positioned INDEPENDENTLY of the rest of the object. Rotations and scalings all use the object's axis as a reference point. Absolute positioning will move the FIRST point you pick to the location you choose, and the rest of the picked points will be translated an equal amount. Interactive dragging is accomplished using the "drag points" mode.

Picking edges is similar to picking points, except to specify an edge you just click on the two points that make it up, or lasso or drag box the entire edge. Just like points, you can't perform every command on them. You can delete them and split them.

You CANNOT translate edges or use taut on them. Deleted edges will delete any face they belong to, but the points in the edges will NOT be removed.

A new command you cannot perform on points but can use on faces is called "fracture." This command is in the Functions pull down menu, and is often very useful. The fracture command will take and break each edge into two edges, with an additional point added to the midpoint of each selected edge. This command is very useful when you need to increase the detail level at a certain area of an object; the extra edges that appear allow you to manipulate them to add finer details and structures.

Select Faces is again pretty straightforward. You must click on ALL THREE of the points that make up the face to select it. Fracture works very well on faces; it splits each face (one triangle) into four triangles defined by the midpoints of the face. The new faces can then be manipulated for higher object definition.

Deleting faces removes the faces, but not the edges or points that it was made up of.

Picked faces allow you to characterize an object's appearance in local areas. The attribute requester normally allows you to give the object overall color, reflection, and transparency values. You can actually set these for every single face, if you like. You can pick one or more faces, select "attributes" from the Object menu, and use the sliders to set the color, transparency, and filter values for the face or faces.

You will NOT see any change in the appearance of your object when you do this, but when you render, the faces you selected will all override the default object color with the attributes you selected. A danger is that face attributes are somewhat fragile. If you join or merge objects or start deleting or adding points to it, all face coloring is

often lost. To keep this from happening, color individual faces LAST, just before saving your object.

A final note about face coloring; don't depend on it for coloring your objects in complex ways. Using grouped objects or brush maps is much more robust and allows better control. Coloring individual faces is useful mostly for quick and dirty attribute definition or for making small details that aren't worth the bother of a brushmap or extra object.

Both "pick edges" and "pick faces" will allow you to split off the selected parts of the object to create two new objects by using "split", just as split works with selected points.

Three additional modes are "add points", "add edges", and "add faces". Add points will add an additional point to your object in the location you click on. Add edges lets you click on TWO points and will add a new edge joining them. Add faces mode will let you add a new face to an object by clicking on the THREE points that make it up.

"Add lines" mode is a convenient combination of "add points" and "add edges". As you click, a new point is added in the location you point to, and further clicks will add additional points along with an edge joining the latest point to the one that was immediately preceding it. Thus, a few clicks around the border of a rough circle will make a set of points with the edges following the outline of that circle. Carefully clicking on the location of an existing point will cause the new line to connect to that point, so making closed shapes is easier.

"Drag points" mode allows you to interactively drag individual points in your object around. If you select this mode, you can click on any point and drag it to a new location interactively. Any edges or faces that this point is connected to will follow the point to its new location.

Dragging multiple points is also easy- just use the shift key, multi-pick the points by clicking on each in turn, and when you want to start dragging them, just release the shift key.

AN IMPORTANT TECHNIQUE: What if you want to select a point or points in one view, and drag them in an orthogonal direction? For example, you have a plane defined by a horizontal 10 by 10 grid, and you want to select a bunch of points from the middle and pull them up. If you click on the points from the top view, you can easily select any of the points you're interested in, but you can only drag them left and right, forward and back. You want to be able to drag them UP.

Here's the method for doing this: it is invaluable, so remember it. Whether you want to move one point or a hundred, press the shift key to multi-pick the points. Click on the points you want to move in ANY view, keeping the shift key depressed. To move all of these points, KEEP THE SHIFT KEY DEPRESSED and move the mouse to the view where you want to move the points in. Press and hold the left button, then RELEASE the shift key. The picked points will move with your mouse for as long as you keep the button held down. Releasing the button will anchor the points.

In the example with the 10 by 10 horizontal grid, you would press shift, click on the points you want in the top view, move to the front (or right) view, release the shift key, move the points up, and release the mouse button. That's it!

Magnetism, a more complex way of dragging points will be covered in the "advanced" Detail tutorial.

One problem with manipulating points, edges, and faces is picking the RIGHT point. When the object is complex, the wireframe displays can get very cluttered. There is a convenient way of simplifying a view to get points out of your view- it is a mode called "hide points". In hide points mode, any points you select (with click, drag box, or lasso) will disappear from view- they will go away. They still exist, they just aren't displayed and can't be picked or manipulated. You can "hide" whatever points that get in the way of your work area, then change modes, and manipulate the non-hidden parts of your object. Selecting "pick objects" or "pick groups" will make the hidden points re-appear.

For example, if you're working on a helicopter model and you want to work on the rotor alone, you might select "hide points" mode, and use the lasso to indicate the main helicopter body. The rotor is left alone, and after changing into drag points or select faces mode, it is easy to indicate what portion of the rotor you want to deal with without accidentally modifying the helicopter body. Selecting "pick objects" mode makes the entire helicopter, with the rotor changes, reappear.

In theory, you can create any object by adding an axis, then adding points, edges and faces. In practice, these are very low level commands; you generally use the more powerful commands like "mold" and "slice" found in the Object editor. The low level select and add modes are built to give you the low level control that you sometimes need; however, they are more for defining basic outlines that are then used in the more powerful Object commands, or for touching up small details on nearly complete objects. The next Detail tutorial will talk about these commands.

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Return to Alphabet  
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## 1.20 COLOR RGB

\* Subject: Colors  
\* Date: Wed, 26 Jun 91 13:00:01 -0600 [7]  
\* From: webbs@mozart.cs.colostate.edu (Steven Lee Webb)

---

COLOR	R	G	B
alice blue	240	248	255
aliceblue	240	248	255
antique white	250	235	215
antiquewhite	250	235	215
antiquewhite1	255	239	219
antiquewhite2	238	223	204
antiquewhite3	205	192	176
antiquewhite4	139	131	120
aquamarine	127	255	212
aquamarine1	127	255	212
aquamarine2	118	238	198
aquamarine3	102	205	170
aquamarine4	69	139	116
azure	240	255	255
azure1	240	255	255
azure2	224	238	238
azure3	193	205	205
azure4	131	139	139
beige	245	245	220
bisque	255	228	196
bisque1	255	228	196
bisque2	238	213	183
bisque3	205	183	158
bisque4	139	125	107
black	0	0	0
blanched almond	255	235	205
blanchedalmond	255	235	205
blue	0	0	255
blue violet	138	43	226
blue1	0	0	255
blue2	0	0	238
blue3	0	0	205
blue4	0	0	139
blueviolet	138	43	226
brown	165	42	42
brown1	255	64	64
brown2	238	59	59
brown3	205	51	51
brown4	139	35	35
burlywood	222	184	135
burlywood1	255	211	155
burlywood2	238	197	145
burlywood3	205	170	125
burlywood4	139	115	85
cadet blue	95	158	160
cadetblue	95	158	160
cadetblue1	152	245	255
cadetblue2	142	229	238
cadetblue3	122	197	205
cadetblue4	83	134	139
chartreuse	127	255	0
chartreuse1	127	255	0
chartreuse2	118	238	0
chartreuse3	102	205	0

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chartreuse4	69	139	0
chocolate	210	105	30
chocolate1	255	127	36
chocolate2	238	118	33
chocolate3	205	102	29
chocolate4	139	69	19
coral	255	127	80
coral1	255	114	86
coral2	238	106	80
coral3	205	91	69
coral4	139	62	47
cornflower blue	100	149	237
cornflowerblue	100	149	237
cornsilk	255	248	220
cornsilk1	255	248	220
cornsilk2	238	232	205
cornsilk3	205	200	177
cornsilk4	139	136	120
cyan	0	255	255
cyan1	0	255	255
cyan2	0	238	238
cyan3	0	205	205
cyan4	0	139	139
dark goldenrod	184	134	11
dark green	0	100	0
dark khaki	189	183	107
dark olive green	85	107	47
dark orange	255	140	0
dark orchid	153	50	204
dark salmon	233	150	122
dark sea green	143	188	143
dark slate blue	72	61	139
dark slate gray	47	79	79
dark turquoise	0	206	209
dark violet	148	0	211
darkgoldenrod	184	134	11
darkgoldenrod1	255	185	15
darkgoldenrod2	238	173	14
darkgoldenrod3	205	149	12
darkgoldenrod4	139	101	8
darkgreen	0	100	0
darkkhaki	189	183	107
darkolivegreen	85	107	47
darkolivegreen1	202	255	112
darkolivegreen2	188	238	104
darkolivegreen3	162	205	90
darkolivegreen4	110	139	61
darkorange	255	140	0
darkorange1	255	127	0
darkorange2	238	118	0
darkorange3	205	102	0
darkorange4	139	69	0
darkorchid	153	50	204
darkorchid1	191	62	255
darkorchid2	178	58	238
darkorchid3	154	50	205
darkorchid4	104	34	139

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darksalmon	233	150	122
darkseagreen	143	188	143
darkseagreen1	193	255	193
darkseagreen2	180	238	180
darkseagreen3	155	205	155
darkseagreen4	105	139	105
darkslateblue	72	61	139
darkslategray	47	79	79
darkslategray1	151	255	255
darkslategray2	141	238	238
darkslategray3	121	205	205
darkslategray4	82	139	139
darkturquoise	0	206	209
darkviolet	148	0	211
deep pink	255	20	147
deep sky blue	0	191	255
deeppink	255	20	147
deeppink1	255	20	147
deeppink2	238	18	137
deeppink3	205	16	118
deeppink4	139	10	80
deepskyblue	0	191	255
deepskyblue1	0	191	255
deepskyblue2	0	178	238
deepskyblue3	0	154	205
deepskyblue4	0	104	139
dodger blue	30	144	255
dodgerblue	30	144	255
dodgerblue1	30	144	255
dodgerblue2	28	134	238
dodgerblue3	24	116	205
dodgerblue4	16	78	139
firebrick	178	34	34
firebrick1	255	48	48
firebrick2	238	44	44
firebrick3	205	38	38
firebrick4	139	26	26
floral white	255	250	240
floralwhite	255	250	240
forest green	34	139	34
forestgreen	34	139	34
gainsboro	220	220	220
ghost white	248	248	255
ghostwhite	248	248	255
gold	255	215	0
gold1	255	215	0
gold2	238	201	0
gold3	205	173	0
gold4	139	117	0
goldenrod	218	165	32
goldenrod1	255	193	37
goldenrod2	238	180	34
goldenrod3	205	155	29
goldenrod4	139	105	20
green	0	255	0
green yellow	173	255	47
green1	0	255	0

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green2	0	238	0
green3	0	205	0
green4	0	139	0
greenyellow	173	255	47
honeydew	240	255	240
honeydew1	240	255	240
honeydew2	224	238	224
honeydew3	193	205	193
honeydew4	131	139	131
hot pink	255	105	180
hotpink	255	105	180
hotpink1	255	110	180
hotpink2	238	106	167
hotpink3	205	96	144
hotpink4	139	58	98
indian red	205	92	92
indianred	205	92	92
indianred1	255	106	106
indianred2	238	99	99
indianred3	205	85	85
indianred4	139	58	58
ivory	255	255	240
ivory1	255	255	240
ivory2	238	238	224
ivory3	205	205	193
ivory4	139	139	131
khaki	240	230	140
khaki1	255	246	143
khaki2	238	230	133
khaki3	205	198	115
khaki4	139	134	78
lavender	230	230	250
lavender blush	255	240	245
lavenderblush	255	240	245
lavenderblush1	255	240	245
lavenderblush2	238	224	229
lavenderblush3	205	193	197
lavenderblush4	139	131	134
lawn green	124	252	0
lawngreen	124	252	0
lemon chiffon	255	250	205
lemonchiffon	255	250	205
lemonchiffon1	255	250	205
lemonchiffon2	238	233	191
lemonchiffon3	205	201	165
lemonchiffon4	139	137	112
light blue	173	216	230
light coral	240	128	128
light cyan	224	255	255
light goldenrod	238	221	130
light goldenrod yellow	250	250	210
light gray	211	211	211
light pink	255	182	193
light salmon	255	160	122
light sea green	32	178	170
light sky blue	135	206	250
light slate blue	132	112	255

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light slate gray	119	136	153
light steel blue	176	196	222
light yellow	255	255	224
lightblue	173	216	230
lightblue1	191	239	255
lightblue2	178	223	238
lightblue3	154	192	205
lightblue4	104	131	139
lightcoral	240	128	128
lightcyan	224	255	255
lightcyan1	224	255	255
lightcyan2	209	238	238
lightcyan3	180	205	205
lightcyan4	122	139	139
lightgoldenrod	238	221	130
lightgoldenrod1	255	236	139
lightgoldenrod2	238	220	130
lightgoldenrod3	205	190	112
lightgoldenrod4	139	129	76
lightpink	255	182	193
lightpink1	255	174	185
lightpink2	238	162	173
lightpink3	205	140	149
lightpink4	139	95	101
lightsalmon	255	160	122
lightsalmon1	255	160	122
lightsalmon2	238	149	114
lightsalmon3	205	129	98
lightsalmon4	139	87	66
lightseagreen	32	178	170
lightskyblue	135	206	250
lightskyblue1	176	226	255
lightskyblue2	164	211	238
lightskyblue3	141	182	205
lightskyblue4	96	123	139
lightslateblue	132	112	255
lightslategray	119	136	153
lightsteelblue	176	196	222
lightsteelblue1	202	225	255
lightsteelblue2	188	210	238
lightsteelblue3	162	181	205
lightsteelblue4	110	123	139
lightyellow	255	255	224
lightyellow1	255	255	224
lightyellow2	238	238	209
lightyellow3	205	205	180
lightyellow4	139	139	122
lime green	50	205	50
limegreen	50	205	50
linen	250	240	230
magenta	255	0	255
magenta1	255	0	255
magenta2	238	0	238
magenta3	205	0	205
magenta4	139	0	139
maroon	176	48	96
maroon1	255	52	179

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maroon2	238	48	167
maroon3	205	41	144
maroon4	139	28	98
medium aquamarine	102	205	170
medium blue	0	0	205
medium orchid	186	85	211
medium purple	147	112	219
medium sea green	60	179	113
medium slate blue	123	104	238
medium spring green	0	250	154
medium turquoise	72	209	204
medium violet red	199	21	133
mediumaquamarine	102	205	170
mediumblue	0	0	205
mediumorchid	186	85	211
mediumorchid1	224	102	255
mediumorchid2	209	95	238
mediumorchid3	180	82	205
mediumorchid4	122	55	139
mediumpurple	147	112	219
mediumpurple1	171	130	255
mediumpurple2	159	121	238
mediumpurple3	137	104	205
mediumpurple4	93	71	139
mediumseagreen	60	179	113
mediumslateblue	123	104	238
mediumspringgreen	0	250	154
mediumturquoise	72	209	204
mediumvioletred	199	21	133
midnight blue	25	25	112
midnightblue	25	25	112
mint cream	245	255	250
mintcream	245	255	250
misty rose	255	228	225
mistyrose	255	228	225
mistyrose1	255	228	225
mistyrose2	238	213	210
mistyrose3	205	183	181
mistyrose4	139	125	123
moccasin	255	228	181
navajo white	255	222	173
navajowhite	255	222	173
navajowhite1	255	222	173
navajowhite2	238	207	161
navajowhite3	205	179	139
navajowhite4	139	121	94
navy	0	0	128
navy blue	0	0	128
navyblue	0	0	128
old lace	253	245	230
oldlace	253	245	230
olive drab	107	142	35
olivedrab	107	142	35
olivedrab1	192	255	62
olivedrab2	179	238	58
olivedrab3	154	205	50
olivedrab4	105	139	34

---

---

orange	255	165	0
orange red	255	69	0
orange1	255	165	0
orange2	238	154	0
orange3	205	133	0
orange4	139	90	0
orangered	255	69	0
orangered1	255	69	0
orangered2	238	64	0
orangered3	205	55	0
orangered4	139	37	0
orchid	218	112	214
orchid1	255	131	250
orchid2	238	122	233
orchid3	205	105	201
orchid4	139	71	137
pale goldenrod	238	232	170
pale green	152	251	152
pale turquoise	175	238	238
pale violet red	219	112	147
palegoldenrod	238	232	170
palegreen	152	251	152
palegreen1	154	255	154
palegreen2	144	238	144
palegreen3	124	205	124
palegreen4	84	139	84
paleturquoise	175	238	238
paleturquoise1	187	255	255
paleturquoise2	174	238	238
paleturquoise3	150	205	205
paleturquoise4	102	139	139
palevioletred	219	112	147
palevioletred1	255	130	171
palevioletred2	238	121	159
palevioletred3	205	104	137
palevioletred4	139	71	93
papaya whip	255	239	213
papayawhip	255	239	213
peach puff	255	218	185
peachpuff	255	218	185
peachpuff1	255	218	185
peachpuff2	238	203	173
peachpuff3	205	175	149
peachpuff4	139	119	101
peru	205	133	63
pink	255	192	203
pink1	255	181	197
pink2	238	169	184
pink3	205	145	158
pink4	139	99	108
plum	221	160	221
plum1	255	187	255
plum2	238	174	238
plum3	205	150	205
plum4	139	102	139
powder blue	176	224	230
powderblue	176	224	230

---

---

purple	160	32	240
purple1	155	48	255
purple2	145	44	238
purple3	125	38	205
purple4	85	26	139
red	255	0	0
red1	255	0	0
red2	238	0	0
red3	205	0	0
red4	139	0	0
rosy brown	188	143	143
rosybrown	188	143	143
rosybrown1	255	193	193
rosybrown2	238	180	180
rosybrown3	205	155	155
rosybrown4	139	105	105
royal blue	65	105	225
royalblue	65	105	225
royalblue1	72	118	255
royalblue2	67	110	238
royalblue3	58	95	205
royalblue4	39	64	139
saddle brown	139	69	19
saddlebrown	139	69	19
salmon	250	128	114
salmon1	255	140	105
salmon2	238	130	98
salmon3	205	112	84
salmon4	139	76	57
sandy brown	244	164	96
sandybrown	244	164	96
sea green	46	139	87
seagreen	46	139	87
seagreen1	84	255	159
seagreen2	78	238	148
seagreen3	67	205	128
seagreen4	46	139	87
seashell	255	245	238
seashell1	255	245	238
seashell2	238	229	222
seashell3	205	197	191
seashell4	139	134	130
sienna	160	82	45
sienna1	255	130	71
sienna2	238	121	66
sienna3	205	104	57
sienna4	139	71	38
sky blue	135	206	235
skyblue	135	206	235
skyblue1	135	206	255
skyblue2	126	192	238
skyblue3	108	166	205
skyblue4	74	112	139
slate blue	106	90	205
slate gray	112	128	144
slateblue	106	90	205
slateblue1	131	111	255

---

slateblue2	122	103	238
slateblue3	105	89	205
slateblue4	71	60	139
slategray	112	128	144
slategray1	198	226	255
slategray2	185	211	238
slategray3	159	182	205
slategray4	108	123	139
snow	255	250	250
snow1	255	250	250
snow2	238	233	233
snow3	205	201	201
snow4	139	137	137
spring green	0	255	127
springgreen	0	255	127
springgreen1	0	255	127
springgreen2	0	238	118
springgreen3	0	205	102
springgreen4	0	139	69
steel blue	70	130	180
steelblue	70	130	180
steelblue1	99	184	255
steelblue2	92	172	238
steelblue3	79	148	205
steelblue4	54	100	139
tan	210	180	140
tan1	255	165	79
tan2	238	154	73
tan3	205	133	63
tan4	139	90	43
thistle	216	191	216
thistle1	255	225	255
thistle2	238	210	238
thistle3	205	181	205
thistle4	139	123	139
tomato	255	99	71
tomato1	255	99	71
tomato2	238	92	66
tomato3	205	79	57
tomato4	139	54	38
turquoise	64	224	208
turquoise1	0	245	255
turquoise2	0	229	238
turquoise3	0	197	205
turquoise4	0	134	139
violet	238	130	238
violet red	208	32	144
violetred	208	32	144
violetred1	255	62	150
violetred2	238	58	140
violetred3	205	50	120
violetred4	139	34	82
wheat	245	222	179
wheat1	255	231	186
wheat2	238	216	174
wheat3	205	186	150
wheat4	139	126	102

---

```

white                255 255 255
white smoke          245 245 245
whitesmoke           245 245 245
yellow               255 255  0
yellow green         154 205  50
yellow1              255 255  0
yellow2              238 238  0
yellow3              205 205  0
yellow4              139 139  0
yellowgreen          154 205  50

```

```

->
Return to Alphabet
<-

```

## 1.21 BOTTLE WINE GLASS LIQUID

```

* Subject: Green glass & Wine Attributes
* Date: Sun, 8 Sep 1991 14:04 MDT [11]
* From: SL3B4@cc.usu.edu

```

John's wine-bottle-green glass & Wine:

```

Color   : 10 49 9           Color   : 50 10 10
Reflect: 15 20 15          Reflect: 0 0 0
Filter  : 205 230 205      Filter  : 255 110 110
Specul  : 235 255 235      Specul  : 255 0 0
Dither  : 50                Dither  : 50
Hardn   : 230                Hardn   : 200
Rough   : 0                  Rough   : 0
Shine   : 0                  Shine   : 0
Refraction: 1.5              Refraction: 1.33

```

```

->
Return to Alphabet
<-

```

## 1.22 LINEAR FLYING LOGO ENTRANCES

```

* Subject: Re: Hmmm Revisited
* Date: Wed, 11 Sep 91 17:55:59 EDT [11]
* From: spworley@ATHENA.MIT.EDU

```

If you want fun and exciting entrances, Wayne was right, linear textures would work great! Here's another fun linear texture trick. Make an extruded tube of your logo that is REALLY long. Add TWO linear textures with the Z axis facing backwards. make the first texture color the object a solid red, the second a transparent red. Put the z width of both to -zero- and the first at the front of your object and the second a bit into the tube, as far as you want your final object to be thick. Save this object. Now move the second texture about 50 "logo thicknesses" back with the same texture

---

settings but a z transition width of maybe five "logo thicknesses". Set the second texture z transition to about one "logo thicknesses" and a position about 2 "logo thicknesses" in front of the back texture. Save this second object. The default attributes for both objects should be complete filter so they are invisible.

Anyway, take these two objects and morph from one to the next. Loads of fun!! You get a fuzzy blob flying at you and it finally condenses into a sharply defined logo right where you want it. Boom, instant dramatic entrance!

```
->  
Return to Alphabet  
<-
```

## 1.23 ROPE BRAID BREAD

```
* Subject: Some Cool Object Tutorials...  
* Date: Wed, 25 Dec 91 10:04:07 -0500 [17]  
* From: mbc@po.CWRU.Edu (Michael B. Comet)
```

The first one is basically a braid. You can use this to create bread, or rope and perhaps even columns for a Persian like design.

To start with, go into the DETAIL editor and a PRIMITIVE DISK. Select, 20 for the 20 for the radius and then OK. Now comes the part which makes the braid work.

Rotate the AXIS (axis only- SHIFT-R) around the Z-Axis so that the Y-Axis of the object is facing left from the top view. ie: You are rotating counter clockwise. This can also be done from the TRANSFORMATION requestor and making the ALIGNMENT of the Z-AXIS = 90, then clicking on TRANSFORM AXIS ONLY, and then on PERFORM.

Now select EXTRUDE from the MOLD requester and then change the following in the EXTRUDE requestor. Make Sections=25 and Y Rotation=720. You may also wish to turn on Mirror Ends. Click on perform and the braid is done. Nice thing is, phong shading works properly.

```
->  
Return to Alphabet  
<-
```

## 1.24 HANDLE

```
* Subject: Some Cool Object Tutorials...  
* Date: Wed, 25 Dec 91 10:04:07 -0500 [17]  
* From: mbc@po.CWRU.Edu (Michael B. Comet)
```

---

Another object created similarly is a ring. Once again add a PRIMITIVE DISK and select 20 for the radius. Next rotate the Z-Axis to +90. Then once again get into the EXTRUDE requestor and set Section=25 and Y Rotation=720 and click on Mirror Ends. But also set BOTH the X Translate and Z Translate = 100. Click on Perform, and an instant bicycle handle appears. (At least that's what it looks like to me - maybe you can think of other uses for it).

->  
Return to Alphabet  
<-

## 1.25 RING

\* Subject: Some Cool Object Tutorials...  
\* Date: Wed, 25 Dec 91 10:04:07 -0500 [17]  
\* From: mbc@po.CWRU.Edu (Michael B. Comet)

This next object is basically a ring (the kind you wear), but it is detailed with indentations in almost a honeycomb fashion. First, add a PRIMITIVE DISK as before and select OK to accept the defaults. Now rotate the X-AXIS (SHIFT-R and then X) or use the transformation requestor so that the AXIS (AXIS ONLY!) is set to 45.

Now select the MOLD requestor, and then SWEEP. Then finally click on PERFORM to accept the defaults (note: you can raise or lower the # of Sections to change the number of 'facets' on the ring). You can then set the alignment back to zero to make your ring in a normal position. NOTE: Before you render it you should turn OFF PHONG shading. If you do not, the phong shader will simply smooth out the detail.

->  
Return to Alphabet  
<-

## 1.26 TEAR DROP

\* Subject: Some Cool Object Tutorials...  
\* Date: Wed, 25 Dec 91 10:04:07 -0500 [17]  
\* From: mbc@po.CWRU.Edu (Michael B. Comet)

The next object is a very nice Tear Drop. Actually rather simple to make, without using magnetism and dragging points. First, add a PRIMITIVE SPHERE and accept the defaults by clicking on OK. Then scale the OBJECT so that its Z-LENGTH is 30. This is most efficiently done by using the TRANSFORMATION requestor, and then clicking on size, and then setting Z=30. Then click on PERFORM. You should now have a 3-D ellipse.



Now, click on CONFORM TO SPHERE from the MOLD requestor and accept the defaults which should be 50 for the Sphere radius, and 160 for the Object radius. Click on Perform. Selecting higher Object radii will result in a more elongated tear drop.

->  
Return to Alphabet  
<-

## 1.27 STAR

```
* Subject: Some Cool Object Tutorials...
* Date: Wed, 25 Dec 91 10:04:07 -0500 [17]
* From: mbc@po.CWRU.Edu (Michael B. Comet)
```

The Star is basically made up of 2 TORUS's with the proper angle between them. Add a PRIMITIVE TORUS and change the Ring Sections to 3 and Tube Sections to 6. Also turn OFF stagger points. Click on okay, and one (beveled) triangle is made.

Select it and then make a copy (RightAmiga-C). then Paste the copy down (RightAmiga-P). Then select the copy (pick select or F1 depending on whether or not you've changed your preferences file).

Now select the TRANSFORMATION requestor and then ALIGNMENT. Enter 60 for Z, then click on perform. Now you may wish to redraw using the RightAmiga-R option.

Finally select pick all (RightAmiga-A). Then Join (Right Amiga-J). This will give you 1 complete object.

Assuming that you picked the axis which was at 60 degrees first before you joined, your star will be lying down and the axis is 60 degrees from the standard Y axis. To correct both problems first go into the TRANSFORMATION requestor and select ALIGNMENT, then 30 for Z. Also click on TRANSFORM AXIS ONLY. Then click on PERFORM. Then go into the TRANSFORMATION requestor one more time and select ALIGNMENT. Then set X=90 and Z=0 and click on perform. Finally if you wish your axis to be oriented the same as the WORLD axis, go into the TRANSFORMATION requestor once again, click on TRANSFORM AXIS ONLY. Next, click on ALIGNMENT and set X=0. Then click on SIZE and set Y=50 and Z=150. Click on perform. That should create one star object, with its axis in perfect alignment with the WORLD axis, and facing front. This looks pretty cool in both phong or facet mode.

You can do some neat anims with falling raindrops simply by scaling them. Also creating a braid as above, and then another not braided braid you can make a neat morph.

->

---

Return to Alphabet  
<-

## 1.28 FOG

\* Subject: Fog trick  
\* Date: Sat, 15 Feb 92 20:28:10 PST [20]  
\* From: Mike.G.Wilson@mtsg.ubc.ca

A simple fog trick: Using global fog, set Top to 0, bottom to, say, -5000 and then pick everything (cam, lights, objects) and rotate it 90 deg on the X axis: presto, a Wall O Fog, easily controlled.

\* Subject: Another Fog trick  
\* Date: Sun, 16 Feb 92 11:27:44 -0500 [20]  
\* From: mbc@po.CWRU.Edu (Michael B. Comet)

Another 2.0 fog trick, or use really is to make stars or suns. Simply add a sphere, make it a yellow-white, set it's fog length so it is a thick fog, but somewhat less dense at the outer area, and you have an instantaneous sun! Look really good, much better than if you had just added a sphere and made it bright.

->  
Return to Alphabet  
<-

## 1.29 FOG LIGHTS

\* Subject: Foggy Lights  
\* Date: Sun, 1 Mar 92 18:08:29 PST [21a]  
\* From: Len@cup.portal.com

However, Imagine 2.0 offers a much more elegant solution! After you create the light/bright object, set the FOG to some small value (I used 1.0). Since a fog object doesn't create a shadow, all the light passes through it and you have something that actually looks like a light bulb (or candle flame etc.) without having to turn the intensity up!

->  
Return to Alphabet  
<-

## 1.30 SPACESHIPS PLANETS

\* Subject: Re: Planets  
\* Date: Wed, 10 Jun 92 19:49:29 -0400 [23]  
\* From: mbc@po.cwru.edu (Michael B. Comet)

I have recently made an anim of this spaceship coming around a planet in 24 bit and found that the PASTELLA texture for Imagine 2.0 is great for this, if you just want swirls of color.

Try these settings for a blue planet with some swiling lighter blue shades. Note: If you are not rendering in 24 bit, they really don't look that good....you kind of need 24 bit to get the full effect:

```

ATTRIBUTES:
      R      G      B      Value
Color:    0      0      255    *
Reflect:  0      0      0      *
Filter:   0      0      0      *
Specular: 0      0      0      *
Dithering: *      *      *      255
Hardness: *      *      *      0
Roughness *      *      *      0
Shininess *      *      *      0

```

```
Texture:    PASTELLA
```

```

Detail Size: 32
RandomSeed: 123
Red1: 255
Green1: 255
Blue1: 255
Red2: 0
Green2: 0
Blue2: 255
Red3: 255
Green3: 255
Blue3: 255
Red4: 0
Green4: 200
Blue4: 255

```

This is done for a sphere with size 40,40,40.

```

->
Return to Alphabet
<-

```

## 1.31 GEMSTONES REFRACTION INDEX

```

* Subject: Index of Refraction's
* Date: Wed, 8 Jul 92 11:12:09 PST [24]
* From: kennys@terapin.com (Kenny Sequeira)

```

Here are a few index of refractions for some gemstones.

```

Opal      1.44 - 1.46
Amber     1.54
Garnet    1.73 - 1.89
Cubic Zirconia 2.15 Did you not want to create a fake diamond.

```

->  
Return to Alphabet  
<-

## 1.32 SHELLS SNAIL

\* Subject: Snail shells  
\* Date: Fri, 06 Nov 92 10:27:01 -0800 [29]  
\* From: mvilaubi@sfsuvax1.sfsu.edu

Add a primitive disk with default diameter. Delete the center point. Rotate it 90 degrees on X. Realign the axis only to 0 rotation on X. Translate the axis only 50 units on X, so it is in line with the edge of the disk. Scale the disk to .5 on X.  
Extrude to Length 1, Y Rotation 720, X Scaling .1, and Sections to 36. Afterwards you can Conform to Sphere with a Sphere Radius of 150. I have gotten interesting results by scaling the disk larger on X and setting Extrude Length to 100 or more.

->  
Return to Alphabet  
<-

## 1.33 GOLD

\* Subject: uuencoded gold attributes  
\* Date: 02 Dec 1992 01:59:52 -0500 (EST) [30]  
\* From: VISHART@ubvmsb.cc.buffalo.edu

The gold attributes of which I spoke are simply settings....  
No textures, mapping, or brushes are required...  
The settings are as follows :

color, reflect, filter, specular all set as follows :		
red	255	
green	207	
blue	95	
dither	255	only necessary if not using 24 bit
hardness	255	
roughness	0	
shininess	0	

->  
Return to Alphabet  
<-

## 1.34 WOODEN TABLE

---

```

* Subject: Re: settings for color, reflectivity, filter, & ↔
      realistic objects
* Date: Mon, 7 Dec 92 10:02:59 CST [30]
* From: tes@gothamcity.jsc.nasa.gov (Thomas E. Smith [LORAL])

```

VISHART@ubvmsb.cc.buffalo.edu writes:

```

> you design an old, unpolished wooden table top with the COLOR set
> as follows :

```

```

>     COLOR
>
>         red      - 100
>         green - 52
>         blue     - 30
>

```

```

> ... all the FILTER settings should be zero.
> If you follow the above guidelines, however,
> you will calculate that the REFRACTION must be set
> to exactly the same values as the COLOR settings.
> For example , in the case of the old wooden table top,
> the calculated settings would be :

```

```

>     REFRACTION
>
>         red      - 100
>         green - 52
>         blue     - 30

```

->

Return to Alphabet

<-

## 1.35 SHADOWS

```

* Subject: Shadow Object attributes
* Date: Mon, 18 Jan 93 16:37:14 -0500 [31]
* From: mbc@po.cwru.edu (Michael B. Comet)

```

I have recieved a couple of requests for this so here are the attributes for a "shadow" object:

```

COLOR:  R,G,B = 5,5,5
REFLECT: R,G,B= 0,0,0
FILTER: R,G,B = 210,210,210
SPECULAR: R,G,B= 0,0,0
DITHERING=255
HARDNESS=0
ROUGHNESS=0
SHININESS=0
PHONG = ON      (probably doesn't matter)

```

Now make you normal object, and then make a simple flat object which would look like the shadow and place it in the proper location. (Ie: on the floor, wall, and parts of the object itself)

You can add a texture (linear say...etc...) and set it to have the same texture color, but to have a higher filter...ie:255,255,255 thus the part that becomes textured will fade into nothing and will have

the effect of a shadow with fuzzy edges. If you want a darker shadow set teh above filter settings lower.

```
->
Return to Alphabet
<-
```

## 1.36 CARPETS FLOORS

```
* Subject: Re: Rendering Rooms
* Date: Sat, 22 May 93 13:23:38 -0500 [37]
* From: pjfoley@sage.cc.purdue.edu (PJ Foley)
```

I find that a good way to make carpet is to use the dreaded lame-o, cheapy, "gause-screen," ant-crawling, don't-animate-this, roughness setting. I crank it way up. I also add the Bumps texture from Essence to give it that "lived-in look." Here are my settings:

```
Color: 150,150,150 (arbitrary, I suppose)
Specular: 230,230,230 (adjust to your color)
Dithering: 255 (I usually set this to zero since I deal with 24bit exclusively)
Roughness: 100 (more or less depending on how far you view the carpet)
Everything else: 0
And for Essence "Bump"
Initial Scale: 2.0
# of Scales: -1.random (take off the negative if this is too slow for you)
Scale ratio: 0.5
Amp: 0.5
Alt: 0.5
```

```
->
Return to Alphabet
<-
```

## 1.37 WOOD

```
* Subject: Good Wood
* Date: Sun, 27 Jun 1993 03:11:59 -0300 [41]
* From: LEYEN%VORTEX.UFRGS.BR@UICVM.UIC.EDU
```

```
object RGB: 83 14 19
```

```
wood texture
RGB: 102 33 27
ring spacing: depend on the object's size
```

```
pastella texture
RGB1: 130 54 54
RGB2: 160 72 54
RGB3: 143 73 38
RGB4: 128 62 38
detail size: depends on the object's size
```

->  
Return to Alphabet  
<-

## 1.38 LIGHTBULB

\* Subject: Re: Shadows and Light Objects  
\* Date: Mon, 4 Oct 93 10:46:18 CDT [43]  
\* From: setzer@comm.mot.com (Thomas Setzer)

The best setting I got for a lightbulb was as follows.

Make the bulb glass(transparency 200, 200, 100 or what ever, I used the settings from Understanding Imagine 2.0) Not sure if you need this since you are going to be setting fog. I need to play some more.

Make the object a light source by clicking on the light box in the attributes requestor. No need to set the bright box. In light requestor select spherical and put the light to 400 400 250, kindof yellow. Select cast shadows if you like.

Put the object axis of the bulb where the filament of the bulb would be. (shift-M to move the axis)

Set the fog length as suggested by another Imagineer. You will have to play with this as it depends on the distance from the object axis to the edge of the bulb. My bulb was 40 units across(turn on coords and measure) and my fog length was 10 or 15, can't recall which. The smaller the setting, the more opaque the bulb will be. The fog will be the color of your object. My bulb was white.

Some weirder results occurred when the object was not transparent. It still seemed to emit light, but the bulb was completely black. Turn on "bright" and the bulb turned white(but it didn't look right, kindof flat looking"). I makes sense to make the bulb transparent and this seems to work the best.

->  
Return to Alphabet  
<-

## 1.39 FIRE CANDLE FLAME

\* Subject: Candle flame  
\* Date: Thu, 11 Nov 93 23:20:41 [44]  
\* From: greg.tsadilas@hofbbs.com

Read the info on the FIREBALL texture. It describes how to make a candle flame. If you don't have time to hunt for it, here it is:

"To do fire: create a candle flame shaped object. Apply the texture and

select "Edit Axis" from the texture requestor. Move the center of the texture axis to the base of your flame. Now scale the texture axis until ... [the] axis extends beyond the top of your object. In the texture requestor, set the noise to 0.3 and the "Filter 2" param to 1.0. Make the object bright."

```
->
Return to Alphabet
<-
```

## 1.40 STARFIELD STARS

```
* Subject: Starfield
* Date: Fri, 10 Dec 93 10:14:27 [45]
* From: greg.tsadilas@hofbbs.com
```

Ok fellow Imagineers, we all know that Imagine's starfield is very cheesy at best. Here's a great solution for Imagine 2.9 users.

Create a sphere that is as large as your world, minimum size should be at least 1000 units along each axis.

Set the sphere's filter values to 255 for each R,G,B component.

Apply the CONFETTI texture and make these adjustments to the default values:

```
SIZE - .25
V1   - .53
V2   - .55
COLOR 1 - R,G,B values to 255 each
COLOR 2 - R,G,B values to 100 each
```

Make sure the camera is somewhere in the center, and render. Voila! a great Starfield! As Impressive as FractInt's starfield, BUT this one is in 3D and takes up very little valuable RAM.

Refer to the docs on the confetti texture to make any adjustments that you like.

Also, try making a short anim with just the sphere, and just change the Camera's perspective, you can get a nice space warp effect.

- 1] Make the sphere bright to make sure the stars show up
- 2] Make a copy of the sphere and scale it slightly smaller or bigger and rotate it so it's at a diff angle.

Then, you'll get a cool rotate effect when you move the camera.

\* Note: I can't seem to find the author of the following paragraph (??)

However, you are on the right track to creating a better looking starfield. Create a large sphere, make it black in color. Make it BRIGHT. Apply the confetti.itx to it. Give it the two colors to use to interpolate all the different colors...give it a dark grey, and a light grey or white. Read the texture doc for all the parameters in CONFETTI.ITX, and how to control how many "stars" are rendered, and how their size is controlled.



->  
Return to Alphabet  
<-

## 1.41 PANELS SPACESHIP

\* Subject: Textures  
\* Date: Thu, 16 Dec 93 22:37:16 [45]  
\* From: greg.tsadilas@hofbbs.com

Imagine 2.9's DETHSTAR texture leaves much to be desired for my tastes. Here's a solution I came up with....use the RADWIND,TUBEWIND,RECTWIND textures to create multicolored spaceship panels:

- Add a primitive sphere with it's default values.
- Apply the RADWIND texture
- Make these adjustments to the texture variables:

Column One	Two
---	---
1	210
3	210
60	210
0	190
1	190
0	190
0	-1
0	0

\*These params will gill give you panels that are randomly colored from the two color ranges defined in column two.  
\*Play around with some of the variables to get the affect right for you.

->  
Return to Alphabet  
<-

## 1.42 BARK MARBLE STONE

\* Subject: Textures  
\* Date: Thu, 16 Dec 93 22:37:16 [45]  
\* From: greg.tsadilas@hofbbs.com

BARK, MOUNTAIN RIVULETS, GRANITE, MARBLE EFFECTS

-Use the WRINKLE texture for all these and more!

- Add default cylinder and CLOSE the TOP
- Select the top edges of the cylinder and MAKE SHARP
- Apply the WRINKLE texture and render.

This will look like bark around the cylinder....play with the noise functions to adjust the look of the bark.

Now make these changes to the Texture:

Column One	Two
---	---
0.5	150

\* This will look like the sides of a mountain around

```

0.5      150      the Cylinder. On the top of the cylinder it will
10.0     150      look like granite.
1.0      20      * When applied to organic object the vertical faces
0.5      50      will have the rivulets, the horizontal faces will
0.0      20      be granite-like.
0.0      0
1.0      0      * Try changing the first three variables in Column
                    one to 10,10,1 respectively. The resulting look
                    will make the cylinder look like a core sample
                    around the cylinder, while the top of the cylinder
                    will have a marble-like quality.

```

```

->
Return to Alphabet
<-

```

### 1.43 BUBBLE SOAP

```

* Subject: Soap 2.nd time.
* Date: 05 Jan 94 17:05:22 GMT [46]
* From: izi@scala.ping.dk (Soren Wind)

```

After i've got a few requests on the attributes for my Soap Bouble, here it is... :

Make a Sphere.... "no matter what size but lets make it 50 :D"

COLOR	REFLECT	FILTER	SPECULAR
R 250	10	192	255
G 215	10	162	245
B 225	10	133	238

Dithering	Hardness	Roughness	Shiniess	Index of refraction
0	245 (Or less)	0	0	1.08

Then Add a Pastella Texture.  
With the following datas.

```

102.333374  100.00
  0.0       0.0
255.0       255
  0.0       180
100.0       80
  0.0       110
255.0       0.0
100.0       0.0

```

Now, try render it, and remember to put a object behind, and try to make several copies, and make a complet BoubleBath :D

```

->
Return to Alphabet
<-

```

## 1.44 TRANSPORTER EFFECTS LOGO ELECTRICITY

\* Subject: Electric Field effect  
\* Date: Sun, 9 Jan 94 11:09:53 GMT [46]  
\* From: Andrew Nunn <apn@moby.demon.co.uk>

Here's an interesting texture effect to try.

1. Create an object (in my case a logo)
2. Set the Filter Attribute to 255,255,255.
3. Set the Bright attribute.
4. Add the 2.9 Worm Vein Texture, set the vein colour to your choice eg electric blue, and adjust the Filter setting to 0,0,0.
5. Create a second version of the object with the texture axis moved (in the logo case say from one end of the logo to the other).
6. Create a short animation morphing the two versions.

Further, it is then possible to morph the object filter setting to 0,0,0 and the texture filter setting to 255,255,255, creating a transporter beam materialization effect. However for this to work fully, the Bright setting must be removed at some point.

->  
Return to Alphabet  
<-

## 1.45 FIRE FLAMES

\* Subject: Re: Lens Flare texture  
\* Date: Wed, 12 Jan 94 20:06:07 PST [46]  
\* From: ual97@freenet.victoria.bc.ca (Christopher Stewart)

For the person that was wondering if Imagine can do re-entry flames. Try the fireball texture, a teardrop and some fractel noise. Morphing the object's shape and textures while entering an atmosphere (you'll run into the fog/transparency bug here) looks pretty good at a distance.

->  
Return to Alphabet  
<-

## 1.46 CAMERA SIZES FOCUS LENS

\* Subject: Re: Camera sizes  
\* Date: Mon, 17 Jan 94 0:43:15 EST [46]  
\* From: tmarshal@st6000.sct.edu (Tyrone Marshall)

\* Note: The next paragraph was written by greg.tsadilas@hofbbs.com

If you are using Imagine 2.9 all you have to do is set the Camera's POV (Point Of View) to the desired focal length. Imagine 2.9's is 90 for default. But 45 equates to a 35mm camera, and 65 is a zoom lense. Human vision is around 55. Of course if you are using Imagine 2.0 you can't use

---

this.

->  
Return to Alphabet  
<-

## 1.47 CLOUDS

\* Subject: 33300 lines of drivvel from Scott...  
\* Date: Tue, 1 Feb 1994 09:45:54 -0600 (CST) [46]  
\* From: kirvan@SSESCO.com

I use FilNoiz2.itx (Filter Noize 2). Apply the texture to a white ground, set the texture's filter values to whites and blacks (doesn't really matter which ones you set to what), mess with the noise parameters to try and get the shapes you want, and set the scaling parameters to something big and more equivalent than the defaults (maybe 200x200x200). Put the textured ground up in the sky and tweek the numbers until it looks like what you want. This won't give you cumulo nimbus type clouds, but will do a light wispy, hazy, overcast look. (to do smoke, copy the cloud-plane, and paste the copy a little below (underneath) the cloud-plane. Now change the color of the lower plane to a gray and you got smoke).

->  
Return to Alphabet  
<-

## 1.48 WATER DROPS

\* Subject: 33300 lines of drivvel from Scott...  
\* Date: Tue, 1 Feb 1994 09:45:54 -0600 (CST) [46]  
\* From: kirvan@SSESCO.com

Here's how I've done this - first, though, an explanation of why water drops won't work that well as a texture: The refraction effects that water drops have on the surface of a pop can is dependant on the actual thickness of the drop. A texture doesn't actually add any thickness or bumps with real depth to a surface, it only changes the way the surface looks, giving the impression of bumpiness.

Ok, how to do it: take your pop can, copy and paste it in the same spot, and scale one up just a tiny bit bigger than the other. Brush map the can's label onto the smaller of the two cans (also set up the can's spec/hard). The bigger of the two cans is going to be the water droplets. Make that can totally transparent, set the index of refraction to that of water (1.5 I think - I don't have space in my head for things I can look up when I need them), and give it a white specularity and hardness of about 200 to 255. Add DinoSkin to the larger can, set the scaling to make very small drops, reduce the values in the noise functions so the bumps won't be kinked up so much, put a negative number in one of the color boxes (to turn off the coloring), and set the dispersion to a small number (like .1, maybe even less) to turn off most of the bumps. You may want to experiment with

the DinoSkin parameters on a non-transparent can to get the size / distribution you want. To finish off the look, make (actually build objects) several small water drops and stick them on the can. The drops you build should be the bigger water droplets on your pop can. That way the errors in the DinoSkin refraction are not seen because your eye is attracted to the bigger drops. You can also animate the bigger drops for more effect.

->  
Return to Alphabet  
<-

## 1.49 WRINKLES FOLDS DRAPES

\* Subject: 33300 lines of drivvel from Scott...  
\* Date: Tue, 1 Feb 1994 09:45:54 -0600 (CST) [46]  
\* From: kirvan@SSESCO.com

I've worked on some Wrinkle textures (they will probably be released with V3.0), but haven't been to impressed with how they look. I've had the best luck actually modeling the draped/wrinkle look by actually pushing points around. Let's see if I can explain the process I use to do a draped table cloth.... Start out with the flat object (like a flat piece of fabric for a table cloth). Set up the part of the fabric that is touching the table with enough faces around the table edge to get the phong shading to look correct after you bend the cloth. The parts of the table cloth that hang down the sides of the tabel have to be built so that every other triangle that hangs down has one edge alligned to the edge of the table and that edge's opposite point on the outside edge of the cloth (every other triangle points out like teeth from the table to the edge of the cloth). The remaining triangles around the edge are inverted to those just mentioned (like teeth pointing from the cloth's edge in towards the table). (Sorry, this isn't really that difficult, it's just tough to explain in text.) Now pick all the points that make up the edge of the cloth and using move and scale, drag them down and under the table like they would be if hanging from the table top. Use Hide points to make all the table top points go away (you should only have the points that make up the edge of the cloth after this). Using Drag Points, just randomly push the points that make up the bottom edge of the table cloth around to make folds and wrinkles. That's it - render it. Should give you some ideas for doing more detailed wrinkles and for animating them (using states - states now has spline interpolated morphing - looks great, REALLY great!).

->  
Return to Alphabet  
<-

## 1.50 SPONGE

\* Subject: 33300 lines of drivvel from Scott...  
\* Date: Tue, 1 Feb 1994 09:45:54 -0600 (CST) [46]

---

\* From: kirvan@SSESCO.com

Try Peened.itx with coloring shut off and the Bump Adjust cranked way up.

->  
Return to Alphabet  
<-

## 1.51 HELMET SHINY COPPER

\* Subject: 33300 lines of drivvel from Scott...  
\* Date: Tue, 1 Feb 1994 09:45:54 -0600 (CST) [46]  
\* From: kirvan@SSESCO.com

Here's a cool finish for the helmet: Use a brush mapped pattern as a bump map for the patterns on the helmet. Apply the same brush again as a color map. Apply Antique.itx with the texture parameters set to do shiny copper and crank up the noise value a bit to get a good grainy look - This gives a really good 'used' look to the objects.

->  
Return to Alphabet  
<-

## 1.52 FOOTBALL LEATHER

\* Subject: 33300 lines of drivvel from Scott...  
\* Date: Tue, 1 Feb 1994 09:45:54 -0600 (CST) [46]  
\* From: kirvan@SSESCO.com

To whomever was having trouble doing a football:  
Try the textures, Pebbled and/or Leather.

->  
Return to Alphabet  
<-

## 1.53 LATTICIZE LATTICES WIREFRAME

\* Subject: RE: textures  
\* Date: Thu, 17 Feb 1994 11:20:15 +0000 (GMT) [47]  
\* From: "Alex..." <eezer@dcs.warwick.ac.uk>

Ahh, well, this is really easy to do in Imagine 2.9. Use the Lattice function (under the New Stuff menu) and enter a value of about -0.05 in the requester. This will turn your entire object into a wireframe, made up from narrow tubes.

\* Subject: Wireframe  
\* Date: Fri, 18 Feb 94 01:51:51 [47]

---

\* From: greg.tsadilas@hofbbs.com

Here's another way for creating the wire-frame with square or rectangular wireframe openings.

Set the objects filter values to 255, 255, 255. Apply one of the Death Star family of textures to the object. Set the Bevel Filter value to 0 (zero).

What you get is the bevel portion of the texture showing only. Voila! "Wireframe". Of course, you may or may not want to adjust the bevel width and the bevel slope.

->  
Return to Alphabet  
<-

## 1.54 BUBBLE SOAP

\* Subject: Re: Renderings  
\* Date: Thu, 24 Mar 1994 07:46:55 -0700 [48]  
\* From: Lesk@cc.snow.edu (Lesk)

Soren Wind put the basis of this bubble out here on the IML and this is how I used them (Thanks Soren).

Color	Reflect	Filter	Specular
R 250	10	192	255
G 215	10	162	245
B 255	10	133	238

Dithering	Hardness	Roughness	Shiness	Index of refraction
0	245 less	0	0	1.08

Then add pastella with the following settings

102.333374	100.00
0.0	0.0
255.0	255
0.0	180
100.0	80
0.0	110
255.0	0.0
100.0	0.0

->  
Return to Alphabet  
<-

## 1.55 GOLD METALS

\* Subject: Re: GOLD attributes  
\* Date: Wed, 6 Apr 94 13:32:00 EDT [49]  
\* From: jgoldman@acs.bu.edu (Jeffrey Goldman)

As for what the base attributes should be for your object, just use a goldish/yellow color (try 255,255,90), a reflection of a lighter gold/yellow (try 255,255,200), no filter, a specular color of yellowish white try (255,255,220), and a high degree of hardness (around 200). I'm doing this all from memory so I can't guarantee the results with these attribute values. But, remember that the illusion is in the global reflection map (as assigned in the globals bar of the stage editor).

->  
Return to Alphabet  
<-

## 1.56 GLASS

\* Subject: Re: A Transparent Question  
\* Date: Mon, 11 Apr 94 16:44:52 EDT [49]  
\* From: jgoldman@acs.bu.edu (Jeffrey Goldman)

Well, if you figure glass is transparent then I'd say that the background has a lot to do with it. Glass always looks terrible against a black background. Try it against the old checkerboard floor or something...

My glass is never always the same (it always depends on the use), but try the attribute settings:

Color	255,255,255	
Filter	220,220,220	
Reflect	30,30,30	<---(Play with this)
Specular	255,255,255	
Hardness	255	
IofRef	1.5	

->  
Return to Alphabet  
<-

## 1.57 SPACESHIPS BORG WIREFRAME LATTICE

\* Subject: RE: C= and the Borg  
\* Date: Tue, 12 Apr 94 15:07:00 PDT [49]  
\* From: Stethem Ted <TedS@ms70.nuwes.sea06.navy.mil>

The Borg ship is generally in the shape of a cube but it looks like layer after layer of tangled pipes and tubing. Have you thought about using the Latticize function in V2.9 to do this? Take a primitive plane, say 50x50, and extrude it by 50 with 50 sections. This gives you a cube with 50x50x50 faces. Use Latticize with a fairly small value like .05. Make another cube with 20x20x20 faces, Latticize and scale it so it is slightly larger than the previous one. Do this for several cubes with a different number of



faces. The other thing you can do it give it the more tangled, random look of the Borg ship is to remove edges/lines in the cube before Latticizing and rotating various layers by 90 degrees in the X, Y and/or Z axis. You can also add different brushmaps and textures to the different layers. I think this will create a more convincing Borg ship, although it may end up to be a huge object in memory size.

->  
Return to Alphabet  
<-

## 1.58 FORMS EDITOR THUMBS

\* Subject: Re: Forms editor and hearts... (long)  
\* Date: Wed, 13 Apr 94 0:13:09 EDT [49]  
\* From: jgoldman@acs.bu.edu (Jeffrey Goldman)

A Basic Form Example-

Take a simple example, your thumb. Treat your thumb as if it were an object on an axis. Say that the Z-axis runs from the base of your thumb to the tip. The X-axis runs across the top of your thumb. The Y-axis goes through your thumb. In other words, if your thumb were an Imagine object it would be oriented as if you were viewing a painting with your thumb out in front of you...

First trace the right profile of your thumb. If you want to do this the extra step way, lay your thumb down on a piece of paper and trace it for all three views (you'll have troubles with the top view, so just eye it.). Then, just copy what you see on paper to the screen. Do this for all three views. What you get is a pretty crude looking thumb. To get a better looking thumb you have to go in and edit individual cross-sections. But first...

Remember that if the object is solid you must have a totally enclosed profile (the endpoints are separated normally. You have to place the endpoint points at the same location. An easy way to do this is to select the cursor lock and lock the endpoints to similar grid locations).

In the case of the heart, do the same thing as the thumb...

What the Forms Editor Really Does-

It's important to understand what exactly you're doing when manipulating points in the forms editor, so go back to a simple sphere (new object and new defaults). Turn on the solid wireframe option and view the sphere object from the front. Notice how many points are on your front view profile. You will see that they equal the number of vertical sections in the wireframe object divided by two. Every point in an editor view has a twin on the opposite side of the object (except for the top view). If you add a point in the front view you will notice that two points are actually added. One on one side of the profile, and one on the other side. When altering an object's profile you actually directly manipulate a specific point, but because of the

forms editor's nature it changes other points around it to tween and smooth the change.

#### Editing Individual Cross-Sections-

Look at a forms object like several horizontal cross-sections (which are circular by default) connected like skin. Think of the top view as the cross-section editor. By default only one cross-section can be manipulated, the top one. It can be considered a controlling, or key, cross-section. Because it is the only key cross-section defined on the object then whatever you change will affect every cross-section below it.

To have ultimate control of the individual cross-sections you have to define the cross-section you want to manipulate as a key cross-section. You do this by selecting '+ KEY' and selecting the cross-section you want to manipulate (in the front or right view). When you perform this operation (or 'Select') Imagine will display which cross-sections have been defined as key cross-sections in red. At first, you will notice that only the top cross-section is highlighted in red because no others have been selected to act as key cross-sections. Make the middle cross-section a key cross-section. The object now has two cross-sections which can be separately manipulated as keys. Use 'Select' to pick the cross-section you want to alter.

Think of key cross-sections as animation frames. In an animation you can set an initial position for an object on one frame and a final position on another frame. These two frames are now key frames. When the animation is generated the object's position will tween between the two key frames. The same process occurs with key cross-sections. All non-key cross-sections tween between key cross-sections.

Take an example of a salt shaker with a circular top and square bottom. If you create a circular key cross-section as the top of the shaker and a square key cross-section for the bottom all the cross-sections between the top and bottom will blend to form a smooth transition from circle to square.

So now you know how to alter the individual cross-sections. Remember that you can also delete key cross-sections. Just be sure you select the appropriate cross-section. BTW, Imagine tells you what cross-section you're manipulating in the upper menu bar. Also, remember that Imagine's cross-section tween goes from key to key in a downward order. If there is no key cross-section at the object's base Imagine will use the next highest defined key section.

#### So Where do the Front/Right Views Come into Play?-

If the top editor edits individual cross-sections then the front and side view editors locate the cross-sections in space. The default sphere has all the cross-sections parallel to each other. You can change the orientation of a cross-section (so that it is not parallel to the ground) by moving points on the front and right views. Basically, the front and side view alter an object's overall profile shape.

---

This particular explanation only really works with the default sphere, but the results can be translated to any object. The front view controls all the points along the object's x-axis. The side view controls all the points along the object's y-axis. This effectively splits the sphere into four sections; a front profile, back profile, left profile, and right profile.

In the front view select the right-most point and you'll notice that it's twin point will be highlighted on the left. These two points define the right-most and left-most points of one cross-section. Specifically, these two points represent two outermost x-axis points on the middle cross-section.

Similarly, the same two points in the side view control the farthest points on the y-axis of the middle cross-section.

You will find that by altering these you alter the orientation of the cross-section. If you raise the right-most point in the front view and lower the left-most point the middle cross-section now tilts.

What Does It All Mean?-

It's tough to explain exactly how the forms editor operates, and in particular what alters what exactly. So my greatest advice is to experiment.

The easiest way to create object was illustrated in the first section. Create profiles for the object you want to create. If you need better form edit the individual cross-section as if you were manipulating spars on and airplane wing or bulkheads on a boat.

I can tell you now that only experience can show you what will go wrong, and believe me something will go wrong. I can only say, keep things simple. You probably won't understand this now, but try and keep cross-sections relatively parallel to each other. If this means adding more cross-sections then do it. You'll find that some really complex things can't be done with small numbers of cross-sections, and it's important to realize when you need more...

->  
Return to Alphabet  
<-

## 1.59 LATTICE PIPES LAYERS

```
* Subject: Re: c= and the
* Date: Wed, 13 Apr 94 06:31:08 [49]
* From: greg.tsadilas@hofbbs.com
```

Here's a way to add many layers of lattice or piping work with very little memory...

Apply the DETHSTAR texture to the cube object. Make the cube 100% filtered. In the DETHSTAR texture requestor make the BEVEL FILTER 0 (ZERO). The result

will be a lattice in the shape of the cube. Several imbedded cubes with varying DETHSTAR parameters would make a good base to add attitional object details to.

```

->
Return to Alphabet
<-

```

## 1.60 GLASS

You can use the following Attribute setting for a default glass:

	RED	GREEN	BLUE	VALUE	
COLOR	0	0	0	*	
REFLECT	0	0	0	*	
FILTER	255	255	255	*	
SPECULAR	255	255	255	*	
DITHERING	*	*	*	255	
HARDNESS	*	*	*	255	
ROUGHNESS	*	*	*	0	
SHININESS	*	*	*	0	(Very important see below!)

```

PHONG = ON
INDEX = 1.50
FOG LENGTH = 0.00

```

This should give you glass.

One thing many people get confused by is:

- 1) Shininess must be set to ZERO. If you set this to anything but 0, the FILTER setting will not work. This is just the way Imagine works since FILTER usage assumes shininess automatically.
- 2) No background. To get glass, you need surroundings. If you render a glass cup on a pure black screen, you'll probably just see the highlights. Adding global colors for Scanline and Ray Trace will give your object something to refract.
- 3) Ray Trace. To get refraction of surrounding objects exactly, you need to Trace, though scanline WILL approximate refractivity.

```

->
Return to Alphabet
<-

```

## 1.61 REFRACTION INDEX

(All items except Vacuum are in alphabetical order)  
(STP = Standard Temperature and Pressure)

MATERIAL	Index
----------	-------

---

```

-----
Vacuum ..... 1.00000 (exactly)

Air (STP)..... 1.00029
Acetone ..... 1.36
Alcohol ..... 1.329
Amorphous Selenium ..... 2.92
Calspar1 ..... 1.66
Calspar2 ..... 1.486
Carbon Disulfide ..... 1.63
Chromium Oxide ..... 2.705
Copper Oxide ..... 2.705
Crown Glass ..... 1.52
Crystal ..... 2.00
Diamond ..... 2.417
Emerald ..... 1.57
Ethyl Alcohol ..... 1.36
Flourite ..... 1.434
Fused Quartz ..... 1.46
Heaviest Flint Glass ..... 1.89
Heavy Flint Glass ..... 1.65
Glass ..... 1.5
Ice ..... 1.309
Iodine Crystal ..... 3.34
Lapis Lazuli ..... 1.61
Light Flint Glass ..... 1.575
Liquid Carbon Dioxide ..... 1.20
Polystyrene ..... 1.55
Quartz 1 ..... 1.644
Quartz 2 ..... 1.553
Ruby ..... 1.77
Sapphire ..... 1.77
Sodium Chloride (Salt) 1 .... 1.544
Sodium Chloride (Salt) 2 .... 1.644
Sugar Solution (30%) ..... 1.38
Sugar Solution (80%) ..... 1.49
Topaz ..... 1.61
Water (20 C) ..... 1.333
Zinc Crown Glass ..... 1.517

```

->

Return to Alphabet

<-

## 1.62 MIRRORS

The trick with mirrors (or especially chrome-like objects) is not setting the attributes of the mirror correctly, but making sure that the environment is set up so something will be reflected into the camera.

If a mirror is TOO reflective, the mirror can actually become invisible! This is because the mirror's own flat glass/metal flat coloring is overwhelmed by all the reflected light. You see a PERFECT reflected image, so the object itself isn't shown. This is especially

true with flat mirrors.

Some attributes that give a nice mirror polish:

	RED	GREEN	BLUE	VALUE	
COLOR	150	150	150	*	
REFLECT	200	200	210	*	(a bit of a blue tint)
FILTER	0	0	0	*	
SPECULAR	255	255	255	*	
DITHERING	*	*	*	255	
HARDNESS	*	*	*	255	
ROUGHNESS	*	*	*	0	
SHININESS	*	*	*	0	

PHONG = ON  
 INDEX = 1.00  
 FOG LENGTH = 0.00

->  
 Return to Alphabet  
 <-

## 1.63 METALS GOLD

One thing you can do to make your objects look more like metal is to give them a specular setting close to the main color of the object, but higher in intensity. One mistake is to often make the specular a pure white. This makes objects look more like plastic than metal. For example, if you are trying to make gold, don't make the specular pure white, but try a bright yellow or yellow/orange creame color.

Another problem is that many metals reflect the world. For example a chrome ball is pretty much just a shiny mirror. Thus, if you want to make realistic metals you will need to at least simulate reflection. This can be done by adding a global reflect map, doing a true ray trace or even just setting sky colors in the stage editor.

You can use the following Attribute setting for a default gold:

	RED	GREEN	BLUE	VALUE
COLOR	205	205	80	*
REFLECT	180	160	125	*
FILTER	0	0	0	*
SPECULAR	255	255	160	*
DITHERING	*	*	*	255
HARDNESS	*	*	*	255
ROUGHNESS	*	*	*	0
SHININESS	*	*	*	0

PHONG = ON  
 INDEX = 1.00  
 FOG LENGTH = 0.00

This should give you something close to gold. Note that the reflect values are fairly high. You may wish to lower them to see how it would look if you don't have anything to reflect etc...

```

->
Return to Alphabet
<-

```

## 1.64 ORGANIC BARK STONE

This uses the WRINKLE texture.

- Add default cylinder and CLOSE the TOP
- Select the top edges of the cylinder and MAKE SHARP
- Apply the WRINKLE texture and render.

This will look like bark around the cylinder....play with the noise functions to adjust the look of the bark.

Now make these changes to the Texture:

Column One	Two	
0.5	150	* This will look like the sides of a mountain
0.5	150	around the Cylinder. On the top of the
10.0	150	cylinder it will look like granite.
1.0	20	* When applied to organic objects the vertical
0.5	50	faces will have the rivulets, the horizontal
0.0	20	faces will be granite-like.
0.0	0	* Try changing the first three variables in
1.0	0	Column one to 10,10,1 respectively. The
		resulting look will make the cylinder look
		like a core sample around the cylinder, while
		the top of the cylinder will have a marble
		like quality.

----- END FAQ

```

->
Return to Alphabet
<-

```

## 1.65 FOG

```

* Subject: Imagine v3.0 bug
* Date: Tue, 26 Apr 94 23:01:59 [49]
* From: greg.tsadilas@hofbbs.com

```

They aren't really broke. You need to have a backdrop OTHER than the default world background. A fog object in 3.0 only appears when it's in front of something, or consumes something. If you want to see the fog shape itself, it must be rendered or ray-traced in front of some other object in the background. This may or may not be a bug...depending on the reasons for the change.

->  
Return to Alphabet  
<-

## 1.66 LIGHTS TEXTURES GLOBAL EFFECTS

\* Subject: Imagine v3.0 bug  
\* Date: Tue, 26 Apr 94 23:01:59 [49]  
\* From: greg.tsadilas@hofbbs.com

> There are several new "LITES" textures, but they are not documented  
> in the

Apply the texture to a light object. The resulting shadows will be the type of the texture you select.

> The EFFECTS.TXT file is missing completely from the IMAGINE PC  
> disks! There are a couple new effects and I also don't know how to use  
> these!

Ok....lensflare Global Effect. Create a Light and select it's Lensflare Check box. Apply the Global effect to the GLOBALS timeline. Voila...lenseflare when rendered. And it DOES animate very well.

HAZE global effects. HAZE affects only BRIGHT objects. Create a sphere, make it bright. Apply the HAZE effect to the GLOBALS timeline. Render...get a HAZE.

->  
Return to Alphabet  
<-

## 1.67 ANTIALIASING

\* Subject: Imagine v3.0 bug  
\* Date: Tue, 26 Apr 94 23:01:59 [49]  
\* From: greg.tsadilas@hofbbs.com

Yep...it will only look better in RAY-TRACE mode. Yes, it is slow. Change the number of rays that are cast from the Pref editor. The default is 255 rays per pixel. Lower that untill you get a comfortable speed to quality ratio.

->  
Return to Alphabet  
<-

## 1.68 INVERSE KINEMATICS BONES

---



\* Subject: Imagine v3.0 bug  
 \* Date: Tue, 26 Apr 94 23:01:59 [49]  
 \* From: greg.tsadilas@hofbbs.com

The Menu options are in the states Menu. They are FREEZE, RELEASE, RELEASE ALL, and CONSTRAIN. Create three spheres as such:

```

                O           O           O
Group them like this:  O           O-----O
then:                 O-----O-----O
                    Base       Joint       Tip

```

Be in object mode. Select the BASE and FREEZE it. Play with that New Gadget Box...pretty straight forward. Do the same for the other two objects in order to set their constraints. RELEASE the Joint & Tip. Select CONSTRAIN.

Select the TIP while in object mode, move it, the Joint should act accordingly. I think the above steps are correct. I have only played with it so far. Impulse has mentioned that they will be providing a supplemental text.

->  
 Return to Alphabet  
 <-

## 1.69 TEXTURES LIGHTS EFFECTS

\* Subject: RE:Imagine 3.0 Bug List  
 \* Date: Wed, 27 Apr 94 05:12:00 UTC [49]  
 \* From: d.kamalsky@genie.geis.com

Fakely - simulate that cool effect you see with Oakly sunglasses!  
 Terra - simulates basic landforms!  
 BmpBrnch - soft-edged and bumbed vein like patterns or branches  
 Hardwood - much more complex wood texture  
 BeamMeUp - animated texture!! you guessed it!  
 DancSpark - animated texture! Dancing plasma spark

Here is a list of the "Lites" textures..

Caustics  
 Frnchwin  
 Purphaze  
 Softedge  
 Strobe  
 Venlite

The new EFFECTS..

Sway  
 Spike  
 Baloon  
 Global effects: Haze, and Lensflar

->  
 Return to Alphabet

<-

## 1.70 SMOKE

\* Subject: Nebular Texture  
\* Date: Sat, 30 Apr 1994 16:42:54 -0400 (EDT) [49]  
\* From: Andrew McDonald <kingb@echonyc.com>

I've just been playing with the Nebular texture to create a little animated smoke. Works great, and I just thought some of you with 3.0 might make some use of this info.

Remember to render fog objects in front of a background object, and that this texture will apply to the area bounded by the texture axis, not the entire object. Scale the texture axis to affect the shape of the fog.

General Notes:

Noise 1 seems to affect the quality of the swirls. Higher numbers adjust the thickness and reduce the transparency. Noise 2 affects color transitions, color intensity of nebular color as set in texture requester, and color mixture, or grain. Grain appears as a very pointillated surface, as if there are thousands of dots of color rather than a smooth gradation or defined boundaries between object and nebula colors. Higher numbers of Noise 2 intensify the nebular color and increase grain.

Fog length and the 'T' value work together to determine amount and density of the fog appearing on the object. For stills I would set the 'T' value between .6 and .8, object fog length at .1, and adjust the 'Fog Length at T' to get the right density of fog. I would use the 'T' value combined with some of the noise values to create a fluctuating fog, or even to morph from a dense fog to one very nearly dissipated.

A nice, swirly smoke might use the following attributes in the nebular texture requester. I used these on a sphere primitive with diameter of 300, so use that number as a reference to fog length.

Object color:  
R:150  
G:150  
B:175

Object Fog length:  
.1

Nebular attributes:  
Fog Length at T:500  
T:.8  
Noise 1 Magnitude:5.0  
Noise 1 Velocity:1.0  
Noise 2 Magnitude:.2  
Noise 2 Velocity:10.0  
R:150

G:100  
B:225

The texture axis forms a square completely inside the sphere object, whose corners touch the inside surface of the sphere.

->  
Return to Alphabet  
<-

## 1.71 STATES ROBOT BONES IK

\* Subject: FREEZE, RELEASE, CONSTRAIN  
\* Date: Tue, 3 May 94 17:49:24 -0700 [50]  
\* From: etotman@gort.ucsd.edu (Ed Totman)

As GreG already posted, these options in the states menu work fine for creating linked, jointed object movement such as a robot arm. You don't need faces or points to try it out. Do this:

Detail editor - front view

1. create an axis
2. copy and move +Z <up the screen)
3. do 2. again so that you have 3 axes in a line
4. select the bottom two axes, group them
5. select the top two axes, group them
6. states menu, select CONSTRAIN
7. mode menu, select PICK OBJECTS
8. pick the top axis, press m for move
  
9. HAVE FUN! try out the different freeze options, play with it

If you grouped the axes as I listed, then the top axis is the parent and nothing will happen if you try to move it. So move the middle or bottom axis instead.

->  
Return to Alphabet  
<-

## 1.72 SOLAR CORONA

\* Subject: RE: Solar corona and anti-aliasing  
\* Date: Fri, 6 May 1994 16:30:07 -0500 (CDT) [50]  
\* From: kirvan@SSESCO.com

The discussion about how to do a solar corona got me curious so I quickly threw this together. This is a pretty good example of Imagine 3.0's (cool) new fog textures. Move the texture axes and rotate the outer object to get them to animate.

---

Red Giant with Corona (from the kitchen of Scott Kirvan)

=====

Primitive Sphere: Size: (50, 50, 50)

Attributes: Bright

Texture: Fireball

Size: (86, 86, 86)

Parameters: 0.0 0.0

255.0 0.0

255.0 0.0

100.0 0.0

200.0 0.0

30.0 0.0

0.0 0.0

0.4 0.0

Primitive Sphere: Size: (75, 75, 75)

Attributes: Color: (255, 85, 0)

Fog Length = 0.01

Texture: Nebula (Fog Texture)

Size: (4.5, 4.5, 4.5)

Parameters: 325.0 0.0

1.0 0.0

0.0 0.0

5.0 0.0

0.2 0.0

1.0 255.0

1.0 255.0

0.0 100.0

Texture: Ghost (Fog Texture)

Parameters: 1200.0 0.0

1.0 0.0

0.0 0.0

0.0 0.0

0.0 0.0

0.0 0.0

0.0 0.0

0.0 0.0

->

Return to Alphabet

<-

## 1.73 BONES

\* Subject: My bones trouble

\* Date: Fri, 13 May 1994 16:19:34 -0700 [50]

\* From: Lesk@cc.snow.edu (Lesk)

ok I am going to be as consistant as I can and for menu items I will put it in the form of menu->selection->selection1 and for requesters that ask for input I will just say what needs to go in.

Detail editor:

```

add->primitive->tube
    Radius = 30
    Height = 300
    circ sec = 12
    vitr sec = 3
close both bottom and top.

```

I like to work in the front view of the four.

```

.....
|||||| top section           note that when I refer to a
.....                       section that means the points
|||||| mid section          above and below are selected
.....
|||||| base section
.....

```

for example the top section is

```

.....
||||||
..... <- these points used
        twice once for top
        and once for mid

```

```

f1 select tube
mode->pickfaces
mode->method->drag box
shift select top section (points above and below)
    function->make->makesubgroup
    enter topl
    deselect faces
shift select mid section (all points above and below mid faces)
    function->make->makesubgroup
    enter midl
    deselect faces
shift select base section
    function->make->makesubgroup
    enter basel
    deselect faces
shift select top and mid section
    function->make->makesubgroup
    enter midall
    deslect faces
shift select top, mid, and base
    function->make->makesubgroup
    enter baseall
    deselect faces

```

If you think about this for a minute it will all make sense especially concerning how this thing is going to bend.

OK next phase.

```

mode->pick groups
      (and go back to pick method points)
object->add->axis
      select tha axis
      select move
      move axis to center of tipl (top section)
      deslect axis
object->add->axis
      select axis
      select move
      move axis to center of midl (mid section)
      deselect axis
object->add->axis
      select axis
      select move
      move axis to center of basel (mid section)
      deselect axis

```

Now comes the tricky part the order here is very important and you may have to try this a few times until it works just right.

use the find requester and choose the axis in the base section. doing it this way should make make the order correct.

```

mode->pickobjects

select axis in tipl
      shift select axis in midl
      states->group
      deselect
select axis in midl
      shift select axis in basel
      states->group
      deselect
select axis in basel
      shift select object axis
      states->group
      deselect

```

go back to group mode and check this out, and make very certain that the order is right. click on the tip axis and it should be the only one blue. deslect it and click on the axis in the mid section BOTH it and tip axis should be highlighted. deslect them and click on the axis in basel and all three axis should turn blue. now the hard part! go back to pick object mode and then click on the object axis. it should be blue with a yellow line connecting it to the basel axis.

If none of the above is correct all progress is at a halt! go back remove all the groups and try it again this order is IMPORTANT!

now having that done correctly we can move on make sure nothing is selected and go back to pick group mode.

```

select axis in tipl
      States->bones->subgroups
      bigsub: browse->tipl

```

```

                smallsub: browse->tip1
            OK
select axis in mid1
    States->bones->subgroups
        bigsub: browse->midall
        smallsub: browse->mid1
    OK
select axis in base1
    States->bones->subgroups
        bigsub: browse->baseall
        smallsub: browse->base1
    OK

```

SAVE THAT SUCKER NOW!

If you think about this it really makes sense what has happened at this point.

```

States->states
    create
    default
    select buttons shape and grouping, the book says
    this will be the only place you need to have this.
    OK
States->states
    create
    start
    OK
deselect all
select axis tip1 and rotate in the x 30 degrees.
space bar
select entire object
states->bones->update
states->states
    create
    bendtip1
    OK
select axis in tip1 and rotate another 30 degrees in x.
deslect all
select axis in mid1 and rotate it in x 30 degrees.
select entire object
states->bones->update
states->states->create
    midbend
    OK
deslect all
select axis in tip and rotate 30 degrees in x.
select axis in mid and rotate 30 degrees in x.
select axis in base and rotate 30 degrees in x.
select entire object
states->bones->update
states->states->create
    basebend
    OK

```

SAVE THIS AGAIN! to much work to loose....

```

States->stateanim->make
OK
start
15
bendtip
15
midbend
15
basebend
15
start
0
full objects
states->stateanim->play

```

```

* Subject: Re: Lesk's Bones example
* Date: Sun, 15 May 1994 11:40:22 -0700 [50]
* From: Lesk@cc.snow.edu (Lesk)

```

The object at this point is to set the proper order

```

mode->pickobjects

select axis in tipl
  shift select axis in midl
  states->group
  deselect
select axis in midl
  shift select axis in basel
  states->group
  deselect
select axis in basel
  shift select object axis
  states->group
  deselect

```

However, you got it backwards ;^) When you're grouping axes, you state that you have to select tipl + midl, midl+basel... It's the other way around. You need to group the object to Basel, then basel to midl, then midl to tipl. Only then do you get the proper heirarchy.

Paul

```

->
Return to Alphabet
<-

```

## 1.74 DEPTH-OF-FIELD DOF

```

* Subject: Depth of Field is cool
* Date: Thu, 19 May 1994 08:09:14 -0700 (PDT) [50]
* From: Ed Totman <etotman@gort.ucsd.edu>

```

Try DOF. Neat effect even though the text file on it is somewhat complex.

---



Add an actor bar to the camera in the action editor. Use these settings:

```
Y size is DOF
Aperture size (DOF): set to 2 or 3 (larger numbers = longer render times)
Ap size is actual size
Eye separation is screen width multiplier (may be used only for stereo)
```

I like to have the camera close to the ground with an object nearby, with lots of background objects.

```
->
Return to Alphabet
<-
```

## 1.75 PISTON CYLINDER IK STATES

```
* Subject: Pfffffft...
* Date: Fri, 27 May 1994 18:02:37 -0500 (CDT) [50]
* From: kirvan@SSESCO.com
```

Add an axis and move it to the edge of your work area - this will be a parent axis for the group you are about to make. Add a primitive disk. Add another axis and put it on the periphery of the disk (this will be the pivot point for the cylinder). Add a tube (piston), scale it down, and move and rotate it to the right (positive X) side of the disk you already added.

Now group these all together - parent axis to disk, disk to pivot axis, pivot axis to piston.

Now you have to set up the constraints by freezing parts of this group. Freeze the parent axis in X,Y, and Z world position and rotation. Freeze the disk in X and Z world rotation (you can still rotate it around Y). Freeze the piston in X,Y and Z world rotation and in Y and Z world position (the piston can still move in X).

Now, turn on constraints. Switch to object mode, and rotate the disk around Y - voila - you should get the piston moving properly. Now use states to come up with tween positions (the transformation requester can be used to get the rotation angle precise).

The group needs the parent axis because the parent object is automatically frozen, and I don't think you can rotate it. Also, you will have to create a lot of tweens, because the constraint info isn't used in animation, and the piston will take short cuts between key frames.

```
->
Return to Alphabet
<-
```

## 1.76 PARTICLES PINNATE

---

\* Subject: Re: Particles Question / Help  
 \* Date: Sat, 28 May 1994 12:36:01 -0700 (PDT) [50]  
 \* From: "Randy R. Wall" <rrw@ecst.csuchico.edu>

The actual particle effect worked great though! all the shperes fell off the logo making the logo fall apart and then they hit the ground and bounce...I set the Elasticity to 50 which caused them to bounce when they hit the ground which was set at 0...you also should remember to set the "time to terminal Z and H velocity to the amount of frames you wish for the effect to take place..these control the amount of frames it takes for the effect to take its full effect..at least as far as your particle distribution is concerned. I used Delayed/bounce and set the travel distance to 500 as my logo was that high above the ground..you would want 100 for what you are talking about.. hope this helps you out a bit..all of the other settings are at your discretion...

->  
 Return to Alphabet  
 <-

## 1.77 SHELLS SNAIL

\* Subject: Re: 3d sea-shell  
 \* Date: Mon, 30 May 1994 16:01:46 -0700 (PDT) [50]  
 \* From: Jeremy White <jwhite@efn.org>

This is how I made a 3-d snail shell.

- 1.) Create a spiral path
  - a.) Add an axis with a point in the x direction.
 

```

z
|
y---x          . <-point
          
```
  - b.) Extrude to a VERY small distance along the y axis, while scaling up and rotating several multiples of 360 degrees.

This should give you a spiral path, try playing around with how much you scale and rotate the extrusion.

- 3.) Create an extude template
  - a.) Create a disk primitive
  - b.) Delete the center point.

(I also made an edge flat, so that I could overlap the shell rings better.)

- c.) Make sure that the y-axis is pointing up through the disk (x and z to the sides of the disk)
- 4.) Extrude the disk along the path (1) (Scale it bigger through the extrusion if you desire this effect.)

\* Subject: Re: 3d sea-shell  
 \* Date: Wed, 1 Jun 1994 00:40:11 +1000 (EST) [50]

\* From: Nikola Vukovljak <nvukovlj@extro.ucc.su.OZ.AU>

Add a primitive tube. Accept the defaults. Go into pick points mode and delete the top row of points.

Then, move the axis(only) by 50 units in X direction only. Then scale the object in x by 1.5x.

Extrude the object as following. To length 1-10 (or more, it is up to you). No. of sections - 36. Y-rotation 720 (or more), X scaling - .1.

This should give you the right shape. To make it 'bent' use Conform to Sphere option.

->  
Return to Alphabet  
<-

## 1.78 CLOUDS VISTA

\* Subject: Re: Simulating clouds  
\* Date: Tue, 31 May 94 21:16:40 GMT [50]  
\* From: Andrew Nunn <apn@moby.demon.co.uk>

I tried this recently: Generate some fractal clouds in Vista. With the landscape flat, position the camera at the very centre. Render four pictures with the camera positioned in the four corners ensuring that the pitch is set the same in each. Then use ADPro (or whatever) to composite the pictures together side by side in the same rotational order as they were rendered. The joins do show (just) but could be ironed out with a suitable Superbitmap capable paint program.

Back in Imagine, create a hemisphere by adding a Primitive sphere and deleting half the points ( $z < 0$ ). Apply the large brush as a cylinder wrap (wrap Z) and set the Bright attribute. Position all your other objects, lights etc inside the dome. The effect is especially good if the camera moves because the the clouds also move around. The Bright setting ensures that no shadows get cast on the sky!

->  
Return to Alphabet  
<-

## 1.79 SOFT SHADOWS LIGHTS

\* Subject: Soft Shadows RE: Is it Possible?  
\* Date: Wed, 1 Jun 94 13:52:25 EDT [51]  
\* From: jgoldman@acs.bu.edu (Jeffrey Goldman)

1. Figure out how many lightsources you will have in the final packed bundle. In this case it will be 21 (not exactly arbitrary and you'll see why).

---

2. Figure out the final intensity of the packed bundle. In this case it will be 255, 255, 255 (the default value for an Imagine lightsource). The packed bundle (with all its lightsources) must emit as much light as a similar single lightsource otherwise you get too hot a lightsource.
  3. Divide the final intensity by the number of lightsources (step #2 divided by step #1). This gives the individual intensity for any lightsource that makes up the packed bundle. In this case  $255/21 \approx 12.1$ .
  4. Add a primitive disk with radius of 100 and 10 sections.
  5. Add an axis and place it at the center of disk. If you're using defaults the axis will automatically appear at the center of the disk (world center of 0,0,0)
  6. Select the axis you just added and enter the Attributes requester.
  7. Make the axis a Lightsource with Light Intensity settings of the number you got in step #3. In this case it's 12.1, 12.1, 12.1. Have the axis Cast Shadows. If you're using 3.0 and like Lens Flare disable the feature for now.
  8. This bundled source will act the same as point source. With that in mind determine whether the light should fall off. For these purposes have no light fall-off. Exit the Attributes requester.
  9. Copy the axis (R-Amiga C), paste it (R-Amiga P), and move it (M) to the top of the disk where the the edge of the disk and the section parts meet.
  10. Copy and paste the axis at every section around the outer rim of the disk. This will result in 10 axes at every section and one axis in the center. Delete the disk to get it out of your way.
  11. Group the outer axes to the center axis by selecting first the center axis then every outer axis (using shift), and finally grouping the with (R-Amiga G).
  12. Copy this entire array of 11 lightsources and paste it.
  13. Select one array and scale it by .5. This should bring the outer axes closer to the center.
  14. Rotate the same array by 18 degrees. This causes a stagger of the inner array as compared to the outer array.
  15. Enter Pick Objects Mode and delete the center axis out of one of the arrays (you only want one center axis). Group the non-grouped axes to the center so that every axis is grouped to the center axis.
  16. Enter Pick Groups Mode and save the entire bundle.
-

A word for Imagine3.0 users. If you want Lens Flare to operate for this bundle select the center axis and enable the flare. Having all 21 axes Flare would be tediously slow, and it wouldn't look good.

=== Using the Bundle in the Stage Editor ===

A warning. This bundle object is made of 21 lightsources. Rendering times will decrease with its use for obvious reasons.

The bundle only works in Trace Mode (obviously) because it needs to cast shadows.

The current bundle only works in "Studio Situations" or situations where the bundle only has to work in a near perpendicular fashion. I.E. The pyramid of spheres on a flat plane would be a studio situation. You can aim a lightsource as if you were in a studio or soundstage.

The bundle must always be perpendicular or near perpendicular to the subject. You can track the Y-Axis to the subject to achieve this.

Each of the axes on the bundle emmits a bit of light. It's the multiple shadows cast by each of these lights that creates the soft shadow. You must be prepared to experiment with the scale of the bundle. Scales should always be done (L)ocally. It's pretty easy to figure out how large the bundle should be if you understand how the bundle works. This I leave up to you as it is next to impossible to explain the 'right' scale setting...

Always remember that the more lightsources you use in your bundle the better the results, and sadly the longer the rendering times. You have to make a trade off between how large your soft-shadow fall-off will be compared to how many lightsources you have in your bundle. If your soft-shadow area is too large, and you don't have enough lightsources, you'll see many clearly defined sharp shadows.

This the only way to created a soft-shadow lightsource in Imagine, I believe. It may be a pain in a\$\$ but it works. It should only be used for stills for obvious reasons. Only use the bundle where necessary. For instance, in a conventional three point lighting setup you only really need the bundle for the Key and Back lights. The Fill doesn't cast too noticable shadows and can therefore be a point source.

Oh, one other thing. Specular hits look way cool with light bundles. I mean much more realistic...

->  
Return to Alphabet  
<-

## 1.80 SEASHELLS

---

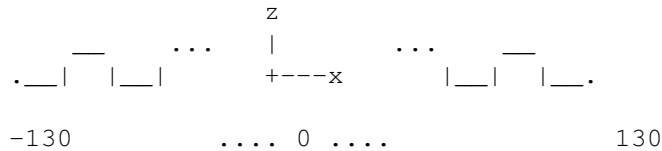
```

* Subject:      3d sea-shell: scallop
* Date:        Thu, 2 Jun 1994 08:28:27 GMT+1 [51]
* From: "Wizard" <TESI2@novell.dima.unige.it>

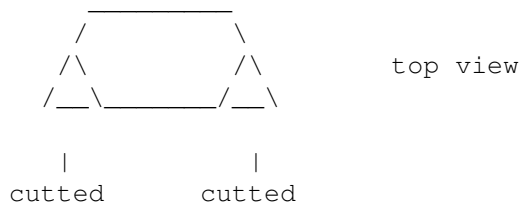
```

The following 10 steps show how obtain a scallop sea-shell (or something similar to it!), perhaps I've a problem (credit for thi little tutorial goes to Wizard):

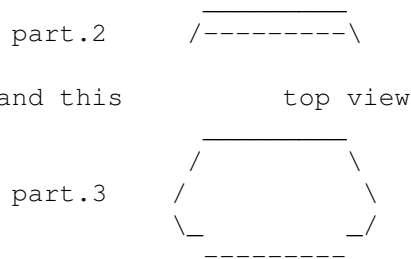
1. add axis
2. add lines (use front view) like this:



3. invoke the extrude req:
  - to length 200
  - scale x 0.5
  - sections 10
4. add a primitive tube: radius 120
5. scale down the tube: 70% only y (shift-y)
6. adjust the tube position to cut the extruded shape like this:



7. select extruded shape then tube and slice them
8. delete resulting objs except the 2 'planes' ('planes' should be part.2 and part.3):



9. select first part.2 and then part.3, join them
10. invoke mold req and conform to sphere:
  - sphere radius 100
  - object radius 320

After all these 10 steps, the resulting shape should be similar to a scallop sea-shell except for its too planar look: anyone has found the proper 'conform to sphere' (or what?) to show it much realistic?

->  
Return to Alphabet

<-

## 1.81 SPOTLIGHTS BEAMS

\* Subject: SPOTLIGHT BEAM  
\* Date: Thu, 2 Jun 1994 02:09:10 -0700 (PDT) [51]  
\* From: "Randy R. Wall" <rrw@ecst.csuchico.edu>

-Persice 2.9/3.0 version

Heres ONE way to do it, make a cone with an open bottom and size, and shape it to how you would like your spotlight to appear in the scene, then move the axis of the cone to the very top point of the cone making sure that the axis center matches up exactly with the top point of the cone. Use shift M and shift Z and move the mouse to do this.

Then make the cone the color of the light you are planning to use and then make it BRIGHT, now go and set the Filters to 180,180,180 or 240,240,240 depending on how translucent you want the beam. This will make it so that when you render it you can see threw it. Now select the object if its not already and use the Transformation requester to move it to Position Z 100 and leave the rest of the positions at 0. Now we can save this object.

Now you need to make a test project to set the light up in so we can get the proper setting for our light. Once you have done this load the cone into the STAGE, now add a light and use the Transformation requester to move the light to position Z 100 and leave the other positions at 0 as we did with the cone in the Detail Editor. Save this and goto the Action Editor, find the light and set it to Conical, Cast Shadows (2.9) or Point Source, Round Shape, Cast Shadows (3.0) and set the color to whatever you set the cone to. Save this and go back to the Stage Editor.

Once your back in the Stage Editor Go up to the Display Menu and select Light Lines then use FIND to select the light.

Now use the Transformation Requester and Align X to -90, Y to 0, and Z to 0. Now the light should be lined up with the cone pointing down. So hit the S key to size it, and size it till the center light line in the Right View reaches the bottom of the cone. While still in size mode go to the Front View and Zoom in on the bottom of the cone as much as you can while still being able to see the outer edges of the cone. Now hit Shift X and then just the L key. This will put you in local size mode of X, now size the light lines till they match up perfectly with the outer edges of the cone. Now do the same thing with the Z size using the Right View and Shift Z then L keys. You need to do them seperately as they will not match up otherwise. Whew! almost done, This may sound hard but its really quite easy. You could actually use this as is in the stage, but just make sure that if you move or rotate either of them you select them both together. Sence it is only a simple matter to make them into a group I will continue.....

OK, I hope someone gets some use out of this? if so let me know...

Now that we have this all set up go to the Transformation Requester and

select size, write down the sizes of X, Y, and Z exactly as they are and hit OK and after all this work why not save it..

Now go to the detail editor and load in the cone object. Now add an axis and select it, use the Transformation requester and select Alignment and set X to -90, Y to 0, Z to 0, then select Size and type in the numbers you wrote down, and then select Position and type in X 0, Y 0, Z 100. and select OK. Now set the Attributes of the axis to a Light and set the light to Conical, Cast Shadows (2.9) or Point Source, Round Shape, Cast Shadows (3.0) and set the color to whatever you set the cone to . Now group the axis and cone together and save it. You can now move this object freely around in the Stage and Action Editors as one object.

If you want the light to have transparency of the cone linearly over it's length ( basically Fade Out at the end ) you will need to size the cone maybe twice as large while leaving the Axis Light the same size and then use the Linear Texture on the cone and rotate the Textures Z axis so that it is pointing down and drag the Texture axis down to slightly above the Axis Lights Y axis line. If you made the cone twice the size this would be halfway down the cones length. Then set the color of the texture to that of the light and the Transition Z Width to whatever looks good for your particular light, I like 100 or 150, for a 500 unit tall cone, then set the Filters for the Texture to 255, 255, 255. You would also have to set your Axis Light's Attribute to Diminish Intensity 2.9 or Controled Falloff for 3.0 to pull off the full effect. You may need to play with this to get it just right though.

-Fairley Persice 2.0 and 2.9/3.0 version.

Make a cone with an open bottom and size, and shape it to how you would like your spotlight to appear in the scene, then move the axis of the cone to the very top point of the cone making sure that the axis center matches up axactly with the top point of the cone. Then make the cone the color of the light you are planning to use and then make it BRIGHT, now go and set the Filters to 210,210,210 so that when you render it we can see threw it. Now COPY the cone and align the X axis to -90 locally in the Transformation requester by using Tranform Axis Only and Alignment. Now resize the Y axis locally till the axis line not letter reaches the bottom of the cones Bounding Box, then resize X axis locally till the axis line reaches the very end of the Bounding Box, and then do the same with the Z axis. Now change the Attributes, turn off Bright, set Filters back to 0,0,0 and set the object to a light and set it to Conical, Cast Shadows (2.9) or Point Source, Round Shape, Cast Shadows (3.0) and set the color to whatever you set the cone to. Now go into Edit Points mode and delete all the points in this object. You can now PASTE the old copy and group the two objects and save them out as a Spotlight This method is easier than the other one and produces good results as well, I just feel the other method is more presice if you plan to zoom up on something like a logo and have the spotlight moving acrossed it.

If you want the light to have transparency of the cone linearly over it's length ( basically Fade Out at the bottom ) you can use the same method as I mentioned above with the Persice Spotlight.

Whew! Now theres a SpotLight!



While even this is not a perfect SpotLight it is a very good one, the only problem with it is that if you shine it threw something the Bright Cone object will still show through the other side, you maybe able to limit this by making the cone more transparant with the Filters, but I think 220's or 240's work pretty good..Or buy making it a fading SpotLight. It also doesn't have edge transparency but I haven't tried to figure out how to do that yet. I imagine you could use multiple cones at different Filter rates and sizes to get something close to it, in 2.0/2.9 or use the global HAZE effect and the SOFTEDGE texture in 3.0.

Once you set up the basic object in Imagine you could just use it and make changes to it as needed.

I do think if you try this SpotLight you will like it as it works great for RayTracing when you want an object in the middle of the SpotLight and yet have other lights coming from other directions, the Spotlight will still light up the object and leave its beam and shadow and works fine in Global Fog unlike a Cone set to FOG as I have seen others suggest.

->  
Return to Alphabet  
<-

## 1.82 STARFIELD STARS

\* Subject: STARS  
\* Date: Fri, 03 Jun 94 05:47:33 -0300 [51]  
\* From: greg.tsadilas@hofbbs.com

Take the CSG sphere. Color it BLACK. Make it BRIGHT. Add the CONFETTI texture (Im3.0), set the V1 and V2 numbers to .54 and .55 so as not to have a ton of stars. Set the two colors to 200,200,200 and 240,240,240 (or whatever turns you on. Scale the Im3.0 CONFETTI texture to get the "stars" the size you want them, render to see how they look and adjust if need be. Place scene INSIDE the sphere. Voila....instant gorgeous stars. You can even add the NEBULA to a sphere fog object in the distance somewhere. :)

->  
Return to Alphabet  
<-

## 1.83 MOEBIUS STRIP

\* Subject: Re: .fli ftp site?  
\* Date: Mon, 6 Jun 1994 18:38:39 -0400 [51]  
\* From: Jason B Koszarsky <kozarsky@cse.psu.edu>

So, in Imagine, I'd start with a simple two point open path. Bend the path so that the endpoint meet each other & the shape of the path is a loop. Do the bending about the x-axis. Place the endpoints exactly on top of one another. Use the transformation requester to

get/set exact location coordinates. Then take one point and rotate it 180 degrees on the local y-axis.

With the path created, you are almost done. Now just make a single line consisting of 2 pointer & one edge connecting the points. Make sure that the axis is placed on the center of the line & that the y-axis is perpendicular to the line itself.

You could add a primitive plane, delete 2 points, move & rotate the axis, it may be quicker this way. If you start with this plane, only use 1 vertical & 1 horizontal section. Hmm. I wonder what imagine would say if I were to try 0 vertical sections?

Now extrude your line object along the moebius path. Use enough sections to get it as smooth as you desire. Also, set it so that the y is aligned to the path. Otherwise, it won't twist.

What has been created is a flat moebius strip. If you want to have some thickness, you could extrude a 4point plane along the path(the y-axis for the plane should be perpendicular to the plane's surface).

You may also want to add a 3rd point to the path by fracturing or splitting it. This will give you more control over the shape. If you add the 3rd point after doing the initial steps above, then you won't have to worry about rotating it on its local yaxis.

```
* Subject: Easy Moebius Strip
* Date: Tue, 7 Jun 1994 13:57:42 GMT +1200 [51]
* From: "Paul Batten" <BATTENP@scicol.chchp.ac.nz>
```

In the detail editor:

1. Add a closed path
2. Add a primitive plane, say 40x20 1 section
3. select the plane, choose Extrude: Along Path (the closed path in 1.), Align Y to Path, Sections = 100, Y Rotation = 180 ( to give the Moebius loop). Perform extrude.
4. You may need to edit the 8 faces where the 1st and last planes join, the seem to get twisted.

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->
Return to Alphabet
<-
```

## 1.84 EYES FOLLOWING

```
* Subject: EYES THAT FOLLOW
* Date: Sun, 05 Jun 94 01:11:31 -0300 [51]
* From: greg.tsadilas@hofbbs.com
```

Apply the FAKELY texture to the eye, have it affect COLOR only. Set transition T to .8, set the back color to -1,, (objects color), set the front color to

---

0,0,255 (The Iris color).

Apply the FAKELY texture to the eye again, have it affect COLOR only. Set the transition T to .95, set the back color to -1,, (objects color), set the front color to 0,0,0 (The pupil color).

Voila! Instant eye that will follow and point to the camera without the need to manually reposition the eye. Try this on a default sphere. Render it from different angles....the eye follows...OOOooooohh! Scary, eh keedz?

->  
Return to Alphabet  
<-

## 1.85 PARTICLES

\* Subject: more < Pfffft.....  
\* Date: Thu, 9 Jun 1994 18:00:10 -0500 (CDT) [51]  
\* From: kirvan@SSESCO.com

"Speed" is used to control how fast an object comes apart when using a "delayed" particle explode. This is the speed the object comes apart, not how fast the particles move.

The "Terminal H and Z" are a bit tougher. The particles, sort of, accelerate away from the exploding object. These params control how many frames the particles will be accelerating through.

Again, I suggest cranking up the gravity. This way the particles will fall faster and stick to the ground sooner.

->  
Return to Alphabet  
<-

## 1.86 FLAG WAVING

\* Subject: Re: Stage Paths  
\* Date: Fri, 10 Jun 1994 00:18:24 -0700 (PDT) [51]  
\* From: "Randy R. Wall" <rrw@ecst.csuchico.edu>

Make a default plane and Align the X axis to 90 in the Transformation Requester, make sure you have Axis Only set when you do this , then make a path, say with 10 axis points, move every other points Z axis up to make some smooth curves, then save these objects seperatley, make a test project and go to the Action Editor and set it to 25 frames load in the objects... set the plane to follow the path. Save this and go to the Stage, now set your camera view on and position it so you can see the plane object, Now heres one of the important parts hit RghtAmiga-P to see what your paths length is, write it down and go to frame 25 of the animation RghtAmiga-C. Now select the path and use RghtAmiga-T to get to the Tranformation Requester, click position and set Y to - (minus) whatever

the number you wrote down is, hit return then OK. Now hit RghtAmiga-7 to save the position as with Position Bar. OK we're almost done, Save this and go back to the Action Editor and select the paths NEW Position timeline bar and set it to Discontinuous Knots, click OK, now select the plane and set its Alignment to Conform Object to Path, click OK. If this were a grouped object you would use Conform Group to Path...Now save this and go to the Stage and Use Make in the Animate Menu to make a preview animation...Wala! a Flag Waving!

->  
Return to Alphabet  
<-

## 1.87 GLASS HOLLOW

\* Subject: Re: Hollow or Solid?  
\* Date: Wed, 15 Jun 1994 13:46:31 -0600 (MDT) [51]  
\* From: Roger Straub <straub@csn.org>

Recipe for a hollow glass sphere is as follows:

Create a primitive sphere. Copy, paste, and scale it down so that there is a little space between them. Give the larger sphere the attributes of glass, and make the smaller one transparent. Group, render and serve with drinks(Preferably tequila, but marguiritas will do.).

->  
Return to Alphabet  
<-

## 1.88 LENSES

\* Subject: Lense tutorial  
\* Date: Mon, 20 Jun 1994 08:37:33 GMT+1 [51]  
\* From: "Wizard" <TESI2@novell.dima.unige.it>

this is just an extract from an italian computer magazine, Commodore Gazette, about doing lens with Imagine:

```
-enter the detail editor
-add primitive sphere (not add sphere, add primitives and then sphere):
  circle=48, vertical sections=24
-pick sphere, pick points, drag box pick method
-multiple select all points except for the first (top) 5 lines (sections)
-delete selected points (functions menu)
-pick object (pick method menu)
-move ONLY the axis (shift-m) to the bottom line of points/section
  (looked from front view): do this step more accurate, use zoom in
-copy selected obj and paste it
-invoke transformation req, scale it -1 to z axis
-select the two objs and merge them
-invoke atts req:
```

color and filter=255,255,255    harness=100 to 130    index=1.2 to 2.0

This method is much realistic one, positioning lense above a plane (e.g a brush mapped one) and moving lense far from it, Ya get also the typically effect of getting an upset image.

PLEASE NOTE: do not use spin or sweep function (drawing profile) coz so Ya cannot manually draw a perfect shape (as sphere primit.)& Ya get an increment of rendering time.

->  
Return to Alphabet  
<-

## 1.89 FIRE TORCH

\* Subject: Re: Fire Tutorial II  
\* Date: Tue, 12 Jul 94 13:33:19 CDT [52]  
\* From: setzer@comm.mot.com (Thomas Setzer)

\* Note: the following tip is from hermelin@math.tau.ac.il

Also, here is a small tip for making open fire, a torch for example:

1. Build an object to base the fire on - cone, cylinder, plane, whatever.
2. Color the object an orange-yellow hue. R221, G189, B000 worked for me. Phong should be enabled.
3. Add the linear texture. My object is 200 units tall, so the Transition Z Width is set to 150. Filter is 255 for R, G and B. Place the texture axes on the bottom of the object, with the Z axis pointing up.
4. From Essence I, add the misc/fractalfilter texture. The axes are oriented at its' default. Here are my parameters:

50.00000 Initial Scale	0.900000 Filter 1 End
5.000000 # of Scales	150.0000 Filter 1 Red
0.400000 Scale Ratio	150.0000 Filter 1 Green
0.400000 Amplitude Ratio	150.0000 Filter 1 Blue
0.400000 Time Ratio	255.0000 Filter 2 Red
0.000000 Time	255.0000 Filter 2 Green
0.100000 Base->1 Trans	255.0000 Filter 2 Blue
0.500000 1->2    Trans	0.000000 Fade 0..1

5. Save the object (Fire.1 could be a good name), and modify the following: In the fractalfilter texture, change the Time parameter to 1, and edit the axes so they are 10 times the length of the object higher. This setting is good for a 200 frame animation, so the fire goes one object height up every 20 frames. Save the object with a different name, maybe Fire.2.

6. In the Stage Editor, load the first fire and determine place, size and orientation. Go to the Action Editor and morph from Fire.1 to Fire.2 over the entire length of the animation.

7. Render, have 200 cups of coffee, and view. Enjoy.

->  
Return to Alphabet  
<-

## 1.90 GRASS LAWN SWAY EFFECT

\* Subject: sway  
\* Date: Thu, 28 Jul 94 09:27:00 -0100 [52]  
\* From: torgeir.holm@tbc.powertech.no (Torgeir Holm)

I made a one polygon object in the detail editor, stretched it so that it was shaped like a piece of grass, and made the Z axis come through paralell to the middle of the object. Picked the edges, and made them quick edges. Added grassy attributes, and turned Quick Edges on in the attributes requester. Quick edges because 3 edges is a lot quicker than 8 in a bounding box, when you get to stage.

I then made about four hundred copies of this object, spread out in a 20x20 grid. Use multi select to speed things up. Could really use Macros Soon, impulse. I then multi selected objects using the lasso tool randomly, and sized, rotated, and moved the objects slightly, just to get an irregular look. Repeated this several times.

When the objects looked like a messy patch of grass, or something like that, I added an axis, and picked it. Picked all the other objects with a drag box and grouped them to the axis. Saved object.

In the action editor, I added the object for 50 frames to do a test anim. In the FX bar I added the Sway.ifx for all 50 frames:

Start Frame 1      End Frame 50

All buttons off except X-axis

Minimum # of gyrations: 1

Maximum # of gyrations: 3

Minimum gyration angle: 10

Maximum gyration angle: 30

Random number seed:      whatever

When I render this I get a patch of grass, swaying back and forth. Some leaves of grass sway fast, and others slow, but they all have almost the same direction of sway. There are no abrupt changes from frame to frame.

->  
Return to Alphabet  
<-

## 1.91 LASER PHASER EFFECT

\* Subject: Laser effect  
\* Date: Fri, 29 Jul 94 10:20:38 EDT [52]  
\* From: sauvp@citi.doc.ca (Patrick Sauvageau [SIA])

For that, I have created a very thin cone object, about 400 units long and 10 wide at the base. The axis of the object is located at the base. The color of the object is blue-white and the object is bright. The next step is to add the "linear" texture in a way that will made the object transparent at the thin end. Finally, add an axis at the top of the cone. Make the Y axis pointing in the direction of the base and make this axis the parent of the cone.

To use thi "laser" in an animation, I used a "feature" of Imagine: In the stage editor, if you resize an object on only one axis, the textures are not resized.

So, in the firing frame, load the laser object, position it's parent axis in the laser "gun",and track it to it's target. Then, scale it down LOCALY ON IT'S Y AXIS until it become very short. Go to the frame where the laser hit it's target, select the laser and resize it locally on it's Y axis untills it touch the target (or get out of camera sight if it miss).

In that way, since all the scaling have been made locally, the lenght of the texture stay constant. In the last frame, even if it seem that the laser is continuous from the "gun" to the target, ONLY THE 400 UNITS AT THE FRONT ARE VISIBLE, since the rest is fully transparent.

\* Subject: Full power to foward phaser banks.  
\* Date: Fri, 29 Jul 1994 11:27:04 -0400 (EDT) [52]  
\* From: "T.W. Albee" <UC245\_444755@emuvax.emich.edu>

Start off with a tube or teardrom or whatever shape you want, save it as something1. Elongate it as you imagine a phaser blast to travel, save that as something2. Finaly, reshape it as you think a phaser blast would look after comming in contact with something; something3. You can even reduce it to a small, dying point if you wish; something4. Color them all how you wish and use the marble texture as a filter map. Morph between objects in the Action Editor to get the desired animation look, and Render HO! Add another shape around the beam if you wish, setting its filter high, and its fog length relative to its size, and you can have an ionization glow too. Play around with using brushmaps you create for different filter-mappings to get different effects. Try animating the filters for a really neat effect.

I forgot to mention that the phaser-beam shapes should be set to 'bright'

->  
Return to Alphabet  
<-

## 1.92 CLOUDS

\* Subject: Imagine vmem and 3.1  
\* Date: Mon, 8 Aug 94 18:05:36 CDT [53]  
\* From: wilks@lbn.com (Stephen Wilkinson)

The "crumpled" texture can make a pretty good "mackerel"-type cloud cover. Make the texture "bump" colors white and set the object to a nice blue (35,118,255 is ok) and scale the texture size up about 200x200x200 (or just bring the plane it is on nearer the camera). I've got a plane with this texture behind a "window" and it looks very nice since I don't have enough ram for a clouds backdrop image :( It looks a lot better if the plane is tilted away from you rather than fully perpendicular. You can flip the colors to make a water plane with "caustics" on the surface (bumps blue, object white)...

->  
Return to Alphabet  
<-

### 1.93 TEXT GROWING WALL TERMINATOR

\* Subject: Re: text extruding from a plane  
\* Date: Tue, 16 Aug 1994 22:27:30 -0600 (MDT) [53]  
\* From: Roger Straub <straub@csn.org>

\* Note: next paragraph written by Steve McLaughlin

- > What's a good way of having text grow out of a wall? Starting out with
- > a flat wall and having text slowly come out of it?
- > Having the same texture and color as the wall.
- > Sort of like a terminator effect.
- > Will a bump map give a good effect?

Well, I don't think a bump map will do the job. If you have 3.0, use the Applique function on a plane with a LOT of subdivisions. Set up the pic just as you would a bump map. Then pick the plane, choose Applique, find the pic, and say ok. Then just morph between the two objects (flat and Applique'd). Hope this helps...

->  
Return to Alphabet  
<-

### 1.94 INVERSE KINEMATICS

\* Subject: Re: Kinematics  
\* Date: Tue, 30 Aug 1994 23:10:48 -0700 (PDT) [53]  
\* From: "Randy R. Wall" <rrw@ecst.csuchico.edu>

Well, I am pretty new to the Kinematics in Imagine but I'll get you started, so that you can experiment. First make three axis, making one and then copy it and paste it down twice. Now press R/a\_F to Find Axis.1 and



select it and then use R/a\_T for the Transformation requester and set it's Z position to 50. Now Find Axis.2 and set it's Z position to 100 in the same manner you did with Axis.1. Now select the bottom Axis and the Axis.1 just above it by using the Shift Key as you select it. Group them together and then click anywhere on the screen to unselect these Axis. Now select the middle Axis.1 and the top axis.2 and group them together. Ok this is a basic bone structure or group, if you select the bottom axis while in Pick Groups mode all of the axis will be selected. So with this I can explain to you SOME simple kinematics...at least enough to get you started.

Ok now go into Pick Objects Mode ( Kinematics will only work in Pick Objects Mode ). Select the bottom axis and then select Freeze, in the Freeze menu set Rotation World X,Y and Z and OK. Now go and set Constrain and then select the top axis.2 of the group and press M. If you are in the quad view ( all four views showing ) you can go in the top view and rotate your pointer around the axis. You will see that all the axis follow the pointer as you move it, but the bottom one stays stationary and does not rotate with the others. If we unset the Rotation World X,Y, and Z it would follow along with the other axis. Now if we wanted to limit this group more we could do the following:

Set the ALL axis so Rotation World Y, and Z are set, Un-set the bottom axis's Rotations. Now go and select the top axis and try rotating the pointer around the axis in the top view, as you can see the axis now only move along the Y axis or should I say will only rotate on the X axis. As we have limited its movement by only letting it rotate on X. Hit the Spacebar and then R/a\_U to undo this and select the Right View Bar.

Now we can make the axis move in a more controllable means. Select the top axis again if its not already, and press R and then X and move the pointer to the right slowly till the axis angle is at 45 degrees. Imagine will tell you this at the top right corner of the menu bar. The top axis will rotate on its X axis. Now press M and move the pointer to the left and slightly down. As you can see the top axis keeps its alignment of X and all the other bones or axis bend to make it look like a finger bending. This may cause a problem if you move to far, but you can either try moving it back and try again or hit the spacebar and then select the middle axis and press R then X and rotate the middle axis into the correct position.

If you wanted to stop the bottom axis from causing this problem you could Freeze its World Tranlations, and then move or rotate the top axis to the position or alignment you want, and Then Un-set the bottom Axis Tranlations and Rotate its Axis on X to rotate the whole group. Or to do a similar effect, yet keep your top axis free to move and rotate you could rotate the middle axis into the angle you want and then Lock it's X Joint and select the top axis and move or rotate it's X axis. By doing this the bottom and middle axis stay aligned to each, yet still follow the top axis, and leaves the top axis free to manipulate...

Oopps! typo on my part, it should read: Set ALL the axis so Rotation World Y, and Z are set,

->  
Return to Alphabet  
<-

## 1.95 NEBULA FOG

```
* Subject: Re: Nebula Texture.  
* Date: Fri, 2 Sep 1994 02:17:47 -0700 (PDT) [53]  
* From: "Randy R. Wall" <rrw@ecst.csuchico.edu>
```

First of load the Fog.attribute onto your extruded sides, then set the Fog to 200.00 and the color of the object to 197,197,222

Now Add the Nebula Texture and set it to:

```
Fog Lenth 500.00  
T 1.00  
Noise1 Mag 5.00  
Noise1 Vel 0.5  
Noise2 Mag and Vel 1.0  
Central Color 220,220,250
```

Now move the texture axis to the middle of the sides from the right view.

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->  
Return to Alphabet  
<-
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## 1.96 ANTENNA SATELLITE DISHES

```
* Subject: Re: Antenna dishes  
* Date: Mon, 05 Sep 94 15:55:35 CET [53]  
* From: cjo <cjo@smtpgw.esrange.ssc.se>
```

I've made a couple of satellite-dishes myself. But i did it a little bit differently.

1. Create a cone (ADD PRIMITIVE CONE) with (say) 12 vertical sections.
2. Make it flat by setting the y-size =0 (you now have a circle).
3. Conform the circle to a sphere (you'll have to experiment a little with the two parameters to get it right).
4. Size the dish to your own preferences. Perhaps you would like it to be elliptic :-)
5. If you want the dish to have depth you'll just have to EXTRUDE it.
6. If you want the front and the back to have different attribute-settings you just pick all the faces on the back (or the front, that is your own choice) by PICK RANGE and FRACTURE them from the rest of the antenna. (I did this to make the front white and the back gold-colored as this is rather usual for antennas on communication satellites.)

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->  
Return to Alphabet  
<-
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## 1.97 FOG

\* Subject: Re: Using Fog Objects...  
\* Date: Fri, 9 Sep 1994 06:30:38 -0500 [54]  
\* From: gregory denby <gdenby@twain.helios.nd.edu>

Try using a plane with a transparency map placed over it. Place this in front of your camera. The down side of this is increased rendering time :-(. Or, make a single plane, not extruded, set it to an appropriate fog length and rotate it so that its top is farther away from the camera. That way the amount of fog applied near the top of the scene will be less than at the bottom.

->  
Return to Alphabet  
<-

## 1.98 HALO LIGHTS LENSFLARE FOG

\* Subject: Re: HALO AROUND LIGHT IN IMAGINE  
\* Date: Mon, 19 Sep 1994 00:31:49 -0400 (EDT) [54]  
\* From: jgoldman@acs.bu.edu

--- METHOD #1 (The Pain in the A's Radial Texture Method)-----

Create a disk utilizing Imagine's standard Disk parameters.

Copy the disk and scale the new one by a factor of two.

Copy the larger disk and scale the new one by a factor of four. You should now have three disks of varying size.

Position the disks so that the smallest is in front of the middlesized. The middlesized is in front of the largest.

Make the smallest disk Bright with a Color of 255,255,255. Also, make it a Lightsource.

Apply Radial textures to the middlesized and largest disks.

The middlesized disk should be Bright and have a color of 150,150,255. The Radial texture should be set so that the disk's transparency is set to 0,0,0 at the center. Create a transition distance over the radius of the disk so that transparency is 255,255,255 at the disk's edge. You want the disk's color to fade as it moves toward the edge of the disk.

The larger disk should be Bright and have a color of 255,255,255, and a Transparency of 170, 170, 170. Set the Radial texture so that the color fades to total transparency (255, 255, 255) at the disk's edge.

Transform the smallest disk's axis ONLY. Bring up the Transformation Requester, and Rotate the Z axis 180 degrees. Select

the Transform Axis Only button and Perform. The disk's Y-axis should be pointing exactly opposite the other disks' Y-Axis.

Group the three disks together using the smallest disk as the Parent. This is a basic "Light w/halo" object. When rendering it be sure to always point the Y-axis at the camera. It's easy to do. Just Align Y-axis to Track to Object Camera.

Render that, and see what you get. In this example the smallest disk acts like the bright lightbulb, the second disk acts like the film burn area, and the third disk acts like the atmospheric dispersion area. This object, being 2D, has some limitations.

A primary limitation is that this object only works well in Scanline situations. This is because in Trace Mode the two larger Radial mapped spheres block the smaller disk's light travelling backwards. To work around it create an axis, make it a Lightsource, place it behind the larger disk, and group it to the smallest disk. It isn't infallible, however...

Experiment with values. The Color values given above were for a standard high intensity lightsource. Always remember what your lightsource would look like in the real world. In the case of a red exit sign, make the Color values predominantly red, and substitute a polygon created "EXIT" object for the first disk. Or something like that...

--- METHOD #2 (The Fog Method) -----

Create a primitive sphere. Make it Bright with the Color values 255,255,255.

Copy the sphere and scale it slightly larger than the original sphere primitive. Make this sphere a Fog object by experimenting with Fog Length values. Color it as necessary.

For those with Imagine3.0 assign the Ghost texture to the foggy sphere.

Experiment with values. I haven't actually tried this yet, but it should work...

--- METHOD #3 (The Haze Method) -----

Use Global FX Haze to fuzz up your exit sign.

->  
Return to Alphabet  
<-

## 1.99 PARTICLES MAPPING TEXTURES

```
* Subject: RE: Imagine bug :(
* Date: Fri, 23 Sep 94 13:38:32 EST [54]
* From: mdrivers@tbag.tscs.com (Michael Rivers)
```

Pick the Object, Fracture it with Scale Factor set to 1.0 (Don't merge the object, because each face must NOT share any point/edge with another face) create a state with Shape checked, apply textures/brushmaps and specify the Lockstate. Create project using the particles. render. (may work for explode, fireworks etc.)

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->
Return to Alphabet
<-

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## 1.100 SMOKE

```

* Subject: Particles smoke
* Date:    Tuesday, 04 October 1994 11:11:47 [55]
* From:    Wizard <GUEST@novell.dima.unige.it>

-detail editor
-add primitives: sphere
-attributes: color 255,255,255      fog 140
             clrnoiz texture:
             color 140,140,140      r,g,b,color vary 0

-particles:  cube
             random align
             interpolated
             dimension 150 units

-save obj

-action editor
-add particle effect to loaded sphere (to all anim frames)
  emission
  travel dista 200 units
  scaling 1
  time to terminal h 2
  elasticity 50
  time to terminal z TOT/2
  velocity .5
  min angle x -5
  max angle x 5
  wind velocity 5
  wind angle 33
  wind start TOT*(-1)
  wind stop TOT
  emission 95%
  SET ALL OTHER VALUES TO 0

TOT ==== number of tot frames

```

```

* Note: The above tutorial was really created by
*       Massimiliano Marras (mcl606@mclink.it):

```

I must point out that he made a few (wrong) changes: Fog Length should be 180, sphere color 128,128,128, ClrNoiz's color 64,64,64, travel distance is 100 units and time to terminal Z is TOT frames and not TOT/2. He has left unchanged all the other values. In addition to

this Imagine 3.0 does render properly fog objects in front of backdrop pictures so his closing remark is wrong.

->  
Return to Alphabet  
<-

## 1.101 LIGHTS NEGATIVE SHADOWS

\* Subject: -----=> Sorry NO Subject!

\* Date: Wednesday, 05 October 1994 17:38:04 [55]  
\* From: Massimiliano Marras (mcl606@mclink.it)

Another nice use for negative values is the simulation of shadows in scanline mode. Enter Detail Editor, add a ground and a primitive sphere, move the ground along Z axis -160 units. Leave the sphere unchanged but transform it's axis (only) so that has this alignment: X -45, Y 0, Z -90 and the Y axis (only) size is 280 (so that it intersects the ground). Make the sphere a parallel rays, round shape, controlled falloff light source and enter a negative value in the intensity requester that is roughly 75% of the other lightsource's intensity. In this case use -196,-196,-196. Quickrender with a 90 degree horizontal angle and a 45 degree vertical angle. Here you are: instant scanline shadows. Of course you can add softedge lite textures, arrange more negative light sources in order to simulate more complex shapes or even create "shadow volumes" that obscure the object travelling in their area. As long as you use controlled falloff and scale properly the Y axis this trick will not slow the rendering down (controlled lights do not affect objects outside their reach) and will save days of render time compared to raytracing. A good reference about negative lightsources is in Graphics Gems III: "Darklights" by Andrew S. Glassner. Well, i guess Wizard will claim copyright over that book too...

->  
Return to Alphabet  
<-

## 1.102 WATERFALLS FIRE

\* Subject: Seamless Waterfalls & Fire

\* Date: Monday, 24 October 1994 22:45:31 [55]  
\* From: Shinobi@ckbbs.tor.hookup.net (Shinobi)

First begin with a 2D outline such as the one below:

```

/
|
|           Z
|           |
|           |

```



This shape should be extruded by whatever distance you choose as the width of your waterfall.

Call it whatever you like (I chose a very light blue), and turn the specularly way up so you can see how the light is affected by the texture. Now, add the BumpNoiz texture. Make the X, Y, and Z sizes something like 100,10,200, which basically give you long, thin bumps. Save this object as Waterfall.1.

Now, edit the texture axis and rotate it -120 degrees (you should see the axis roll forward, towards the left-side of this diagram). Save this object as Waterfall.2. Repeat again, saving the final object as Waterfall.3.

Rotate the axis locally around Y. This will cause the texture to rotate forwards to the camera, which is actually on the far left of the above diagram.

I've been asked to explain this in a little more detail, so I'll give what I can.

A 3D texture occupies 3D space. But the colours or bumps or whatever that appear occur only where the texture in 3D space intersects with the object. By positioning the texture axis away from the object, when you rotate the texture axis the intersection of the texture and the object changes. And because the texture occupies 3D space passing the texture "through" an object works the same as changing a "time" parameter that some textures have.

I'm not sure if that is a better explanation or not, so try this. Put a pencil or something on the screen, with the eraser at the texture axis. Now rotate the pencil around the screen, keeping the pivot point at the eraser. See how the pencil and object intersect at different points as the pencil is rotated? If you think of the texture as being full of bubbles, you can see that the object is actually "slicing" through the 3D texture when it intersects it (kinda like a CAT scan).

Enter the action editor and set the number of frames for, say, 90. Give some ambient light (say 40). Now, at frame 1 load your Waterfall.1 object. From frame 2 through 30, morph to Waterfall.2. From frame 31 through 60 morph to Waterfall.3. Finally, from frame 61 through 90 morph back to Waterfall.1.

Enter the stage editor and set the view up as you would like it. Do a test render to make sure all is well.

Render your animation, but leave off the last frame, so in a 90 frame animation you would render frames 1-89.

The trick is to offset the texture axis so that when it rotates the texture appears to flow along the surfaces it intersects. As I said,

it works well with fire. You can use this technique to seamlessly morph a flame object (ala Steve Worley's example). Just make sure to place the axes of the textures where their rotation and intersection with the plane will give the appearance of movement.

->  
Return to Alphabet  
<-

### 1.103 SUN SOLAR FLARES

\* Subject: E-Z Sun  
\* Date: Sunday, 06 November 1994 17:57:00 [56]  
\* From: KEN\_ROBERTSON@robelle.COM

All this chit-chat about generating suns made me want to try it out, too. I got a great-looking sun (albeit not as nice as the one with the solar flares and sunspots that is on Aminet in gfx/3d, I think) by doing:

Add a sphere primitive, default values  
Set the colour to 255,255,0  
Set the Fog Length to 10  
Make it a light, intensity 655,655,255, point source, diminishing intensity  
Add the Ghost Texture (Imagine 3.0 supplied) with default values.

->  
Return to Alphabet  
<-

### 1.104 SIRDS ZBUFFER STEREO 3D

\* Subject: 3D images (ZBuffer & SIRDS)  
\* Date: Tuesday, 08 November 1994 23:56:49 [56]  
\* From: "Ducharme, Alain: FOB" <Ducharme@fob.istc.ca>

An example:

Load an object into the Detail editor (i.e. Cow.iob). To simplify the process UnGroup any parts then Join them all together as one object.

Attributes should be: Color white, set the rest to zero (0); Bright should be on (x), set Quickdraw on (x) and Texture: ZBuffer. Now reset your perspective view and rotate your object just as you would like to see it by the camera as viewed in the perspective view. This is important because ZBuffer is relative to Global coordinates, and not relative to the camera.

Go into the "Top" view window, turn Coordinates on, move your cursor to the bottom of the bounding box and write down the Y coordinate (Y1), move the cursor to the top of the bounding box and write down the Y coordinate (Y2). These two Y coordinates should be entered in the ZBuffer texture's Y1



and Y2. Leave the color settings from white (255,255,255) to black (0,0,0) (assuming your SIRDS generator expects white as out and black as in). Save the object

Go into Action editor, Add your object and set camera position to 0,Y1-n,0 alignment to 0,0,0 where n is the distance from the object to be viewed.

Save Changes. Go to Stage editor, add a light and place it anywhere in front of the object, turn on camera view and fine tune the placement of the camera making sure not to change it's alignment.

Render.

The resulting image should be a gray scale image which can be loaded into and processed by a SIRDS generator. I've had excellent results with this technique, many of which surpassed some commercially available SIRDS posters.

->  
Return to Alphabet  
<-

## 1.105 LASERS

\* Subject: Re: LASER ray  
\* Date: Monday, 14 November 1994 19:14:34 [56]  
\* From: Patrick Sauvageau <sauvp@citi.doc.ca>

You can use the filter noise texture. Make an axis, apply it the filter noise and "apply to children". Make that axis the parent from the laser beam. Now, create two state where the "textured" axis only move slowly. The result will be that the transparency irregularity will move slowly in the laser beam, simulating an irregular dusty atmosphere with light wind. If you have 3.1, you may use the "clouds" texture and make the clouds morph in time as it move.

->  
Return to Alphabet  
<-

## 1.106 PUDDLES WATER

\* Subject: Easy Puddles  
\* Date: Saturday, 31 December 1994 12:57:07 [57]  
\* From: Shinobi@ckbbs.tor.hookup.net (Shinobi)

Here's a technique for making dead-easy puddles. You know, the kind of puddle of a thick solution such as mercury, oil, blood...anything that has a meniscus that rises above the surface the puddle lies on.

First, add an axis, and make sure you are in the TOP view. Copy and paste this axis roughly in a circular shape. Use as many as you like.

---

Rotate each axis to a different angle. These axes will be used to make a closed loop.

Next, select each axis in turn around the circumference of your puddle-to-be. Usually, I group the whole bunch and save it as PUDDLE\_OUTLINE.GROUP just to be on the safe side. Select MAKE CLOSED PATH. Instantly, you have an outline of your puddle. Now is the time to make any changes to the shape of your puddle. Try to stay away from very thin "fingers" as they may cause you trouble in the next section. Rename the object to PATH, to make life easy for us in the Extrude requester.

Move to the FRONT view and add a disk. Choose PICK POINTS. Delete the center point and all the points for three-quarters of the circle. What you should be left with is a quarter-circle like the diagram on the left:



(Pardon the lousy diagram)

Add one more point to the top-left line segment, so that your shape now looks like the figure on the right. Save this object as something like CIRCLE.OUTLINE.

Next, bring up the EXTRUDE requester. Select FOLLOW PATH, and ALIGN Y TO PATH. Make as many sections as you like.

Now you have a nice, smooth shape that follows the contour of your puddle-path. But what about the center?

Here's the good part. It's so easy, I could have kicked myself for not thinking of it earlier.

Make sure your selection method is set to both CLICK and LOCK. This will cause every point you drag to snap to a grid intersection.

Provided you started out with a clean workspace, the 0,0,0 location should be right in the middle of your puddle (approximately). Change the grid size to something outrageous, like 1000. Select DRAG POINTS.

Now, simply click once on each of the points that sticks out. After you click, the point will immediately jump to the nearest grid intersection...at the center of the puddle. In a few moments, you'll have all the points in the center, and the top of your puddle will have these wonderful faces.

As a final step, make sure to MERGE the object so that you don't have a lot of extraneous points on top of one another.

YOUR PUDDLE IS DONE.

->

Return to Alphabet  
<-

## 1.107 STARFIELD STARS

\* Subject: Re: Starfield object  
\* Date: Friday, 06 January 1995 08:57:50 [58]  
\* From: Charles Blaquiere <blaq@io.org>

### 1) MODELING REAL STARS:

- Add a primitive cone, 5 x 5 units in size, 3 points at the base. No need to close the bottom.
- In Pick Points, pick all and move them, say, 1000 units away from the origin.
- In Pick Objects, enter Attributes, Phong off, Bright on. You've created a star.
- Copy/Paste/Rotate randomly in X, Y, and/or Z. You've created another star.
- Pick All, Join. Repeat these steps (Copy/Paste/Rotate, Pick All, Join) until you have enough stars to suit your fancy.
- Presto, instant starfield! You may want to add a Dirt texture, with intensity set to 1, to vary the color of your stars from white to black.

### 2) FAKE IT:

- Add a primitive sphere, make it Bright.
- Add the Confetti texture, set V1 and V2 to 0.5 and 0.55, and the colors to black and white. Play with size until the stars look right.

->  
Return to Alphabet  
<-

## 1.108 STARS FLY-THRU WARP

\* Subject: Lock & Melt.  
\* Date: Sunday, 08 January 1995 09:25:02 [58]  
\* From: Shane Davison <davis@cs.uregina.ca>

How to create a simple yet effective warp-drive (a la Star Wars/Trek):

- quickrender an Imagine starfield
  - save it and map the image onto a plane
-

- (make sure you create a state and lock it)
- set-up the camera to look directly at the entire plane
- create an appropriate-length animation in which the plane scales to about 10 times its current size
- here's the key: starting with frame 2, use the previously rendered frame as the backdrop image for each successive frame
- once you've rendered the animation, you can use it as a backdrop for star fly-throughs or map it onto a plane for cool special effects

The great thing about doing it this way is that you can easily achieve different but equally nice effects by changing the position of the camera, the length of the animation, the scaling amount, etc. and re-render. Also, other cool effects can be accomplished with clever uses of other parameters such as using the image as a transparency map on a plane with randomly colored faces for a colorful explosion effect.

->  
Return to Alphabet  
<-

## 1.109 LIGHTS VISIBLE BEAMS

```
* Subject: Visible light...again.
* Date:    Sunday, 22 January 1995 19:12:13 [58]
* From:    Curcio Nicholas <curcion@db.erau.edu>
```

Now, for all you water people.

### DATAIL

1. Take a sphere and make it a blue color.
2. Remove approx. the top 2/3 of the sphere.
3. Apply the "crumpled" texture (3.x)
4. Apply the "transpar" texture (3.x)
5. Add an axis, and make it white light source.
6. Place the axis above the piece of sphere and group them.

### STAGE

Place this object high above your scene. The light coming through the crumpled spots makes a great underwater effect.

->  
Return to Alphabet  
<-

## 1.110 PHOTONS PHASERS LASER BEAMS

```
* Subject: Re: Photon torpedo?
* Date:    Wednesday, 25 January 1995 00:26:06 [58]
* From:    "Francis X. Govers" <fxgovers@sun.aitc.rest.tasc.com>
```

From: Bill Osuch <wrosuch@icon.net>

>Anyone have any suggestions on creating the basic shape for a Trek-ish  
>photon torpedo? I basically had the idea of a ball with various spikes all  
>over it, but being a novice with the forms editor I can't quite seem to get  
>it to work.

Go to the Detail Editor

Add a primitive sphere (not a sphere) with a lot of faces. (24x24 works well)

Go to Select Points

Select Range

type in 1,nnnn,5 (select every 5th point or so)

Hit the Scale button and scale up the points

Instant spiky sphere!!

For various heights, change the select range third number (try, 20, 12, and 40 and scale different amounts)

For a wild effect, start with this first spiky sphere, and use state animation in the detail editor to save the state first as a sphere, then with a first set of spikes. Create a second set of spikes by selecting a different start point and step size, then save as a second state. Have Imagine morph states.

\* Subject: Re: Photon torpedo?

\* Date: Wednesday, 25 January 1995 02:24:37 [58]

\* From: sauvp@citi.doc.ca (P.Sauvageau)

>Anyone have any suggestions on creating the basic shape for a Trek-ish  
>photon torpedo? I basically had the idea of a ball with various spikes all  
>over it, but being a novice with the forms editor I can't quite seem to get  
>it to work.

The "spikes" can be created in the detail editor, by adding a primitive sphere with a low number of points. Select about 6 to 8 points, evenly on the sphere and scales them up until you got the kind of spike you wish. Make this object "Bright" and add the radial texture to make the tips of the spikes red and the center of the object also red, but with less saturation. Fading from saturated color to low saturated color is a good way to make thing appears "bright". Add another sphere, bigger than the spikes; make it red with a fog setting two time it's diameter, and add the "Ghost" texture. This second sphere will create the "hallo" around the torpedo.

When you animate the torpedo, apply two time (on different axis) the "rotate2.0" effect, with two very large number of degree of rotation (like 6000), so in each frame, the torpedo will have some pseudo-random alligment.

Make the torpedo a light with controled falloff and make it's Y axis 3 time the size of the "halo" sphere. The torpedo will illuminate the firring ship when launched.

Be sure to use "Controlled falloff"; i remember an anim of a friend where the position strobe lights of a space ship where casting red light on a distant planet on the background; It was barely visible, and since he was short on time, it make it to the final tape! So "Controlled falloff" is a must if you do not want to illuminate the whole galaxy!

->

Return to Alphabet

<-

## 1.111 NEBULA

\* Subject: Re: Nebula effect  
\* Date: Thursday, 26 January 1995 12:39:41 [58]  
\* From: a00448@dtic.ua.es (ERNESTO POVEDA CORTES)

On Jan, 25 1995 Mike wrote :

> Say, I was wondering if anyone knows how to create a Nebula effect?  
> I'd like to use the Imagine Starfield and have a gaseous Nebula in the  
> background. I'm sure this is probably easy to do....but it's got me  
> stumped.

I was after a similar effect and the best results i get was doing a sphere tint it to blue and use the nebula texture on it. Put the sphere behind your scene far far away and test it. Maybe using the ghost texture and high noise on it will surprise you.

->

Return to Alphabet

<-

## 1.112 WAND MAGIC SPARKLES

\* Note: Unable to find author of following text.  
\* Most likely came from Compuserve (GreG ?)

Create an object that will be the length of the "sparkle" stream. I suggest a very elongated tear drop shape, though you can create whatever suits you. Note, make it symmetric, ie: don't worry about making it bend or twist yet. Make the object BRIGHT. Set the filter values to the object at 255,255,255. Do not set specular. We now have an invisible object. Apply the old workhorse CONFETTI.ITX to the object. Set the 2 colors to your liking, a yellow and an orange should work well. Make V1=0.5, and V2=0.55. Leave everything else at the default settings. Now render the object to see how large the confetti particles are. Scale the confetti texture axis down to decrease the size if they are too big. What you have now are little bright "particles" that follow the shape of the teardrop. This will be used to create a following trail. If you want more particles, decrease V1, if you want less, increase it making it closer to V2.

In your animation, you should create a spline path that your wand follows for it's motion. We need it done this way so that we can have the confetti teardrop follow the same path as it CONFORMS to the path. Having it conform to the path will cause it to twist and turn and bend fluidly behind the wand as it moves. But the best is that we are not limited to types of motion. Make sure that the parent axis of the wand is located somewhere in the tip of the wand, because that axis is what follow the path.

Ok, great, we have a wand that has a tail that follows it, but the confetti particles are static, it'll look wierd! Ok, then apply the technique you asked about in the previous question, and morph two teardrop objects where the second object has the displaced confetti texture axis. Now the confetti will also be in motion.

```
->
Return to Alphabet
<-
```

## 1.113 CANDLE

```
* Subject: Candle
* Date: Thu, 09 Feb 95 01:17:00 +0100 [59]
* From: torgeir.holm@tbc.bbs.no (TORGEIR HOLM)
```

[CJO's candle flame question]

I made an animation of a candle a while back, which came out pretty nice.

Take your basic candle-flame ellipsoid shape and add the following attributes:

```
Fog Length: 0.10
```

```
Texture: Ghost
```

```
Fog length at T: 400
T: 0.8
```

```
Texture: FogTop
```

```
Fog length at T: 200
T: 0.5
Noise Magnitude: 0
```

Place the axis so that the origin is in the tip of the flame, and the bottom of the bounding box is 2/3 towards the bottom of the flame. With the Z axis pointing up.

```
Texture: Fireball
```

```
Color1: 255,255,100
Color2: 200,030,000
Noise: 0
Reflect&Filter 1&2: 0
```

Place the axis so that the origin is in the bottom of the flame, and the end of the Y axis is in the tip.

BTW: my object was about 60 units wide, and 150 units tall.

You can now add a child axis in the middle of your flame, and make it a lightsource.

To animate this, make sure the Y axis points upward (Do this before adding textures, as their placement is relative to the axis), and move the the object up along a wavy path with conform to path. Then move the path back down a mirror copy of itself, so that the flame stays in the same position. Makes a really nice and realistic candle- flame

```
->  
Return to Alphabet  
<-
```

## 1.114 DISCO BALL

```
* Subject: Disco Ball  
* Date: Wed, 8 Feb 1995 01:29:04 -0800 (PST) [59]  
* From: "Randy R. Wall" <rrw@ecst.csuchico.edu>
```

Well, sense I had nothing else to do I thought I'd give a quick try at that Disco Ball and see if what I thought would work would.

I think it works pretty nice, but there were a few things I didn't try sense I wanted to post something for you before I hit the sack.

Anyways, heres what I did for a fairly simple Disco Ball, but one that stiil looks and works nice.

```
Add a Sphere  
Load the Chrome.Attribute  
Add the RadWind texture and set it to:
```

```
Radial Scale   -1.0   Color 1 R   255.0  
Z Scaling      3.0   Color 1 G     0.0  
Sweep Division 20.0   Color 1 B     0.0  
Fraction 'On'  1.0   Color 2 R   255.0  
Dist Travelled 0.0   Color 2 G   255.0  
Min Spacing    0.4   Color 2 B   255.0  
Max Spacing    0.4   Reflect Adj  1.0  
Transparancy   0.0
```

The colors can be changed to what you like, but its a good idea to have one a darker color so that when the Transpar texture lights the walls with the little squares some of them will be darker than others.. It maybe a good idea if you are going to have a couple of colored lights hitting the Disco Ball to use a grey color like 100,100,100 for the dark color and 255,255,255 for the lighter color.

Anyways on to the rest of the Disco Ball.

Now Add the Transpar texture and leave it at the defaults

Now Add an Axis to the center of the ball and set it to a Point Source Light and Cast Shodows.

Now your ready to render it.. If you don't have a lot of things to reflect or lots of glass objects you maybe able to speed things up by



setting the RSDP in prefs to 2. if you do have a lot of things to render than set it to what need be. But if you want to test out the Disco ball so you can set it up how YOU like it then I would recomend putting it in a box with an open end for viewing and set RSDP to 2. This should work fine for these test. The Ball I have explained should give you a very good starting point, if not good enough for your project?

The only thing I found I didn't like about it is the squares are all the same distance apart, but the dark and light colors help break this up a bit as well as having the windows Min & Max Spacing fairly large. You could make these smaller to make the Ball look a bit better but I didn't like the sqaures on the walls so close together when I did this. But then I was testing it in a fairly small box..I think in a larger box it might look quite good. Especially if there were other things in the room for the squares to interact with..Anyways something for you to play with..

Well I hope you like the looks of it. I tried the Mosaic texture on it and that looked pretty cool too, but not quite right. I think these Disc Ball actually have many different shapes on them so the produce different shapes on the ground. But the Mosaic texture was a bit to much. I was going to try a combination of a couple of texture, But thought it would take a while to play around with this and really only wanted to see how my suggestion would work sense I was only guessing about it. And sense it did work I figured I'll leave the playing around with the textures for you..

->  
Return to Alphabet  
<-

## 1.115 SMOKE CIGARETTES

\* From: rbyrne@3dform.edex.edu.au (Robert Byrne)  
\* Date: Thu, 9 Feb 95 20:48:51 +1000 [59]  
\* Subject: ideas on how to make chaotic cigarette smoke

Hello Allan, here's a couple of suggestions I've found, but can't take credit for. I've tested the Particles method but 1 frame took about 23 hours to render on an A3000. The texture method would be worth trying first.

### SIMULATING SMOKE WITH PARTICLES

Check this Tutorial out:

-Detail Editor

-add primitives: sphere

-attributes: color 128,128,128 fog 180

CLRNOIZ TEXTURE:

color 64,64,64 r,g,b,color vary 0

-particles: cube

```

random align
interpolated
dimension 150 units

```

-save object

-Action Editor

-add particle effect to loaded sphere (to all anim frames)

(TOT == number of frames)

```

emission
travel distance 100 units
scaling 1
time to terminal h 2
elasticity 50
time to terminal z TOT
velocity .5
min angle x -5
max angle x 5
wind velocity 5
wind angle 33
wind start -TOT (minus TOT)
wind stop TOT
emission 95%
SET ALL OTHER VALUES TO 0

```

REMEMBER: add a backdrop picture, plane or something else behind the particle object because it is a fog obj!!! -- do you want see a blank/black screen?

SMOKE (GAS) USING THE NEBULAR TEXTURE

I've just been playing with the Nebular texture to create a little animated smoke. Works great, and I just thought some of you with 3.0 might make some use of this info.

Remember to render fog objects in front of a background object, and that this texture will apply to the area bounded by the texture axis, not the entire object. Scale the texture axis to affect the shape of the fog.

General Notes:

Noise 1 seems to affect the quality of the swirls. Higher numbers adjust the thickness and reduce the transparency. Noise 2 affects color transitions, color intensity of nebular color as set in texture requester, and color mixture, or grain. Grain appears as a very pointillated surface, as if there are thousands of dots of color rather than a smooth gradation or defined boundaries between object and nebula colors. Higher numbers of Noise 2 intensify the nebular color and increase grain.

Fog length and the 'T' value work together to determine amount and density of the fog appearing on the object. For stills I would set the 'T' value between .6 and .8, object fog length at .1, and adjust the 'Fog Length at T' to get the right density of fog. I would use the 'T' value combined with some of the noise values to create a fluctuating fog, or even to morph

from a dense fog to one very nearly dissipated.

A nice, swirly smoke might use the following attributes in the nebular texture requester. I used these on a sphere primitive with diameter of 300, so use that number as a reference to fog length.

Object color:

R:150

G:150

B:175

Object Fog length:

.1

Nebular attributes:

Fog Length at T:500

T:.8

Noise 1 Magnitude:5.0

Noise 1 Velocity:1.0

Noise 2 Magnitude:.2

Noise 2 Velocity:10.0

R:150

G:100

B:225

The texture axis forms a square completely inside the sphere object, whose corners touch the inside surface of the sphere.

->

Return to Alphabet

<-

## 1.116 FORMS EDITOR

\* Subject: Forms Editor Tutorial (was: Imagine WWW site)

\* Date: Sun, 12 Feb 1995 23:11:01 -0500 (EST) [59]

\* From: jgoldman@acs.bu.edu

The forms editor is the greatest tool in Imagine's arsenal!!! It's so powerful and flexible, (you can create almost anything) it's almost impossible to create an all-encompassing tutorial. Perhaps if you suggest types of objects... For instance, Creation of Humanoid Bodies and Body Parts. I dunno...

I posted a small Getting to Know the Forms Editor type of thing a while back. Let me see here... Ahhh...

---- Forms Editor thing...----

This is my advice to anyone interested in the forms editor. A lot of this may be elementary, but some info might actually be useful... This might definitely (good grammar?) get confusing... It's also rather long...

The forms editor is one of Imagine's greatest features. I find

---

it's easier to create incredibly realistic things in the forms editor than with NURBS (ooohhh, imagine a spline based forms editor)...

Basically, when you create in the forms editor you edit an object's profile. It's sort of like MRIs (Magnetic Resonance Imaging)

#### A Basic Form Example-

Take a simple example, your thumb. Treat your thumb as if it were an object on an axis. Say that the Z-axis runs from the base of your thumb to the tip. The X-axis runs across the top of your thumb. The Y-axis goes through your thumb. In other words, if your thumb were an Imagine object it would be oriented as if you were viewing a painting with your thumb out in front of you...

First trace the right profile of your thumb. If you want to do this the extra step way, lay your thumb down on a piece of paper and trace it for all three views (you'll have troubles with the top view, so just eye it.). Then, just copy what you see on paper to the screen. Do this for all three views. What you get is a pretty crude looking thumb. To get a better looking thumb you have to go in and edit individual cross-sections. But first...

Remember that if the object is solid you must have a totally enclosed profile (the endpoints are separated normally. You have to place the endpoint points at the same location. An easy way to do this is to select the cursor lock and lock the endpoints to similar grid locations).

In the case of the heart, do the same thing as the thumb...

#### What the Forms Editor Really Does-

It's important to understand what exactly you're doing when manipulating points in the forms editor, so go back to a simple sphere (new object and new defaults). Turn on the solid wireframe option and view the sphere object from the front. Notice how many points are on your front view profile. You will see that they equal the number of vertical sections in the wireframe object divided by two. Every point in an editor view has a twin on the opposite side of the object (except for the top view). If you add a point in the front view you will notice that two points are actually added. One on one side of the profile, and one on the other side. When altering an object's profile you actually directly manipulate a specific point, but because of the forms editor's nature it changes other points around it to tween and smooth the change.

#### Editing Individual Cross-Sections-

Look at a forms object like several horizontal cross-sections (which are circular by default) connected like skin. Think of the top view as the cross-section editor. By default only one cross-section can be manipulated, the top one. It can be considered a controlling, or key, cross-section. Because it is the only key cross-section defined on the object then whatever you change will affect every cross-section below it.

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To have ultimate control of the individual cross-sections you have to define the cross-section you want to manipulate as a key cross-section. You do this by selecting '+ KEY' and selecting the cross-section you want to manipulate (in the front or right view). When you perform this operation (or 'Select') Imagine will display which cross-sections have been defined as key cross-sections in red. At first, you will notice that only the top cross-section is highlighted in red because no others have been selected to act as key cross-sections. Make the middle cross-section a key cross-section. The object now has two cross-sections which can be separately manipulated as keys. Use 'Select' to pick the cross-section you want to alter.

Think of key cross-sections as animation frames. In an animation you can set an initial position for an object on one frame and a final position on another frame. These two frames are now key frames. When the animation is generated the object's position will tween between the two key frames. The same process occurs with key cross-sections. All non-key cross-sections tween between key cross-sections.

Take an example of a salt shaker with a circular top and square bottom. If you create a circular key cross-section as the top of the shaker and a square key cross-section for the bottom all the cross-sections between the top and bottom will blend to form a smooth transition from circle to square.

So now you know how to alter the individual cross-sections. Remember that you can also delete key cross-sections. Just be sure you select the appropriate cross-section. BTW, Imagine tells you what cross-section you're manipulating in the upper menu bar. Also, remember that Imagine's cross-section tween goes from key to key in a downward order. If there is no key cross-section at the object's base Imagine will use the next highest defined key section.

So Where do the Front/Right Views Come into Play?-

If the top editor edits individual cross-sections then the front and side view editors locate the cross-sections in space. The default sphere has all the cross-sections parallel to each other. You can change the orientation of a cross-section (so that it is not parallel to the ground) by moving points on the front and right views. Basically, the front and side view alter an object's overall profile shape.

This particular explanation only really works with the default sphere, but the results can be translated to any object. The front view controls all the points along the object's x-axis. The side view controls all the points along the object's y-axis. This effectively splits the sphere into four sections; a front profile, back profile, left profile, and right profile.

In the front view select the right-most point and you'll notice that its twin point will be highlighted on the left. These two points define the right-most and left-most points of one cross-section. Specifically, these two points represent two outermost x-axis points on the middle cross-section.

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Similarly, the same two points in the side view control the farthest points on the y-axis of the middle cross-section.

You will find that by altering these you alter the orientation of the cross-section. If you raise the right-most point in the front view and lower the left-most point the middle cross-section now tilts.

What Does It All Mean?-

It's tough to explain exactly how the forms editor operates, and in particular what alters what exactly. So my greatest advice is to experiment.

The easiest way to create object was illustrated in the first section. Create profiles for the object you want to create. If you need better form edit the individual cross-section as if you were manipulating spars on and airplane wing or bulkheads on a boat.

I can tell you now that only experience can show you what will go wrong, and believe me something will go wrong. I can only say, keep things simple. You probably won't understand this now, but try and keep cross-sections relatively parallel to each other. If this means adding more cross-sections then do it. You'll find that some really complex things can't be done with small numbers of cross-sections, and it's important to realize when you need more...

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Return to Alphabet

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