

IML-FAQ#8

Ernesto Poveda 15-9-1995

COLLABORATORS

	<i>TITLE :</i> IML-FAQ#8	
<i>ACTION</i>	<i>NAME</i>	<i>DATE</i>
WRITTEN BY	Ernesto Poveda 15-9-1995	February 12, 2023
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NUMBER	DATE	DESCRIPTION	NAME

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Chapter 1

IML-FAQ#8

1.1 Imagine Mailing List FAQ #8

```
+=====+
|               Imagine Mailing List               |
|               FREQUENTLY ASKED QUESTIONS          |
|-----|
|               Compiled By                         |
|               Gabriele Scibilia                  |
|               Michael B. Comet                   |
|               Steve Mund                         |
|               Mark Oldfield                      |
|               Dave Wickard                      |
|-----|
+=====+
```

What's New

Contents

This is the Frequently Asked Questions posting for the [↔](#)
Imagine
Mailing list. This posting is sent every so often to answer general
questions that users of the 3D rendering software, Imagine by Impulse
Inc. may have. It is aimed toward all users, especially newcomers to
the program.

If you find any errors or have answers to other frequently asked
questions that you would like to have included in this posting, please
send e-mail to: imlfaq@email.eag.unisysgsg.com (FAQ List).

- Gabriele S.

But, Who made this nice hypertext version?

1.2 What's New

Last Update : August 25, 1995 Friday

Issue Number : 8

What's New :

- Section 1, No 1.
Added HTML home pages list
- Section 2, No 25.
Spin and Sweep: how them work
- Section 2, No 26.
Modeling hands, feet, etc...
- Section 2, No 27.
Realistic neon lights
- Section 2, No 28.
Getting a checkered plane with checks
of different textures
- Section 2, No 29.
Bright light reflecting off thousands
of tiny particles suspended in air
- Section 2, No 30.
Bones can
- Section 2, No 31.
Inverse kinematics
- Section 2, No 32.
Inverse kinematics excitement
- Section 6, No 8.
Depth of field
- Section 7, No 16.
Oct-tree level
- Section 8, No 13.
Spaceship shield Attribute
(Essence)
- Section 8, No 14.
Spaceship shield (Imagine v2.9)
- Section 8, No 15.
Ground cover (Imagine v2.9 or higher)
- Section 8, No 16.
Steam engine attribute
(Imagine v2.9 and higher)
- Section 8, No 17.
Fun with Fuzz texture:

Wispy Smoke, Scattered Cumulus Clouds
(Imagine v2.9 and higher)

Section 8, No 18.
Water attribute

Section 8, No 19.
Castle brick attribute (Essence)

Section 8, No 20.
Cloth attribute (Essence)

Section 8, No 21.
Fabric (Imagine v2.9 or higher)

Section 9, No 4.
Imagine v3.0 / v3.1 high res video
change update

Section 9, No 9.
N.U.R.B.S.

... Please go to Index ...

1.3 Contents

CONTENTS:

=====

SECTION 1 - Support Products/Sites

1]

Imagine related:

References/Help Books/Magazines/ftp sites,BBSes,
Models/Textures (pics) materials, HTML home pages.

2]

How do I reach Impulse?

3]

What is the Imagine Mailing List and how to get it?

SECTION 2 - Modeling and Detail Editor

1]

How do I brushmap a ground plane?

2]

How do I make glass?

3]

The Slice command doesn't work or gives me errors.

4]

How can I make a room so that the walls don't have cracks?

5] When I select a group of points in the DETAIL editor, ←
all I

can do is drag them...not

ROTATE or SCALE interactively.

6]

-
- List of common Index of Refractions
 - 7]
 - How do you make mirrors?
 - 8]
 - How do I make 'metals' and what are some good gold attributes?
 - 9] Is there a quick way to add faces to my object without using the Slice command?
 - 10] How do I make 'wireframe' objects?
 - 11]
 - How can I create seashells?
 - 12]
 - May I use more than four textures in Imagine v2.0?
 - 13]
 - How do I make realistic clouds?
 - 14]
 - How do I create visible light beams?
 - 15]
 - How can I simulate underwater ambient?
 - 16]
 - Does anyone have suggestions for emulating soft shadows?
 - 17]
 - Can I create 2d/3d smoke effects? How?
 - 18]
 - How Bones works?
 - (by Lesk and Mark Decker)
 - 19] Halo around light sources.
 - 20]
 - Can a reflective object inside a glass tube render properly?
 - 21]
 - Help with Slice function,
, By J. Goldman.
 - 22]
 - Fog object and global fog:
: undersea fog spotlight.
 - 23]
 - Disco ball effect:
: how simulate some sort of radiosity.
 - 24]
 - How can I create a candle flame?
 - 25] What are the differences between Spin and Sweep functions?
 - 26]
 - Modeling strategies:
: modeling hands, feet, etc...
 - 27]
 - How can I create neon lights?
 - 28]
 - How can I get a checkered plane with checks of different textures?
 - 29] How can I simulate the effect of a bright light reflecting
-

off thousands of tiny particles
suspended in air?

30]

I still have questions about the bones feature
, let's say

I had a "can" object of coke and I want to make it dance.

31]

Constrain, freeze, release: inverse kinematics.

32]

Inverse kinematics: getting started

, By Randy R. Wall.

SECTION 3 - Forms Editor

- 1] After a Forms Editor object is loaded into the Detail Editor and manipulated,
it won't reload into the Forms Editor.

SECTION 4 - Cycle Editor

- 1] I made this
animation sequence in the Cycle editor
, but when
I set it up in the stage/action editors, the motion of the overall object isn't there!

SECTION 5 - Spline Editor

- 1] I tried to import a Postscript font but I got a

'Vector not found'
error. What does this mean?

SECTION 6 - Animation, Stage Editor and Action Editor

- 1] Even though I move an Object/Camera/Light to a new

POSITION/ALIGNMENT/SIZE in the STAGE editor
, Imagine seems
to 'forget' what I did!

2]

How do I use the Grow Effect?

3]

How do I use the Tumble Effect?

4] How do you get something to
roll (at the right speed!)

while

following a path?

- 5] When I move a

Tracked Camera in the STAGE editor

, it doesn't

realign and draw the Perspective view correctly!

- 6] When I increase the number of frames in an animation I find
my

scene gets mangled in the first frame

. Why?

7]

How do I use the Sway Effect?

8]

Depth of field.

SECTION 7 - Rendering and the Project Editor

- 1] Why do objects render fine in Scanline, but disappear in Trace?
 2] I have a problem with
 Filtered objects/fog and the Global Backdrop!
 3] My animation frames look fine, but when animated, they ←
 have
 the 'crawly' effect.
 4] What situations, parameters, attribute values, etc. ←
 require
 the most
 trace rendering time?
 5]
 How do I get rid of the 'Jaggies'?
 6]
 How can I figure out pixel aspect for a given resolution?
 7] When making a
 disco ball effect
 , will a SPHERICAL light set
 at 255 be bright enough to cause visible spots on the
 surfaces in a scene?
- 8] How long should it take to do a full trace picture
 with
 perhaps one transparent glass on a Amiga 3000/25? Is 4.5 hrs
 too much?
- 9] Is there any particular format that Imagine prefers?
 Ham? 32 Color? EHB? 24 bit 1000 x 1000?
- 10] I would like to use
 conical light sources
 with my rendering,
 is there anyway "see" in wireframe where the light will fall?
- 11] How important is lighting for a rendering
 , and is there any
 'preset' method
 used to get good results?
- 12] Help with Fog
 , How do I use it and how does it work?
- 13] How can I render in Widescreen/Letterbox format?
 14] I selected Spheres for my
 particle object
 , but all I get is a
 polygonal shape!
- 15] Help with Fog
 : if you place a fog object inside another,
 they cancel out, why?
- 16] The config file says something about "oct-tree level
 What EXACTLY is this about?

SECTION 8 - Essence Settings and Other Attributes

1]

-
- 2] Electrical Arc
(Essence)
- 3] Veined Marble
(Essence)
- 4] Rough marble/rock
(Essence)
- 5] Soap Bubble
(Imagine 2.0 and higher)
- 6] Spaceship Panels
(Imagine 2.9 and higher)
- 7] Bark, mountain, stone effects
(Imagine 2.9 and higher)
- 8] Solar corona
(Essence)
- 9] Solar corona
(Imagine 2.9 and higher)
- 10] Sludge
(Imagine 2.9 and higher)
- 11] Marble
(Imagine 2.0 and higher)
- 12] Starfield
(Imagine 2.9 and higher)
- 13] Photon Torpedo
(Imagine 2.9 and higher)
- 14] Spaceship shield
(Imagine 2.9 and higher)
- 15] Spaceship shield
(Imagine 2.9 and higher)
- 16] All purpose ground cover
(Imagine 2.9 and higher)
- 17] Steam engine, shafts of light
(Imagine 2.9 and higher)
- 18] Fun with Fuzz texture
(Imagine 2.9 and higher)
- 19] Water
(Imagine 2.0 and higher)
- 20] Castle brick
(Essence)
-

```

                Cloth
                                (Essence)
21]
                Fabric
                                (Imagine v2.9 and higher)

SECTION 9 - Miscellaneous
1] What the heck is BTW, IMO and other weird
   abbreviations
   ...
2]
   Rendering and refresh times
   are MUCH too slow, even with an
   accelerator. Are there any Basic tricks or hints to help?
3]
   How long will before my renderings aren't ugly anymore?
   4]
   Hex edit for Imagine
   - High Res video mode change Amiga only
5]
   What are Particles?
   6]
   Everything about motion blur
   , By Mark Allan Fox
7]
   3D stereograms
   , By Gary Beeton
8]
   Working with bitmaps
   , By Douglas Smith
9]
   What are N.U.R.B.S?
   CLOSING -
   Closing statements and Disclaimer
   -----

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1.4 SECTION 1 - Support Products/Sites

1] Imagine related: References/Help Books/Magzines/ftp sites.

->

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REFERENCES AND HELP BOOKS
->
MAGAZINES
->
FTP SITES
->
MODELS/TEXTURES LIBRARY
->
BULLETIN BOARD SYSTEMS
->
HTML PAGES

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1.5 REFERENCES AND HELP BOOKS

"Imagine 2.0 User Manual", Impulse Inc, 1992.
 (Yes....read the manual!)

"The Imagine Companion", David Duberman, Motion Blur Publishing,
 1991

"Understanding Imagine 2.0", Steven Worley, Apex Software
 Publishing, 1992.

"3D Modeling Lab", Philip Shaddock, The Waite Group Press,
 ISBN 1-878739-52-2, 1994.

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1.6 MAGAZINES

These are some good graphics magazines, most of which focus ↔
 on the
 Amiga computer. If anyone has some other suggestions please post them
 to the FAQ list!

"Amazing Computing for the Commodore Amiga" aka "Amazing Amiga"
 P.O. Box 2140
 Fall River, MA 02722-9969 USA
 (508) 678 - 4200
 (800) 345 - 3360
 (508) 675 - 6002 (FAX)

(A general Amiga computer magazine, focusing more on how
 to, hints and tips, programming, reviews of software and
 hardware(less ads and more meat than AW))

"Amiga Video/Graphics Magazine" (formerly AVID)
 365 Victor Street
 Suite "H"
 Salinas, CA 93907
 (408) 758 - 9386
 (408) 758 - 1744 (FAX)

(A general Amiga computer magazine, focusing on both

hardware, software, utilities and graphics)

"Amiga World"

P.O Box 595

Mt Morris, IL 61054-7900

(800) 827 - 0877

(815) 734 - 1109

(A general Amiga computer magazine, focusing on both hardware, software, utilities and graphics)

"AV Video"

701 Westchester Ave

White Plains, NY 10604

(800) 800 - 5474

(914) 328 - 9157

(914) 328 - 9093 (FAX)

(An audio/video and computer magazine. Has articles about all types of video and graphics applications including the Amiga and Video Toaster)

"Computer Artists"

P.O. Box 2649

Tulsa, OK 74101-9632

(A magazine specifically for computer artists. Articles on software and methods from Amigas, PC's and MAC's)

"Computer Graphics World"

P.O Box 122

Tulsa, OK 74101-9845

(800) 443 - 6632

(918) 835 - 3161 ext. 400

(918) 831 - 9497 (FAX)

(A general computer graphics magazine focusing on the latest technology from PC's to SGI's)

"Video Toaster User"

21611 Stevens Creek Blvd.

Cupertino, CA 95014

(800) 322 - 2834

AVID Publications,

273 N. Mathilda, Sunnyvale,

CA 94086, USA

(A magazine focusing specifically on NewTek's Video Toaster device. Nothing related to Imagine, but some more neat pictures to look at!)

"Computer Gazette"

IHT Gruppo Editoriale S.r.l.

Via Monte Napoleone, 9 - 20121 Milano

(39) 02 - 895921

"Scientific Amigan"

Dept AZ, POB 60685,

Savannah, GA 31420-0685, USA

"Geoffrey William's Computer Artists & Videographer Report"

aka "The CAV Report"

CBP, 1833 Verdugo Vista Drive,

Glendale, CA 90218

USA (818) 2409845

USA (818) 2409845 (FAX)

"XPress" aka "The Amiga CAD Newsletter"
8231 NE Paulanna Lane,
Bainbridge Island, WA 98110, USA

"Nonlinear Nonsense"
Cedar Software, PO Box 4495,
Wolcott, VT 05680
USA (802) 8885275
USA (802) 8883009 (FAX)

"3D Artist"
Columbine Inc. PO Box 4787,
Santa Fe, NM 87502-4787
USA (505) 9823532
USA (505) 8206929 (FAX)

(Magazine for users of 3D Studio, Lightwave 3D, Topas
and other popular programs including low-cost programs. Topics
includes modeling, lighting, camera work, character animation,
sound, and video)

"Amigator"
PO Box 26026, Nepean,
Ontario, Canada K2H 9R0

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1.7 FTP SITES:

There is now a new ftp site set up for Imagine related [↔](#)
items
including pictures, animations, tutorials, objects, and help files such
as previous postings from the list, and this FAQ at:

wuarchive.wustl.edu
in the /systems/amiga/boing/video/imagine

Under this directory are the following sub-directories:

art
archive
anims
objects

Note: New files cannot be sent directly here. Instead send
any new files you wish to upload into the same directory:

/systems/amiga/boing/incoming/imagine

Files here will/should eventually get moved to the proper

location by the ftp site administrator. Don't forget to send a text file explaining the data you uploaded, and where it should be placed.

The archives are kept by Nik Vukovljak. They can be found in the archive subdirectory listed above, and in the incoming/imagine directory. New archives may also be posted to aminet.

Aminet can be reached on the same FTP site (ftp.wustl.edu) under /systems/amiga/aminet. Numerous other sites also have the aminet directories.

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1.8 Models

Imagination Works

644 N. Santa Cruz avenue,
Suite 12, Los Gatos, CA 95030
USA (408) 3545067

Antigravity Products
456 Lincoln Blvd.,
Santa Monica, CA 90402
USA (310) 3936650
USA (310) 5766383 (FAX)

Visual Inspirations
809 West Hollywood,
Tampa, FL 33604
USA (813) 9356410
USA (813) 9356513 (BBS)

View Point Data Labs
625 S. State street,
Orem, UT 84058
USA (801) 2293000
USA (801) 2293000 (FAX)

Micro R&D
P.O. Box 130,
721 "O" Street,
Loup City, NE 68853
USA (308) 7451246

Syndesis Corporation
235 South Main Street,
Jefferson, WI 53549
USA (414) 6745200
USA (414) 6746363 (FAX)
syndesis@beta.inc.net

Modern Medium
580 West 8th. avenue Eugene,
OR 97401
USA (503) 3434281
USA (503) 3434325

AniGraF/X
PO Box 1715,
Jacksonville, OR 97530
USA (503) 7726525
USA (503) 8570616

VRS Media
7116 SW 47 Street,
Miami, FL 33155
USA (305) 6675005

Richard & Esther Shapiro Entertainment Inc.
335, North Maple Drive,
Beverly Hills, California 90210
USA (512) 3281454
USA (512) 3281455

Cybergraf Synthiotics
PO Box 5851, Hanover Center,
Wilmington, NC 28403-0879
USA (910) 7625776

Digital Wisdom
Box 2070, Tappahannock,
VA 22560
USA (804) 7580670
USA (804) 7584512

Allegro New Media
387 Passaic Ave
Fairfield, NJ. 07004
201-808-1992

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1.9 BBS

New Horizons
Stefano Epifani
ITA (39) 06-88640190
ITA (39) 06-8862660

3000+ Amiga BBS

William Molducci
ITA (39) 0544-451764

Digital Pixel
USA (001) 416-2981487

Studio Amiga BBS
USA (001) 817-5572111
USA (001) 817-5572112

Toaster BBS
USA (001) 616-7912109

The Graphics Alternative
USA (001) 510-5242780

The Intersection BBS
USA (001) 410-7425452

Lightwaved BBS
USA (001) 510-2280886

Vertech Design's Graphic Connection
USA (001) 503-5918412

You Can Call Me Ray
USA (001) 708-358611

Pisquare
USA (001) 301-7259080

The New Graphics BBS
USA (001) 908-4690049

GraFX Haus BBS
USA (001) 805-6831388

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1.10 HTML HOME PAGES:

Conny Joensson "Conny's Corner"
<http://www.kiruna.se/is/cjo/>

Fred Aderhold
<http://www.netrix.net/users/fredster>

Ian Smith
<http://www.ncinter.net/~iansmith/>

Paul Rance "Paul R's Home Page"
<http://metro.turnpike.net/P/paulr/index.html>

Sharky "Shark's Cove"
<http://www.aloha.com:80/~sharky/>

Greg Tsadilas "GreG's Electric Dreams"
<http://www.websharx.com:80/~greg/>

Mike Comet "Mike's Home Page"
<http://inswww.ins.cwru.edu:8000/php/comet/comet.html>

Dan Farmer "Dan Farmer's Home Page"
<http://www.websharx.com:80/~dfarmer/>

"HomeWoild"
<http://www.websharx.com/~ttbrown/warpwufg.html>

Andrew Denton "The Andrew H Denton Art Site"
<http://www.eunet.ch/People/ahd/select.html>

Steven Blackmore "Steven's Synthetic deLights"
<http://www.websharx.com:80/~kinda/mainmenu.html>

Glenn Lewis "Glenn's Graphics Gables"
<http://www.c2.org/~glewis/>

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1.11 SECTION 1 - Support Products/Sites

2] How do I reach Impulse?

Impulse Inc.
8416 Xerxes ave. North
Brooklyn Park, Minnesota 55444
USA

(612) 425-0557
(800) 328-0184
FAX: (612) 425-0701
Compuserve: 76004,1767

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1.12 SECTION 1 - Support Products/Sites

3] What is the Imagine Mailing List and how to get it

(From the Imagine Mailing List Sysop, Dave Wickard)

The Imagine Mailing List is a wide variety of Amiga computer artists sharing friendship and knowledge. The main thrust of the List is the Imagine renderer. Subjects discussed though have varied widely. There are discussions of Imagine and it's competitors, Imagine wish lists for future versions, 3D rendering principles in general, single frame recording techniques and many more.

With first day users thru battled scarred veterans :-) there is someone at your level of knowledge on the List. We are always glad to see questions from every level of user. So often a simple and seemingly embarrassingly easy question will lead to an interesting comment on a related topic.

New products, both hardware AND software, are discussed as to their relationship with Imagine and Amiga 3D rendering.

Names of Amiga luminaries dot the list, and often join in to lend their insights without the usual "noise" of a USENET newsgroup.

There are over 300 individual sites receiving the Imagine Mailing List, and they include many networks, BBS systems, user groups, and individual computer artists from literally around the globe. We share one thing. Interest in each other's work with Imagine.

YOU can get the Imagine Mailing List. All you need is access to Internet mail. Simply mail to the following address:

imagine-request@email.eag.unisysgsg.com

and in your subject line, enter the word "subscribe".

If you are reading this from a Commercial System, ask the Amiga Coordinator to set up an Imagine Mailing List area that everyone can read.

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1.13 SECTION 2 - Modeling and Detail Editor

1] How do I brushmap a ground plane?

The problem with brushmapping a ground plane is that the ground itself is off 90 degrees in relation to its' axis for proper brush placement. (Add a primitive plane, a ground and compare them). The following will properly set a ground wrap:

- 1) Add a ground object, select it, go into attributes, select a brush to use.
- 2) You will now be in a requestor for the type of brushmap and placement etc...
- 3) Select TRANSFORM AXIS
- 4) Click on ALIGNMENT and set X = -90. Leave Y and Z at 0
- 5) Click on SIZE and leave X = +640. Set Y = +2, Z = +400
- 6) Click on POSITION and Leave X = -320, Y = -200. Set Z = +1
- 7) Click on PERFORM.
- 8) If you want the brushmap to repeat forever click REPEAT.
- 9) Click OKAY.

Your brushmap will now be placed correctly. You can of course resize it on the X/Z axis if you wish for scaling purposes.

Basically step 4 re-rotated the brush axis properly and 5 and 6 fixed the size and position which Imagine screws up since it thinks it's brushmapping on the other axis.

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1.14 SECTION 2 - Modeling and Detail Editor

2] How do I make 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.

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1.15 SECTION 2 - Modeling and Detail Editor

- 3] The Slice command doesn't work or gives me errors.

Due to the complexity of doing a 3D slice, sometimes Imagine gives errors, or actually crashes during this operation.

Things to do if you plan on using this function are:

- 1) Save _ALL_ currently loaded object BEFORE trying to slice.
- 2) If you get an error, move one of the objects slightly and try again. Moving one of them may yield a working slice.

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1.16 SECTION 2 - Modeling and Detail Editor

4] I'm making a house which has many rooms and thus many walls, ←
 what is the
 best way of adding walls to the house so that they leave no cracks in the
 corners ?

Three possible methods ---

1. You can design your walls to be nice dimensions like 100 or 1024 instead of 383.38. Place your axis at the corner of each wall. Then, to get seamless joints, use "snap to grid" in the project editor which will instantly adjust your walls to a perfect fit (If wall lengths are multiples of the grid line spacing).
2. Create a 2D outline of the floorplan and extrude it up. Then simply pop a ceiling and floor on it. The floorplan

could be created either in Imagine or even a paint program and then auto-traced. This means you will have to bust up a few polygons to add the windows and doors, but that is a minor task if you have a complex floorplan.

3. A cheesy option is to make your walls too big. Then INTERSECT them. You get a mess BEHIND the wall, but if you don't look there, you'll never see it.

```

wall 1          |
-----+-----
          \  | /  |
bug-eyed 0.0   | wall 2
  monster v    |
              |
              |
camera X

```

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1.17 SECTION 2 - Modeling and Detail Editor

5] When I select a group of points in the DETAIL editor, all I can do is drag them... it doesn't let me ROTATE or SCALE that clump of selected points.

Imagine will let you move selected points, as well as rotate and scale them. The limitation is that you cannot do this interactively in Version 1.1 or earlier by using the mouse: The Transform command does the manipulation. 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 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.

Note: Versions 2.0 and later support interactive point editing.

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1.18 SECTION 2 - Modeling and Detail Editor

6] List of common Index of Refractions (and not so common too!)

(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

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1.19 SECTION 2 - Modeling and Detail Editor

7] How do you make 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

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1.20 SECTION 2 - Modeling and Detail Editor

8] How do I make "metals" and what are some good gold attributes?

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...

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1.21 SECTION 2 - Modeling and Detail Editor

9] Is there a quick way to add faces to my object without using the
 Slice command? ←

Here is a neat trick to add faces. This method works best with an object that is basially concave (such as a circle).

- 1] Make the outline of your object, i.e.: points and edges.
- 2] Extrude the object a distance away.
- 3] Pick all the points that were just made...i.e.: The ones that now comprise the back face. Using Bounding box selection would probably be helpful.
- 4] Choose Join!
- 5] Translate the now 1 pt back on the Y axis by the distance you extruded from, and position the point somewhere in the center of the object.

The object is now a solid faced object with all faces connected to one point on the center, just like the primitive disk object.

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1.22 SECTION 2 - Modeling and Detail Editor

10] How do I make "wireframe" objects?

There are at least two methods to simulate wireframe objects using Imagine (version 2.9 or higher), the first is memory expensive, it uses the Latticize function, the second uses new Death Star textures family (again, only 2.9 or higher):

- Use the Latticize function 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. If you just want part of the object wireframed, then select the edges you want in Pick Edges mode and perform the Lattice from there. This adds a lot of extra polygons though, a sample primitive sphere (24x12 sections) needs 14,608 bytes before, 92,224 bytes after the Latticize function.

Here's another way for creating the wireframe 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.

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1.23 SECTION 2 - Modeling and Detail Editor

11] How can I create seashells?

Tutorial by Gabriele Scibilia:

The following 10 steps show how obtain a scallop sea-shell (or something similar to it!):

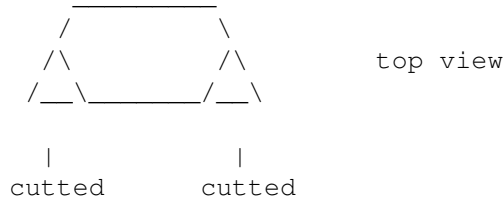
- Add axis
- Add lines like this (use front view):

```

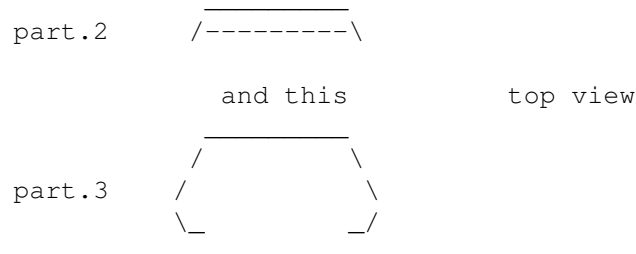
          z
      _   |   _   ...
     ._|  |__|  +---x  |__|  |__|.
-130          .... 0  ....          130

```

- Invoke the extrude req:
 - to length 200
 - scale x 0.5
 - sections 10
- Add a primitive tube: radius 120
- Scale down the tube: 70% only y (shift-y)
- Adjust the tube position to cut the extruded shape like this:



- Select extruded shape then tube and slice them
- Delete resulting objs except the 2 'planes' ('planes' should be part.2 and part.3):



- Select first part.2 and then part.3, join them
- Invoke mold req and conform to sphere:
 - sphere radius 100
 - object radius 320

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1.24 SECTION 2 - Modeling and Detail Editor

12] May I use more than four textures in Imagine v2.0?

Yes and no, to use more than four textures using Imagine v2.0 You can use 'Add axis' function, define texture/s (the axis one/s) with 'Apply to children' gadget on. Now You can group the axis to the object to avoid four textures limit, just one note: this little tip has some side effects with layered textures, just try it.

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1.25 SECTION 2 - Modeling and Detail Editor

13] How do I make realistic clouds?

There was several way to simulate 2d "non-realistic" clouds to use as background, You can:

- a. map some digitized pictures on a plane or a semisphere (or use a so called scenery generator and/or a mandelbrot generator utility like FractInt);
- b. use a mix of textures like filter noize and color noize (i.e filnoiz2, colrnoiz2, Imagine v2.9+) on two planes, the nearest to camera with white shades, the second with gray ones (isnt it overcast?).

How about realistic 3d clouds? I can advise You to map (with flat color map and flat filter map) or to use textures (the ones above) on many planes or shapes one behind the other, it can be a little tip.

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1.26 SECTION 2 - Modeling and Detail Editor

14] How do I create visible light beams?

Here it is an extract from a discussion between Charles Blaquiere and P.Sauvageau:

PS> I have find that the best way to make visible light is to use
 PS> conical shaped bright objects. I use linear texture to augment
 PS> transparency along the y axis, so the cone is semi-transparent
 PS> (160-160-160) at the source and full transparent (255) at the end.

CB> In addition, you could use the Ghost or Fakely textures; they
 CB> would give you more control over the transparency falloff. This is
 CB> off the top of my head, BTW; I haven't actually tried it to see if
 CB> it gives better/worse results than plain ole fog.

PS> One thing that I have done is to use FilterNoize applied on a
 PS> parent axis, with "Apply to children". When I rotate the light
 PS> cone, I do not move the parent axis. This way, you will see the
 PS> light beam moving in an immobile cloud of irregular smoke or fog.
 PS> One of the problem I encoutered is that Filter Noise seem to
 PS> override the linear transparency setting, so the beam do not appear

PS> to vanish as it come farther from the light source.

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1.27 SECTION 2 - Modeling and Detail Editor

15] How can I simulate underwater ambient?
 (little tip by Curcio Nicholas)

Enter the detail editor and follow these six steps:

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.

Enter the stage editor, place this object high above your scene; the light coming through the crumpled spots makes a great underwater effect.

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1.28 SECTION 2 - Modeling and Detail Editor

16] Does anyone have suggestions for emulating soft shadows?

Again, there are many working methods to simulate soft shadows using Imagine, try these:

- Place two lights in the exact same location. One will have the normal intensity that You want to illuminate Your scene & cast shadows. The 2nd light is less intense and doesn't cast shadows.
- Create a ring of about 10 lights each at 10 percent intensity in a ring. These will create soft shadows as if from 1 100% intensity light source. It does slow down rendering a little to have that many more light sources to have to calculate.
- Simulate soft shadows by using a bunch of lights closely placed on a plane (not a plane object, just a mathematical plane)

perpendicular to the stuff You want rendered. You may get some banding doing this, but with enough tweeking, the results are pretty good. Note: The total amount of light coming out of this light-pack should add up to no more than 255 in any one color if You're using non-diminishing light sources. For example, if You are using 10 light sources and you want a white light, set all the color params to 25.5. It's easiest to build all the lights by using axes in the detail editor and then group them (don't forget to make them all shadow casting).

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1.29 SECTION 2 - Modeling and Detail Editor

17] Can I create 2d/3d smoke effects? How?

Tips by Andrew Andrew McDonald:

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.

Tutorial by Massimiliano Marras:

```
- 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
```

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1.30 SECTION 2 - Modeling and Detail Editor

18] How bones work (by Lesk and Mark Decker)?

Tutorial by Lesk:

- Detail editor:
 - Add primitives: tube
 - Radius = 30
 - Height = 300
 - Circular sections = 12
 - Vertical sections = 3
 - close both bottom and top

Looking the front view You should have a similar shape:

```

.....
|||||| top section
.....
|||||| mid section
.....
|||||| base section
.....

```

Note that when we refer to a section that means the points above and below are selected. For example, the top section is:

```

.....
||||||
.....

```

The last row of points is used twice, once for top section and once for mid one.

- Select tube
- Mode, pick faces
- Pick method, drag box
- Shift select top section (points above and below)
- Functions, make subgroup, topl
- Deselect faces
- Shift select mid (all pts above and below mid faces)
- Functions, make subgroup midl
- Deselect faces
- Shift select base section
- Functions, make subgroup basel
- Deselect faces
- Shift select top and mid section
- Functions, make subgroup midall
- Deselect faces
- Shift select top, mid, and base
- Functions, make subgroup 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.

- Mode, pick groups
- Pick method, points
- Object, add axis
- Select this axis
- Move axis to center of tipl (top section)
- Deselect axis
- Object, add axis
- Select axis
- Move axis to center of midl (mid section)
- Deselect axis
- Object, add axis
- Select axis
- 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 the order correct.

- Mode, pick object
- Select axis for object
- Shift select axis in basel
- States, group
- Deselect
- Select axis in basel
- Shift select axis in midl
- States, group
- Deselect
- Select axis in midl
- Shift select axis in tipl
- States, group
- Deselect

What You have done here is simply grouped your axis. You now want to make certain that these axis are in the proper order so that when You bend say Your finger, they move just like Your finger would top to bottom. If they are out of order it will still work but it would look like some double jointed contortionist...

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. Deselect it and click on the axis in the mid section, both it and tip axis should be highlighted. Deselect 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!

So either clear it all out and start the project over or go back to group mode, select an axis and ungroup, repeating until everthing is ungrouped. Make sure there are no groupings at all! Then go back to object mode pick and sadly start again. You will get this, it just takes a little practice. Also this is not a replacement for the manual read through it so You have the concepts, believe me it will really help.

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 tipl
- Select axis in midl
- States, bones subgroups
 - bigsub: browse midall
 - smallsub: browse midl
- Select axis in basel
- States, bones subgroups
 - bigsub: browse baseall
 - smallsub: browse basel
- Save entire object/group now

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

- States, create default state
- Select buttons shape and grouping
- States, create start state
- Deselect all
- Select axis tipl and rotate in the x 30 degrees
- Select entire object
- States, bones update
- States, create bendtipl
- Select axis in tipl and rotate another 30 degrees in x
- Deselect all
- Select axis in midl and rotate it in x 30 degrees
- Select entire object
- States, bones update
- States, states create midbend
- Deselect 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, create basebend
- Save entire group again
- States, make stateanim
 - start
 - 15
 - bendtip
 - 15
 - midbend
 - 15
 - basebend
 - 15
 - start
 - 0
- States, play stateanim

I sure hope this works for You and if You find any errors or things that just don't work feel free to let me know.

Tips by Mark Decker:

I learned a few things that might help somebody else along:

1. Once you are in Pick Objects, pick first the parent axis, then the child axis. In Lesk's tube example, if the axes are numbered from top to bottom, first pick axis number two, then hold down shift and pick axis number one and group. Next pick axis number three, then hold down shift and pick axis number 2, and so on down selecting the object itself followed by the "root" bone and grouping them last. When I first tried this I was using the bounding box to pick both axes at once, and I think it may have been picking them in the wrong order.

2. It helps immensely to move any axes out of the way (shift M moves the axis of an object but leaves the object in place) so that they do not overlap while grouping. Once the grouping is correct, you can move the axis back into place without affecting the grouping.

3. Subgroup assignment is probably the trickiest procedure and was at the start the hardest part for me to grasp. It has not been well explained to date, but I'll see if I can help without muddying the waters any further. Each axis gets two subgroups assigned to it, helpfully referred to as "Big" and "Small". To the best of my understanding, the Big subgroup is the set of all faces which will be affected by motion of the axis. If a face is not in the Big subgroup, its never going to change no matter what that particular axis does. The Small subgroup is a subset of the Big subgroup, which means it can only contain faces which are also in the Big subgroup, but usually won't contain all of them. The Small subgroup moves and rotates with the axis, but all of its faces keep their shape and orientation with respect to each other.

So if the faces outside the Big subgroup don't change, and the faces inside the Small subgroup don't change shape, all that's left is the faces which ARE in the Big subgroup, but ARE NOT in the Small subgroup. These faces form the actual joint, and actually stretch and deform to keep the other two sets (the outside and the Small subgroup) smoothly connected.

Maybe an example will help. Think of a robotoid arm with no fingers, no wrist. It has two parts, a forearm and an upper arm, and hence two bones (axes). The parent axis (bone) sits at the center of the shoulder, with its Z axis pointing at the elbow. The child axis sits at the center of the elbow, with its Z axis pointing at what in a more highly evolved robotoid would be the hand.

You need two subgroups for each bone. Lets start with the forearm. The Big subgroup for the forearm will include all of the forearm and just a little of the upper arm above the elbow, enough to allow the joint to stretch to maintain a smooth connection. The Small subgroup will contain most of the forearm, up to just below the elbow. The faces around the elbow which are in the Big subgroup but are not in the Small subgroup will be the ones which stretch and deform to allow the joint to connect smoothly.

On the upper arm, the Big subgroup will contain all of the forearm, all of the upper arm, and a little of the shoulder it is attached to. The Small subgroup contains all of the forearm, and most of the upper arm up to just below the shoulder. Again, it is the faces

between these two where all of the deformation takes place.

4. Once your grouping is all set up, go back to Pick Groups and pick the actual object which is the parent of all these bones. All the axes should be turn blue (in the default color scheme) to indicate that they have been picked as well. Then create your "DEFAULT" state, being sure to select both Shape and Groups. You may need to select properties as well if you want to do brush or texture tacking, but I'm still having problems with this myself, so I'm not sure.

5. In order to manipulate the bones, you need to be in Pick Groups mode. You have to pick the axis you want to manipulate, rotate (or move) it, and accept the change. To see the result you have to pick the base object again (still in Group mode) and select Update Bones and it will then warp your object to conform to the new bone positions.

This has gotten a lot more long winded than I intended, but I hope it helps clarify a few things for someone.

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1.31 SECTION 2 - Modeling and Detail Editor

19] Halo around light sources.

There are several ways of doing this. The first method works under version 2.0 and 3.0, it takes the most work, but looks terrific if done correctly. The second method works under 2.0 and 3.0, and is easier, 3.0's version looks better due to the textures involved. The third method use Lens Flare and works only under 3.0.

You can refer to an easy example, a simple lightbulb. Think 2D for a bit, remember that the visible lightsource described is the type you'd see on film. What's a light look like? Well, there's a central disk of light that seems to be a constant brightness, the bulb itself. As you go further outward a secondary disk of light surrounds the central disk: this is the first halo, it is roughly twice twice the size of the central disk. It fades out rather quicky, it's, essentially, the part of the light that "burns" the film. Go further outward. There's a second halo, it's very dim and eventually fades out. This halo varies in size, but can usually be set to eight times the size of the original disk. This is the halo that is create when the light is dispersed by atmospheric conditions. So with that in mind:

Radial texture method:

- Create a disk using 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, Rotate the Z axis 180 degree. 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. The 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, 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.

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 Imagine v3.0 assign the Ghost texture to the foggy sphere, experiment with values.

If you're using Imagine 3.0 you can use the Sparkle texture. If you've downloaded Milan's textures (BTW, Thanx, Milan!) there is one itx in there that is useful, but my memory fails me as to the name. I don't have essence, so I don't know what there might be in there. Hope this helps...

Lens flare:

You could use the Lens Flare effect that comes with Imagine 3.0, just disable the flaring and have only the halo turned on. Easy.

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1.32 SECTION 2 - Modeling and Detail Editor

20] Can a reflective object inside a glass tube render properly?

You have discovered one of the famous "behind glass" raytrace bugs that have ALWAYS plagued Imagine. You also cannot get a glass attribute inside a glass attribute object to render! There is NOTHING you can do but try to fake the effect (i.e. wrap a brushmap around your sphere to imitate the surroundings, maybe a global brushmap would work?)

A possibly solution is to copy your glass tube and scale it slightly smaller or larger so you get a double-walled tube. You have to use a global map and an animated chrome spheres going up the tube. They all reflected the global map correctly.

So, what you should do is to make the glass-tube have both an inner AND an outer wall (make two tubes, one slightly smaller than the other and join them to a single object). Then put your chrome ball inside.

The secret is that the ray has to travel through two (2) faces with glass-attribute-settings (or any other transparent material for that matter).

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1.33 SECTION 2 - Modeling and Detail Editor

21] Help with Slice function, By J. Goldman.

Slice is so weird. Here are a few things I've discovered about Slicing.

Interestingly, you can Slice anything. You do not have to have multiple objects to perform a slice.

So what? Well, most of the slice problems I've run into arise from messed up object geometry. For instance, say you want to use boolean functions to create a complex object, *NEVER* Join and Merge objects you want to later Slice. It doesn't create sliceable geometry, always Slice objects together and then Merge, this usually insures good geometry.

To find out whether an object will perform well under a Slice, perform Slice on the single object itself, if you get errors the object will not Slice well in the future.

If that single object actually separates into multiple parts it means the object didn't have continuous geometry to begin with. Usually because of duplicate points. It probably won't slice well in the future.

Here's an example. Slice a primitive sphere, it should result in one sphere.

Now take two spheres, Join and Merge them and Slice. You'd think it would act like a single object. It should Slice to itself. If you do not get an error you'll get multiple objects proving that the object geometry was bad.

In any case you must fix the geometry. If your object errors you are fairly screwed unless you have a saved copy of the object with good geometry (i.e. an object saved before a function messed with its geometry).

If your object splits into multiple objects you must Merge those objects to create continuous geometry. Here's where I'm not sure what is really true. Can someone confirm this?

If you Merge an object duplicate points are not eradicated, if you Merge an object in Points Mode duplicate points WILL be eradicated. Is this true? If so, then to Join Sliced objects you should Merge objects AND points.

So, as advice try Slicing each individual object to be sliced. Make sure those are okay. If they are, Slice 'em. Merge (or Join and Merge) the resulting objects/parts the way you want (deleting unnecessary parts), and Slice the new object. If THAT'S okay then the next Slice should work.

I've gotten into the habit of testing the 'Sliceability' of every object I will Slice and every object I have Sliced. I rarely run into problems.

The one downside to Slicing everything (as opposed to just Joining) is that your poly count goes way up.

Imagine does need a better Slice/Boolean function...

Of course, if it's an edge to close to an edge problem you could just offset one of the objects to be sliced slightly...

Hope some of this helps...

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1.34 SECTION 2 - Modeling and Detail Editor

22] Fog object and global fog: undersea fog spotlight.

Tips by Dylan Neill:

I was reading through an old IML archive and saw that someone said that fog objects didn't work in global fog. Well I got news for you! It does! So I've made a little underwater scene with low rolling hills along the ocean floor and a submarine that appears from out of the fog. Ok so heres how you make a cool fog spotlight...

- Add a primitive cone (and leave it OPEN at the bottom for the best effect)
- Press F1 to select it
- Go into attributes
 - Set the fog length to 50
 - Make it bright
 - Add the ghost texture with these settings:

150	fog length at T
1	T
 - Hit OK and OK to get back to the detail editor
- Add an axis
- Select it with F1
- Go into the transformation requester
- Click position and type 100 in the Z box. Then OK

The axis should be sitting on the top of the cone.

- Rotate it -90 degrees around the X axis so that the Y axis points down into the cone.
- Press s and scale the whole axis object by a factor of 1.56 and press space
- Press s then l then shift Y to and scale it by a factor of 2.

The Y axis should now reach all the way down the cone.

- Go into attributes
 - Click light
 - Click on point source, round shape, cast shadows
 - Click OK
 - Add the light texture 'softedge' with default settings
 - Click OK to go back to detail editor.
- Select both the axis and the cone and select group
- Save it

And now you have a fog spot light to rival those of Lightwave. One thing to note though is that you must keep the wide end of the

object hidden in what ever you're lighting up. eg. if you are pointing it at the ground, scale it so that the wide end is underground. You can make another one which has a closed bottom but it doesn't look rounded like this one. Render two, side by side and find out.

Notes by Randy R. Wall:

Well, I can tell you why you think the fog object is working and that's because you have the ghost texture added to it, but I can tell you if you take this texture off the object it will not render the fog thicker for the object. In fact even with the Ghost texture it still doesn't look completely correct at the edges. Try using it with a thick global fog and you will see what I'm talking about.

It does produce an effect similar to what one would expect, and in a light fog would probably work just fine. But I wouldn't go so far as to say fog objects do render correctly. Try a fog object with a nebula, fogtop or fogpaint textures and you will see that the fog object becomes clear in spots.

Anyways, I'm not knocking your fog spotlight. It probably works great. It looks familiar to something I posted a tutorial on for 2.0 a long while back. But modified a bit for 3.0. Not that that's what you did. I'm just saying it looks familiar, but then many effects do.

But Fog objects by themselves still do not make the fog thicker.

But on the other side this can produce a nice shield effect for something.

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1.35 SECTION 2 - Modeling and Detail Editor

23] Disco ball effect: how simulate some sort of radiosity.

Alan Gordie:

Last night I was trying to do a disco ball effect, you know like saturday night fever:)

I made a primitive sphere and scaled and rotated selected points to make angular patches on the sphere then made it reflective 90% and put it inside of a box (extruded plane) then aimed two lights from 2 angles. Ok so far, but...

...when I render, I can see the reflection of the light on the wall in the sphere, but the light shining off the sphere is not hitting any of the walls...argh

Is this something which Imagine cannot do or am I doing something wrong?

Curcio Nicholas:

No raytracer (that I know of) can do this. To reflect lights you need a radiosity raytracer. These aren't too common and take forever to render scenes.

What you could do is make some sort of transparency map (or use the `transpar.itx` texture with something else as I did with the underwater lighting) and put a light source inside the disco ball so that the light shines out from the ball.

Goldman:

Actually, it's something ray-tracers in general can't do. Scenes are rendered opposite to convention. That is, a ray is traced from the camera to a light, not from the light to the camera. Therefore, light reflecting off of objects, bouncing, and in turn hitting other objects is not possible.

A technique exists, called Radiosity, that attempts to simulate "real-world" lighting effects. Unfortunately, Imagine (as well as the majority of commercial software on the market) does not have this rendering capability. It's just as well since the process is extremely processor intensive (read: takes a loooong amount of time), though the results can be stunning..

Since 3D visualization is just a simulation anyway, you can fake the effects with several well placed lights or textures.

I suppose you could make an inner sphere with lots of holes in it. Stick a point lightsource in this and have the whole thing rotate. It wouldn't be the best method (points of light would be sharp), but it would do.

Anyone know what would happen if you made a sphere totally transparent, but totally reflective? Would a lightsource (with shadows enabled) pass through it? Would the object look like glass from the outside (because of the high reflectancy) at the same time? If so, then take your original sphere object, give it 255, 255, 255 filter, and 255, 255, 255 reflect values. Hopefully, the inner sphere will act as a gobo/cookie thing while the outer sphere gives the impression of the disco-ball glass.

Craigh:

Sorry, ray tracing doesn't work that way (usually)...You need radiosity. The portion of the wall will check to see if lights are pointed at it when it is being shaded, but will NOT check to see if REFLECTED light is impinging upon it.

One way to do this:

Use Scanline rendering (or ray-tracing, but make sure the new lights are outside the disco ball if using ray-tracing). Set up a cluster of multi-colored blinking spotlights inside the disco ball that rotate with it and point outward.

The original lights will illuminate the disco ball and the new lights will illuminate the wall with the spinning/blinking effect seen in your favorite disco-theque! This will also allow you to use a nice lens flare since the new spinning spot-lights will occasionally point directly at the camera!

Randy R. Wall:

No Imagine won't bounce light off of objects (yet). But you could probably make a good fake for it using a Sphere with the RadWind and Transpar textures. And an axis set to a point source light inside of the sphere.

I haven't tried this but am sure with some work it would shoot little squares all over your walls as you rotate your disco ball. One problem I can think of is you may not be able to have the nice reflective look that the object you have already tried. But then with the correct setting it might be possible. Maybe the metal texture set to chrome on the sphere as well might help?

I'm only gueussing with all of this but do believe the Transpar texture will be the key to success.

Randy R. Wall:

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 did not 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 still 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 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..

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1.36 SECTION 2 - Modeling and Detail Editor

24] How can I create a candle flame?

Tips by Torgeir Holm:

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.

Tips by Mike Rivers:

If you have version 3.0 or higher, here's a free candle tip:

- Make a brushmap with a vertical gradient from the white (top) to black (bottom).
- Then make another brushmap that is solid white. Apply the gradient map to the candle as a 'reflectivity' map and apply the solid white map as a 'reflection' map. This makes the candle stick glow like a real lit candle.

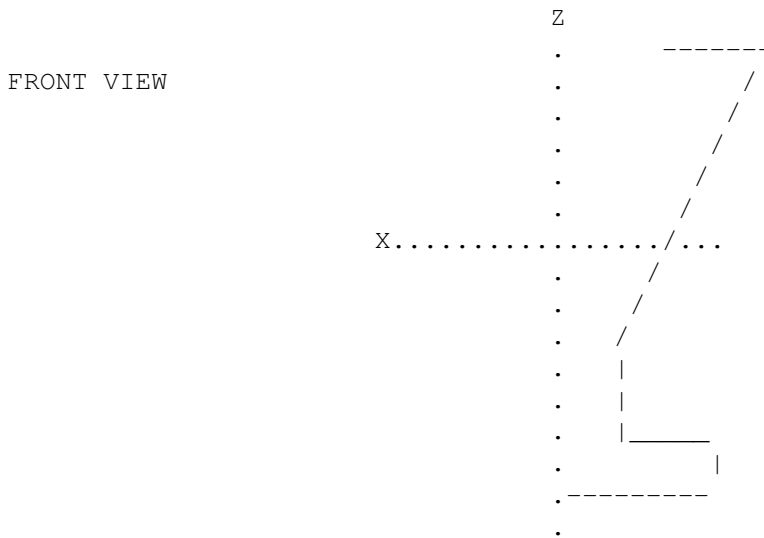
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1.37 SECTION 2 - Modeling and Detail Editor

25] What are the differences between Spin and Sweep functions?
(By Pierfrancesco Parente and Robert Byrne)

Spin uses the Z axis of the object as the pivot point and the first and last points should be at the same X coordinates otherwise the object will be lop-sided. Sweep, on the other hand uses the first and last points of the outline as the pivot.



If You Spin this object the top will be closed with its centre offset. If You Sweep it the top will be open and symmetrical.

You have to remember:

- BOTH Spin & Sweep use the Z axis as the pivot;
- Sweep rotates ALL the points of the outline around the pivot;
- Spin rotates all the points of the outline BUT the first and the last ones, which just remain in place.

Spin is useful when trying to build a closed top/bottom lathe object (paying care that the first and the last points of the outline fall right on the Z axis), since Sweep fails in this. Also Sweep is to be used when the outline to be spun is a closed one (e.g. when making a torus of a circular outline) since Spin is definitively not recommended for this.

SP & SW always rotate the object along the local Z axis of the object, so You can obtain different kind of rotations by moving or rotating the object's axes only (select "Transform Axes Only" in the Transformation Requester or press the Shift button in interactive mode).

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1.38 SECTION 2 - Modeling and Detail Editor

26] Modeling strategies: modeling hands, feet, etc...

I've noticed a few questions asking how to model complex shapes such as hands, feet, talons etc. I use a variation of the rotoscoping technique to model some very complex objects.

The way it is done is to first digitise or draw a 2D version of the object You want to model (to model a humanoid I've used a digitised version of Leonardo DaVinci's drawing so I'll use that as an example). The picture must be a two colour iff (for Amiga users) with the shape filled completely. Use the detail editor's Object/Convert Iff/Ilbm menu selection, and click on Don't Add Faces (You can let Imagine add faces if the object is not too complex, but it's risky).

Extrude the resulting shape to the default values, then create a primitive plane with as many points as you think You will need for the object (for DaVinci's human I used the default 10x10 plane). Scale the plane until it's at least twice as big as the object (no need for precision), and move it so that the bottom quarter cuts through the middle of the extruded object (to minimise problems with Slice). Then shift-pick both objects and select Object/Slice from the menu.

Once slice has done its stuff You'll be left with all the objects grouped together. Switch to Pick Object mode and pick and delete all the objects except the cutout shape. Extrude the cutout to the default values, except with 3-6 rows depending on how complicated Your object need be (I used 4 for DaVinci's human). Go to Pick Points and Drag Box mode and shift-pick the top layer of points, scale them to make a rounded profile, and do the same for the back.

Shift-Move the axis to the neck and use Pinch, Shift-Move the axis to just below the chest and use Taper.

Switch to Pick Faces mode and go the bottom of the legs. Shift-Pick the lowest faces at the front of the legs (use Fracture if You need more points), extrude to form feet, and voila - a (very rough) bones-ready human.

I already have a few heads, hand and feet (made the same way) ready to splice onto any human I make, and I find it handy to keep this rough shape in my objects collection. With a bit of detailing it can be made into a variety of different people.

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1.39 SECTION 2 - Modeling and Detail Editor

27] How can I create neon lights?

Tutorial by Mike McCool:

Using a path, created in the shape of the desired neon, I extruded a disk (align Y to path, and the more sections, the smoother the tube will look -- but the longer it'll take to render).

Next, I extruded a second disk, smaller than the first, but along the same path. What You want is a tube within a tube.

Invoke attributes on this second, inner tube, and make it the desired color of your neon. Also, make it a Bright object.

Invoke attrib's on the first, outer tube, and leave it the default color, all white, and in Fog Length, type in 100. You want it a fog object. The fog tube gives the neon its 'glow.'

Delete the path, and group these objects, and You've got Your neon tube.

Here's where the fun begins, and the appearance of Your tube will depend on how You plan to use it. For that NeonCool pic, ala Aminet, I made all the inner tubes, the colored ones, lightsources. This works fine for neon floating in black space -- but if You want it to actually illuminate something, or have it sit in front of a wall, or a backdrop picture, you have to be more subtle with your lighting. Otherwise, You'll be completely washed out with colored light, and the effect of the neon tube will be lost.

I uploaded another pic to aminet; I think it's in pix/trace, and it's called LouvreAtHome, in which my 'cool' neon letters are mounted on the back wall of a room. To get the right effect of glowing tubes, I found it best to have only a couple of the letters of the 'cool' sign actual lightsources (I picked the o's, for symmetry). I added an axis to the original 'o' object, made it a Lightsource, with a color to match the color of the desired neon.

You've played with lightsources already, so you know it takes some tweaking to get the desired effect. You don't want the neon to wash out the entire scene, so experiment with the Lightsource options (Control Falloff, Diminish Intensity) to get the look you want.

Please note that I do NOT deserve credit for this method. My tutorial is based on a compilation of advice from several Imaginoids. I'd list their names, but that portion of my brain that retains relevant memories was accidentally drained during a routine flush operation.

Tutorial by Granberg Tom:

Make Your Object, make it bright, put the fakely texture on it, adjust the colors to Your liking. Bright color in the center and a darker one at the edges.

If You use tubes (disk) object as Your base for extrude's, it will not make any difference to where your camera is placed, due to the fakely texture it will make the vectors facing the camera brighter than the others (vector normals). Now go to the Action editor and add the haze global effect, type in the same values You've put in for the side color in the fakely texture. This way You get a good neon effect even in scanline.

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1.40 SECTION 2 - Modeling and Detail Editor

28] How can I get a checkered plane with checks of different textures? ↔

Two planes are used to create the effect.

The plane on top has it's object attribute filters values set to 255, 255, 255; it has the CHECKS2 texture applied to it also. You may apply the first texture to be used on the checker board.

The plane on the bottom, positioned 0.5 units below the top one has the second texture You'd like to use, the CHECKS2 texture isn't needed: the filtering of the first plane allows the second plane to show through were the CHECKS2 does not apply its color values.

You can also let the top plane filter values 0, 0, 0 but change these in CHECKS2 parameters.

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1.41 SECTION 2 - Modeling and Detail Editor

29] How can I simulate the effect of a bright light reflecting off thousands of tiny particles suspended in air? ↔

A lot of You have been talking about using a fog object to

simulate the effect of a bright light reflecting off thousands of tiny particles suspended in air (well thats what it is). Here is a sort of short thing You can try to further the effect:

- Add a cone.
- Make it white and bright.
- Add the textures FILTNOIZ and MNTTOP.
- Add the MNTTOP texture, align the Z axis so its running down in the direction of the light. Adjust the length of the Z axis so the axis reaches all the way to the end of the cone. Make the texture color white, the filter 255, 255, 255 and reflect 0, 0, 0.

Now comes the fun part: the noise settings can be anything, anyway use numbers that are relatively low, i.e. magnitude .5 and velocity 1.0.

The filter noise is really just an addition to help make the texture appear blochy. Why? Because "the distribution of particles in an area is not perfect throughout the entire area but rather, more highly 'active' in some, although the average of the area is generally the same as other areas", anyway, add the texture and make the Z axis align with the cone (like the previous texture). Then make the "size" larger in the Z direction than in any other. Finally make the amount of noise high to cut up the spheres.

The effect should fade with distance and have the little bloches. The MNTTOP texture should go second not first in the list.

Well, you could always add an empty axis as the parent of Your object and apply the textures to this parent axis. Make sure the "Apply to children" button is activated in all textures and You have a group where the actual beam of light is free to move but the textures will stay fixed in space. Now You can animate Your object through states without touching the parent and the textures will follow world coords, producing the spotlight-in-smoky-room effect You want.

Any fog textures that need to go on the object itself (such as Fog Top, or Ghost) don't need to be mapped to the parent. These could go directly on the cone, since they don't deal with the noise effect, but rather with the fog length of the object. Adding the nebula texture to the parent might look good though.

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1.42 SECTION 2 - Modeling and Detail Editor

30] I still have questions about the bones feature, let's say I ↔
 had
 a "can" object of coke and I want to make it dance.

Tutorial by Rick Valleyview:

I have plans for writing a tutorial to make an animated figure (bones, constraints, edge fill, etc), all that's needed is time.

For now I'll assume You know the basics of bones.

Let's make a can with 3 sections. To make bones work decent You should at least have 1 or 2 sections in between Your bone sections (the more sections, the smoother the bends). So we'll make a can with 7 vertical sections.

Put an axis at the bottom of section 1 (the bottom one), section 4, and section 7 (top). In the attribute requester name them bot, mid, and top.

Enter Pick Group mode. Click on mid, then top: Group them. Click on bot, then multiclick mid. Group them. Click on the can axis (which now becomes the parent), then multiclick bot. Group them.

Make this Your "DEFAULT" state.

Pick Face mode. Multipick the top row of points (faces of top of can). Make this Your Small Bone Subgroup for the "top" axis. Multipick the top 3 sections of the can. These are Your Big Bone Subgroup for "top". Multipick the top 4 sections of the can. Make these Your Small Bone Subgroup for "mid". Multipick the top 6 sections of the can. Big Bone Subgroup for "mid". Multipick all sections of the can and make Your Small Bone Subgroup for "bot". We'll also use all sections for Big Bone Subgroup for "bot". This allows us to deform the whole can without moving the "bot" axis.

There are two ways to twist our can.

Direct method:

Pick Group mode. Pick "top" or "mid" and rotate them around Z. Click on can axis. Click on "Update Bones" menu item. We can also rotate around X or Y to bend the can over. Try it.

Set "State" to "DEFAULT".

Inverse method:

Pick Object mode. Pick can axis. "Freeze" all world axis. Pick "Constrain" menu item. Pick "top" axis. Rotate and see all 3 axis rotate different amounts. Pick Group mode. Pick can axis and "Update Bones". Again You can also move, which affects all the bones to bend the can.

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1.43 SECTION 2 - Modeling and Detail Editor

3] Constrain, freeze, release: inverse kinematics.

Let's first look at bones. Bones objects are like a family, You start with a parent, then have children, grandchildren, etc.. Any bones object can have any number of children but will have only one parent.

There are two ways to manipulate bones objects, directly (there probably is a better word) or inversely.

When You move an object directly, You're moving from a parent's point of view. Any manipulation to You affects all of Your children, grandchildren, etc.. In Imagine You do this by picking in "Pick Group" mode any bones axis and manipulating it. This will also move, rotate, etc.. any bones objects that are down the family tree from it.

When You work inversely (Inverse Kinematics) You are working from the child point of view and affecting all of the way up the family tree. In Imagine You do this by clicking on the "Constrain" menu item.

For example, take a human-like object.

In direct mode click on the thigh "bone". Rotate it and the shin bone and foot bone move with it.

In inverse or constrain mode click on the foot bone. Rotate it and all of the other bones in the body move. This is because You are affecting up the family tree, and parents always affect down the tree to the other children.

This is where "freeze" comes in.

First click on the hips bone ?:) and click on "freeze" menu item. Check all of the axis in world. This freezes the hips from moving. Now go back, click on "constrain", move the foot bone. The shin bone and thigh bone move with the foot bone but nothing else. You can also use "freeze" to only limit movement to certain axis. In the above example You could keep the shin bone to move only as a knee would bend. Some programs even allow You to limit movement in an axis to a certain number of degrees or range of movement.

As it seems to me, direct mode is useful to pose a figure or object in an unusual pose or where placement is more on looks than on exactness. Inverse mode is useful to position a piece of an object in a certain place.

For example, use direct mode to position a cheerleader's arms. Use inverse mode to place a person's foot up on a step.

Make sure You watch what mode You are in! Direct mode use Pick Group mode and inverse mode uses Pick Object mode.

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1.44 SECTION 2 - Modeling and Detail Editor

32] Inverse kinematics: getting started, By Randy R. Wall.

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 pick Axis.1 and then set it's Z position to 50 (using the Transformation requester). Now set Axis.2 Z position to 100. 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. 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.

Go into Pick Objects mode (Kinematics will only work in this mode). Select the bottom Axis and then select Freeze: in the Freeze menu set Rotation World X, Y and Z on. Set Constrain and 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. If we wanted to limit this group more we could do the following.

Set ALL axis so Rotation World Y and Z are set, un-set the bottom Axis's Rotations. 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, 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, 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. 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, select the middle axis and press R then X to 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, un-set the bottom axis

Translations and Rotate its axis on X to rotate the whole group. Or to do a similar effect 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, 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.

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1.45 SECTION 3 - Forms Editor

1] I was working in the forms editor on an object, and loaded it into the detail editor for modification. However, I can't seem to be able to get it back into the forms editor! Help! ←

Simply put, you cannot load objects saved from the detail editor back into the forms editor. The reason is the forms editor requires a specified object structure which the detail does not. Thus, saving an object in the detail editor loses that information.

When you work with the forms editor is recommended that you keep a spare copy of the FORMS OBJECT saved separately from any detail object. In this way you can then go back and make modifications in the forms editor.

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1.46 SECTION 4 - Cycle Editor

1] I made this really great animation sequence in the cycle editor, but when I set it up in the stage/action editors, the motion of the overall object isn't there! ←

When using the cycle editor, Imagine only remembers changes in size, position, and so on in relation to the main parent. Thus, if you make a change to the parent object, it gets forgotten. What this means is if you make a nifty robot jumping cycle, and make it in the cycle editor so the robot actually move up etc... all that will be remembered is the changes to the legs, arms and anything

OFF of the PARENT. The overall rotations and movements to the main object will be gone.

Two solutions exist. One is to simply make those changes in the stage editor each time you need to. The second is to group a plain axis before you start to your object. (ie: Make the parent have a Null link). Then, you can rotate everything by rotating the main child grouped right under this null axis. This way you aren't moving the "parent", and everything will be remembered.

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1.47 SECTION 5 - Spline Editor

1] I tried to import a Postscript font but I got a "Vector not found" error. ←

What does this mean?

There are a couple of different formats of Postscript files. If Imagine doesn't like one, it will pop up this or other errors. In that case you will either have to use another Postscript file, or find a software package that will convert it from that format to one Imagine will load.

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1.48 SECTION 6 - Animation, Stage Editor and Action Editor

1] Even though I move an Object/Camera/Light to a new POSITION/ ←
 ALIGNMENT/SIZE

in the STAGE editor, Imagine seems to 'forget' what I did!

All objects must have timelines split wherever there is a change in position, alignment or size. If you do not set this up, Imagine will forget the changes no matter what.

Rather than going back and forth to the ACTION editor and adding timelines, you can have Imagine automatically create the timelines properly so everything tweens as normal. There are the "Position Bar", "Alignment Bar" and "Size Bar" commands under the OBJECT menu in the STAGE editor.

So, if you have just gone to a frame and are making a new POSITION, ALIGNMENT or SIZE for an object (or camera or light) to tween to, press RIGHT AMIGA and 7/8/9 respectively. Or use the respective bar commands from the OBJECT menu. This

will extend or put a 'split' in the timeline for you (you can check this in the ACTION editor). Also, don't forget to "Save Changes" if you want to keep the motion!

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1.49 SECTION 6 - Animation, Stage Editor and Action Editor

2] How do I use the Grow Effect?

To use the grow effect, create an object in the DETAIL editor that you wish to have 'extrude' over time. Create a spline path as normal in the detail editor. This will be the path the object extrudes along during the animation.

GROUP (not join) the object with the PATH AS THE PARENT. If you do not make the path the parent, it will not work. To do this, select the path, then hold shift and select the object, then select group. Save your GROUP for loading in the animation.

Finally, add the effect in the ACTION editor for the grouped object.

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1.50 SECTION 6 - Animation, Stage Editor and Action Editor

3] How do I use the Tumble Effect?

The tumble effect is used to tumble 1 or more objects during an animation. To tumble an object, create your object or objects in the DETAIL editor. Still in the detail editor add an axis.

Group (not join) the AXIS to all the objects you want to tumble with the AXIS AS THE PARENT. Then load the GROUP into the STAGE/ACTION editor and add the effect as normal.

NOTE: The reason for the null object (axis) as parent is that Imagine does not TUMBLE the PARENT, just the children.

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1.51 SECTION 6 - Animation, Stage Editor and Action Editor

4] How do you get something to roll (at the right speed!) while following a path? ←

Getting an object to spin (like a plane doing a barrel roll) is easy- you align to path, then set Y rotation to be from 0 to 360 and it will do a complete spin. This is not in the right direction for a rolling ball, though. [Annoying feature- you can't say from 0 to 720 for two spins, or 0 to 3600 for ten.] To get it to roll I created a second path, which was basically a larger copy of the first, so the first path was just inside of the second path. I had an axis (a track) follow this new, outside path, then used "align to object" to make the sphere point to the axis.

Thus, as the ball moved along its path, one end (the positive Y axis direction) was always pointed at right angles to the direction of motion. Is this clear? Now using the "initial Y angle" and "final Y angle" I set them to 0 and 360 and it rotated as it rolled. As a special effect, I raised the "track path" a little in the Z direction so the sphere looks a little bit like a top rolling around, since the spin axis was not horizontal anymore.

An alternative would be to make a cycle object, rolling around the X axis. This is equally valid, but I did it this way first.

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1.52 SECTION 6 - Animation, Stage Editor and Action Editor

5] When I move a tracked Camera in the STAGE editor, it doesn't realign and draw the Perspective view correctly! ←

If you have Imagine 2.0 or higher, press RIGHT AMIGA and the K key together, or select "Camera (Re)track" from the OBJECT menu. This will make the camera repoint to the track from the new position and will redraw the perspective view.

If you have an older version of Imagine (or if you just want to) you can press RIGHT AMIGA and the C key or select "Goto" from the FRAME menu. Go to the current frame you are already on which will cause imagine to redraw everything.

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1.53 SECTION 6 - Animation, Stage Editor and Action Editor

6] I have found that after creating a scene in the Stage editor, and then

deciding that I want an animation and adjusting the highest frame count, my scene gets mangled in the first frame. Why?

Well, it seems to me that this will happen if you don't split your channel bar from the first frame (where you want stuff to be exactly) to the second frame. I usually setup my scenes so that I have the first frame all set as it should be and then I do my transformation from frames 2-whatever. In this way, the first frame is ALWAYS where it's suppose to be no matter what changes I make in the remaining animation. If you look at your channel it should have a break between frames 1 and 2 and then be continuous (if that's the way your animation works out) from 2 on.

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1.54 SECTION 6 - Animation, Stage Editor and Action Editor

7] How do I use the Sway Effect?

Sway is used to make several objects oscillate back and forth on their own axis. You can use it to create underwater grass, or an army of those obnoxious red liquid-filled glass birds!

Just create all the objects you want to animate, then group them to a parent axis, load the group in the Stage editor, then add the Sway FX bar in the Action editor. Sway will make all children of a parent object oscillate; the parent is unaffected. The key is in the grouping: using Sway on a single object will do nothing, since the parent is never affected and in this case, there would be no children to affect.

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1.55 SECTION 6 - Animation, Stage Editor and Action Editor

8] Depth of field, By George de Beaumont.

I've spent a fair amount of time investigating Imagine's Depth of Field feature and thought I'd share my findings. The following text is long winded, excessively formal and has not been reviewed for errors. Still, You may find something of use. If not, don't hesitate to delete...

Depth of Field - Overview:

According to the addendum text file accompanying Imagine 3.0, the Depth of Field (DOF) feature was added late in development and is therefore not covered in the manual. While the supplemental DOF text file is brimming with potentially useful information, it has not been prepared with the average end user in mind. Compounding this problem is a less than intuitive DOF interface (DOF and 3D stereo imaging share the same parameters and requester box). The result is an exceptionally high learning curve. The goal of this text is to strip away the noise associated with the mixed function interface and provide a practical explanation of the Depth of Field feature.

Depth of Field - Useful Photographic Concepts:

Imagine 3.0 simulates many of the real world relationships associated with photography/videography. These include:

Focal point:

It is the point of perfect focus. Objects nearer or farther tend to be blurred, although an acceptable field of focus extends for some distance on the near and far sides of this plane.

Depth of field (DOF):

The Depth of Field is the range of distances from the camera over which focus is considered adequately sharp.

Field of view (FOV):

FOV is the width of the camera viewing area (usually expressed in degrees). FOV depends on the lens focal length.

Focal length:

This is the distance behind the lens (usually expressed in millimeters) where the image will be in sharp focus. The focal length also provides an indication of the FOV the user can expect from a camera system. The terms FOV and focal length are used interchangeably in this text. Common focal lengths and their associated FOV are given below.

focal length (mm)	fov (degrees)	lens type
-------------------------	------------------	--------------

17	180	fisheye
20	94	wide angle
28	75	wide angle
50	46	standard
55	43	standard
100	24	intermediate telephoto
135	18	intermediate telephoto
200	12	long telephoto
500	5	long telephoto

Aperture:

The aperture of a lens is the opening through which light is admitted. In photography/videography is desirable to be able to adjust the amount of light passing through the lens. This is accomplished via a variable diaphragm. A wide aperture lets in more light but at the expense of a greatly reduced DOF.

The effect of focal length, aperture size and focal point on DOF:

It is the interaction of the focal length, aperture size and focal point which determine the DOF for a specific situation. In general:

- a) Shorter focal lengths provide increased DOF;
- b) Narrower apertures provide increased DOF;
- c) Focal points farther from the camera provide increased DOF.

Depth of Field - Imagine's Photographic Counterparts:

Imagine's DOF, FOV (or focal length) and aperture controls are intimately associated with the camera's X and Y sizes.

FOV:

We have all adjusted the camera view interactively via the angle (A), zoom (Z) and perspective (P) controls associated with the perspective view in the Stage editor. What follows is a description of how Imagine numerically handles some of this information.

The camera's FOV depends on the RATIO of the camera X and Y sizes. These values can be examined via the Transformation requester (Stage editor) or Camera size timeline (Action editor). The important thing to remember, is that a particular X or Y size does not determine FOV, but the ratio of X/Y (X divided by Y) does. There are MANY X and Y values that will yield the SAME X/Y ratio (and therefore the same FOV). See the following examples:

X	Y	X/Y	FOV (degrees)
100	320	.31	18
200	640	.31	18
100	200	.5	55
320	640	.5	55

Changing the FOV numerically:

As the X/Y ratio changes, so does the FOV. If You decrease X or increase Y (make the ratio smaller) You will zoom in (narrow the FOV). If You increase X or decrease Y (make ratio larger) You will zoom out (widen the FOV). When modeling real life situations, the following may be used as a guide for setting Imagine's FOV numerically.

focal length (mm)	fov (degrees)	X/Y ratio	example X/Y
20	94	2.19	1400/640
28	75	0.68	435/640
55	43	0.50	320/640
100	24	0.43	277/640
135	18	0.31	200/640
200	12	0.22	143/640
500	5	0.04	28/640

An examination of the FOV and X/Y ratio values show that they do not change proportionally (i.e. doubling the ratio does not double the FOV). The relationship is logarithmic. That is, making a wide FOV wider requires a much greater change in the X/Y ratio.

Be aware that wide FOVs produce considerable distortion, especially at the edges (certain portions of the image will appear disproportionately large).

Focal point:

Imagine's focal point is associated with the camera Y axis (the camera view points in the direction of the Y axis). Until the DOF feature is activated (in the Action editor), all objects will be in perfect focus (infinite DOF) and a specific camera Y size is not important. When the DOF function is activated the camera Y size will have a dual role (we already know that the camera size X/Y ratio affects FOV). When DOF is activated, the camera Y size will also specify the distance from the camera which is the point of perfect focus (FOCAL POINT).

Depth of field:

In a real camera, it is the interaction of the lens focal length, aperture size and the point of focus that determines the DOF. In Imagine, the DOF can be configured in several ways. It can be set to a specific numerical value independent of the aperture size or FOV (or focal length). If desired, the DOF can be tied to an apparent aperture size and FOV to allow the simulation of camera optics.

Aperture:

Imagine 3.0 has only a limited notion of aperture size. Imagine uses an apparent aperture size to influence the DOF. This aperture size does not in any way affect the amount of light reaching Imagine's virtual camera. Lighting changes must be done by altering the intensity of ambient lighting or the individual light sources.

Depth of Field - Overview of the DOF/3DS requester:

To activate the depth of field function, You must go to the Action editor and add an Actor bar to the camera timeline. This will open up a the 3D Stereo/Depth of Field Requester box. The following check/data entry boxes deal with the 3D Stereo image features and can be IGNORED when adding simple depth of field to Your project:

Y Size is (3DS) Screen Distance (check box)
Distance Multiplier (data entry box)
Eye Separation (3DS) (data entry box)
Eye Sep is Screen Width Multiplier (check box)
Eye Sep is Actual Size at Scrn Dist (check box)

The check/data entry boxes that pertain directly to DOF are:

Y size is DOF focus distance (check box)
Aperture size (DOF) (data entry box)
Ap. size is DOF width multiplier (check box)
Ap. size is actual size (check box)

Depth of Field - Activating DOF feature:

Check the "Y size is DOF focus distance" box to activate the DOF feature.

Depth of Field - Choosing static or dynamic DOF:

Next, check one of the two following boxes:

Ap. size is DOF width multiplier (static DOF)
Ap. size is actual size (dynamic DOF)

Which one You check will depend on whether or not You need to animate the DOF effect. For example, You may want to animate the DOF effect to simulate the optics of a real video camera. If You were to focus a video camera on an object (at some intermediate distance) and then zoom in (close-up), You would observe that the background would progressively become out of focus.

Depth of Field - Configuring the Aperture Size (DOF) data entry box:

Imagine will interpret the value that You enter into the "Aperture Size (DOF)" box differently, depending on whether You chose the static or dynamic version of the DOF feature.

Static DOF ("Ap. size is DOF width multiplier" box checked):

This DOF option is static in the sense that changes in the FOV (X/Y ratio) do not alter the DOF. The value You enter in the "Aperture Size (DOF) box" will be multiplied by the pixel width of the image (set in the Project editor). The product of which will be the maximum defocusing that will occur for objects in the distant background (in pixels). Larger values result in a narrower DOF and greater defocusing of distant objects. In lieu of using the following equation, entering a small number (0.01) will usually provide an acceptable starting value.

The equation for determining the Aperture Size (DOF) box value:

$$A = D/W$$

where:

A = Aperture Size (DOF) value

D = Desired maximum defocusing (in pixels)

W = Image width (in pixels)

Example: if You wanted the maximum defocusing to be 6.4 pixels (at distant background) divide 6.4 by the image width (set in the Project editor):

$$1) A = 6.4/640$$

$$2) A = 0.01$$

Dynamic DOF (Ap. size is actual size box checked):

When You choose this option, DOF becomes linked to the camera X size value (see the equation below). This DOF option is dynamic in the sense that as You change the FOV (X/Y ratio), the DOF also changes. The dynamic DOF option can be animated to simulate camera optics. Like the static DOF option, larger values result in a decreased DOF and increased defocusing of the distant background. In lieu of using the following equation, entering values in the range of 2 - 4 generally provide an acceptable starting point.

The equation for determining the Aperture Size (DOF) box value:

$$A = DX/W$$

where:

A = Aperture Size (DOF) value

D = Desired maximum defocusing (in pixels)

W = Image width (in pixels)

X = Camera X size

Example: You want a maximum defocusing of distant objects to be 6.4 pixels. You have set the camera FOV. The camera X/Y ratio is 320/640. The image width (Project editor) is 640 pixels.

$$1) A = (6.4 \times 320)/640$$

$$2) A = 3.2$$

Depth of Field - Setting Point of Focus:

As previously mentioned, once the DOF function is activated, the camera Y size determines the focal point. The trick is to vary the Y size (change point of focus) while keeping the desired focal length (FOV). This is accomplished by first activating the camera line function (Stage editor/Display menu). Next scale the camera, using the Y bounding line (Top view) as the guide for determining the point of

focus. As long as the X and Y axis are scaled proportionally, the focal length (FOV) will remain the same.

Depth of Field - Summary:

This text provides the basics for implementing the Imagine 3.0 Depth of Field feature. Use of 3D stereo imagining (LCD shutter glasses) with Depth of Field has not be covered. These instructions should provide a sufficient basis for understanding the Impulse supplemental text.

While Impulse's implementation of Depth of Field is not particularly intuitive, it does offer lots of flexibility and artistic potential. For instance, You could progressively defocus one object while bringing another into sharp focus (thereby changing the viewer's point of attention) by transitioning between two equivalent X/Y camera size ratios. There are undoubtedly many other ways to use this feature creatively.

Be aware that the amount of defocusing adversely affects rendering time. Severe defocusing (narrow DOF) not only results in longer rendering times but also does not always yield photorealistic results.

Depth of Field - Corrections to DOF text:

In the text I listed focal lengths and their equivalent field of view. The values are specific to a 35mm SLR type camera system (which I did not mention). This may mislead some who may want to simulate other camera systems (video or still). Even though focal length and field of view are related concepts, I was not technically correct to use the terms interchangeably.

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1.56 SECTION 7 - Rendering and the Project Editor

1] Why do objects render fine in Scanline, but disappear in Trace ←
?

There are 2 possible causes for this.

- 1) You are running out of RAM
- 2) You objects are outside of the World Boundary

To check #1 (for the Amiga), pull down The Project editor after you start a render during the initialization phase. Click once on the Workbench backdrop and you should see how much RAM you have on the top of the screen. As Imagine starts to render, this will decrease. If it becomes close to 0, chances are, that's your problem. To solve that, buy more RAM.

The other possibility is that the objects are outside of the world boundary. The world boundary is basically a box in which your objects are placed. When you enter the STAGE editor, you are placing objects in this "virtual box" whose center is 0,0,0.

When you Trace, Imagine clips ALL objects that fall outside of the box. The size of the world boundary is set in the ACTION editor. In this editor, there should be an item named GLOBALS. Whatever numbers are set in the SIZE timeline becomes the size of the box so that it lies from +/- Value for X,Y and Z. The default is no information present, which Imagine assumes is +/- 1024 units for all 3 coordinates.

Thus to fix this problem you can:

- 1) Scale your entire scene to fit inside the +/- 1024 size boundary
- 2) Add a size line and set the X,Y,Z to the values you need (This can be found by using "coordinates" in the STAGE editor and moving the cursor around to find the values)
- 3) Add a size line and set the X,Y,Z sizes to 0,0,0. This will force Imagine to calculate the world size for ALL frames based on where objects are for the FIRST frame. This is important since if your objects move farther out during subsequent frames, you will have to set the size manually (see 2 above) since it will now be outside the computed boundary, and thus clipped.

Note: The world boundary has no effect in Scanline rendering.

Note: Setting the World Size to 0,0,0 regardless of problems will usually DECREASE Trace times!

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1.57 SECTION 7 - Rendering and the Project Editor

- 2] I have a problem with Filtered objects and the Global Backdrop ↔
 !

For some reason, clear or glass like objects will not be clear when used with a backdrop. To get around this render with "genlock sky" and then use an image processing program to composite the rendered image onto the background pic for each frame. Fog objects have a similar problem.

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1.58 SECTION 7 - Rendering and the Project Editor

3] I have created an animation (Hurrah!) and when I look at each of the individual frames, they look just as I thought they might. However, when I animate them, anywhere I have applied the "roughness" parameter, surfaces look animated...with lots of "crawling" effect on them. What gives?

Roughness should NOT be used on objects that will be animated. (Unless of course, the "crawley" effect is what you're after). This is caused by a bug in the roughness algorithm. One of the main work-arounds suggested, is by using a very small or fine bump-map. Another work-around is to create a DPaint (or for that matter ANY IFF) multi-gray shaded screen and apply it as an altitude map.

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1.59 SECTION 7 - Rendering and the Project Editor

4] What situations, parameters, attribute values, etc. require the most rendering time?

The list is long: reflections and refractions increase rendering time significantly, anti-aliasing (0 longest)-BTW this you must edit in the .config file and resolve depth (also in .config file), number of polygons, camera position (obliqueness), size of brush maps and even the numerical entries of solid textures, resolution, display and render modes etc etc.

The big ones are refraction, edge level(antialiasing, reflection (along with "depth") and #of polygons. Pretty well in that order too. Remember that a higher refraction index is longer rendering time also. And yes the scale of the object means a LOT. Imagine uses something called an *Octree* to calculate the scene. This is related to the world size setting which is also discussed here in article number 1 above. The difference can go from *hours* to minutes, so scale your scene by the size you make your world. You can select everything in the scene (including camera and lights) and scale it interactively.

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1.60 SECTION 7 - Rendering and the Project Editor

5] How do I get rid of the "Jaggies?"

The .config file for anti-aliasing defaults to 30. This is ok, but not great. The best is 0 and final rendering should always be 0. So you must edit this file every so often (before opening Im) or build a front end on the work bench (requires programming knowledge, though). BTW, the anti-aliasing is EDLE in .config file.

{for those unfamiliar with the term jaggies - they refer to the way lines drawn by computers tend to have a jagged or stair stepped appearance, instead of a smooth continuous line. This is usually found more in low resolution images.}

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1.61 SECTION 7 - Rendering and the Project Editor

6] How do I figure out the pixel aspect for a certain resolution ←
 display? I am

rendering a picture to be displayed on a macII at 1024x768. Does anyone know the formula or is it device dependent?

Pixel aspect ratio depends both on the aspect ratio of the display device (your monitor) and the resolution that fits onto that screen. Most monitors use a 4 x 3 aspect ratio so that to achieve square 1:1 pixels, the resolution must also be 4:3. 1024 x 768 will achieve this as well as 640 x 480. The Amiga typically uses a non-square aspect ratio of about 1.2:1 such as 320 x 200, 640 x 400, 768 x 480, etc. So the pixel ratio can be found using...

(horiz res. / horiz display size) : (vert res. / vert display size)

If your monitor has a 4:3 aspect, you should have 1:1 pixels.

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1.62 SECTION 7 - Rendering and the Project Editor

7] When making a disco ball effect, will a SPHERICAL light set at ←
 255 be bright

enough to cause visible spots on the surfaces in a scene?

No, I bet that a light of 255 won't work too well. So crank it up to 2000!

Lights are not limited to 255 (It is logical that lights can be as bright as they want). Values above 500 or so are pretty severe; they cast strong shadows, like a very sunny day. Above 3000 or so and it looks like you're world is lit by nuclear weapons.

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1.63 SECTION 7 - Rendering and the Project Editor

8] I have a Amiga 3000/25. How long should it take to do a full ←
 trace picture

with perhaps one transparent (nearly) glass? Does 4.5 hours sound reasonable to you? I am running the floating Point version of Imagine.

The floating point version of Imagine uses inline floating point code for maximum speed. It does not use the libraries. I suspect that the non-FP version uses the libraries, just in case. You can probably SPEED UP your trace time SIGNIFICANTLY by scaling up the whole scene in the stage editor (see question 4 above!). A trace time of 4.5 hours on a 3000/25 definitely a "wee bit" on the high side for a scene as simple as you describe.

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1.64 SECTION 7 - Rendering and the Project Editor

9] Is there any particular format that Imagine prefers? Ham? 32 ←
 Color? EHB?

24 bit 1000 x 1000?

The best is a 24-bit image, of course. Anything works, but the color range of a 24-bit will beat the tar out of a 16 color any day. Exceptions would be objects with a few discrete colors, like a red, white, and blue flag. Then a 24-bit and a 4 color image are equal in quality. Note that Imagine converts them all to 24-bit internally, though- the memory goes down equally for a 100 by 100 4-color as it does for a 100 by 100 24-bit.

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1.65 SECTION 7 - Rendering and the Project Editor

10] I would like to use conical light sources with my rendering, ↵
 is there
 anyway "see" in wireframe where the light will fall?

** Note: In imagine 2.9, the ability to turn on 'Light Lines' was added in the Stage editor. The following describes another way to 'see' the light in the Stage editor before this feature was implemented. Of course you can still use this in 2.9 and above.

For conical lights, the X-axis size determines the radius of the light beam at the distance set at the Y-axis. This if a light has a X size of 50, and a Y-size of 200, the light would have a circle with the diameter of 100 units at a distance of 200 units from the light's axis itself.

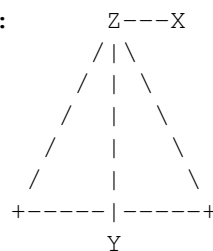
You can use this information to create a conical light object in the detail editor. By creating a wireframe light, you can then load the light in and actually "see" and resize it to get an idea for the lights size.

Add a primitive cone object. Then position the axis of the cone such that it is at the exact tip of the cone object. Finally rotate and resize the cone's axis so the Y axis extends to the end of the cone and the x-axis (which should allready be set okay) has the diameter of the cone.

The above can be done in 4 steps using the transformation requestor, make sure that the "transform axis only" box is checked in steps 2,3 and 4:

- 1] Add a primitive cone with default values.
- 2] Set the Position on the axis -100 on the Z-axis.
- 3] Set the axis alignment to -90 on the X-axis.
- 4] Set the axis size to X=50, Y=100, Z=50.

Front or side view of cone:



Once this is done you will now have a cone object with the axis set correctly to be a light. It is not yet however a light source. Go into the attributes requestor for the object and click on the box labeled "light". In here is a standard light box just like those in the action editor. Click on conical, and set the color and other options as you wish.

At this point you must remove any faces from the object. If you do not do this, when you render the object will will have a white cone. Simply go into "Pick Faces" mode and then "Select All" of the faces and finally "Delete" or "Cut" them. You will now have a wireframe cone light. Save this object.

From now on, you can load this as a normal object into you renderings and resize, scale and move the light around as you wish. The only drawback to this

method is that to change light parameters such as color or shadows, you must re-edit the object in the detail editor and then resave it.

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1.66 SECTION 7 - Rendering and the Project Editor

11] How important is lighting for a rendering, and is there any " ←
 preset" method
 used to get good results?

Lighting in computer graphics is a very important element in creating images. It takes a while of experimenting with different types of lights and settings to get good results, but there is one basic setup that can also be used as a starting point.

The basic approach is one used for lighting real world video scenes. It is known as a "3 point" light setup since it involves 3 light sources.

The first light source named the "key" light is the main light for the scene. It is usually placed about 45 degrees above and to the side of the camera. This provides overall light so you can see your objects etc...

The second light is known as the "back" or "top" light. Place this light above and slightly behind the center of your scene. In video this is used to show highlights on a persons hair so you can tell where the back of their head is. In this case, it provides a similar function so that you can see the back parts of objects. This is typically set at about 2 times the key lights intensity, though for computer graphics a setting equal to or less than that of the key is usually enough.

The final light is the "fill" light. This is usually placed at a 45 degree angle below and to the side of the camera so that it is on the opposite side of the "key" light. This light should be dim and possible colored and diffused to give some illumination to any part of the scene not covered fromt the other lights. For rendering this means lowering the intensity and or making the light "diminish in intensity".

With this setup there should be an improvement over any rendering using just one light. As a test setup a ground and a stationary object. (The typical chrome ball with cool highlights on a checkered ground works well here) Render once scene with just one light (the key light only). Then add the other 2 or more fill lights and re- render it. There should be a big difference.

Also, don't forget that lights can be colored, can cast shadows and can be "conical spotlights". All this can be used to give greater value to your scene.

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1.67 SECTION 7 - Rendering and the Project Editor

12] Help with Fog, By J. Koszarsky

Fog isn't too bad once you get the hang of it. There are a couple problems to be aware of though. Overlapping fogs will cancel each other out wherever they overlap. Fog objects should be closed objects. If you have a tube be sure to close the ends up. And when you scale your object up or down you should be aware that the fog length will not scale with your object, I found this very annoying.

Imagine you have a 100x100x100 cube and you make it a fog object. What does the fog length mean? If you make your fog length 50 units and then move a non-fog object into the fog, once it goes beyond 50 units you won't be able to see it anymore. 50 units is the point at which an object inside the fog will be totally obscured by that fog. If you shorten the length to say 25 then the fog will become more dense. Making the length larger creates a less dense fog. If the length is greater than 100 then you will be able to see objects on the other side of the cube.

Using global fog in the Stage/Action editors is similar but it is applied everywhere, like an infinite plane. You can however control the heights(Z) where the fog begins & ends. So if you wanted fog in a grave yard you could tell it to start at the ground level and end as high as you want, depending upon what your are looking for in your scene. The fog length works the same as with objects. If it is set to 100 units then any object in your scene that is beyond 100 units will be hidden in the fog. For a very subtle fog I sometimes set my length to 2048 or greater, this is very thin.

There is another annoying feature of fogs. It looks great when used for making atmosphere on a planet but it will illuminate the entire planet, no matter where the light source is placed. So you can't get a dark side if you have the fog around the entire planet. You can get around this by using a half sphere fog for the atmosphere and aligning it to your lightsource.

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1.68 SECTION 7 - Rendering and the Project Editor

13] How can I render in Widescreen/Letterbox format?

Besides making for some neat looking animations, this will also lower rendering times. For a render that would normally be 768x482 or so, make it 768x380. Leave the ratio just as it is (6:7). Any where from 380-330 or so will look pretty good.

Remember though that Imagine will still show the entire normal view of the animation in the Stage editor's preview window. This means that while you can see objects at the top of the screen here, they might actually be cropped in the final rendering.

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1.69 SECTION 7 - Rendering and the Project Editor

14] I selected Spheres for my particle object, but all I get is a ←
 polygonal

shape!

In order for you to get spheres in the particle object you will have to render in Ray Trace, not Scanline. Otherwise you end up with a faceted sphere of only a few polygons.

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1.70 SECTION 7 - Rendering and the Project Editor

15] Help with Fog: if you place a fog object inside another, they ←
 cancel out,

why?

(By Ian Smith)

I was looking over an older list of bugs that were still not fixed when I came across the fog canceling out other fog objects. Remembering previous messages about transparent objects I wondered if it would work for fog. It does, sorta.

Imagine only renders flat, one sided triangles. To make a solid object, Imagine keeps track of if it is inside or outside of an imaginary solid. When a ray hits a face with fog or transparency, the ray is considered 'inside' until it hits another edge. That is why if you place a fog object inside another, they cancel out. When the ray hits the second fog object, Imagine considers the ray having exited

the fog object. This is actually a good thing, albet tricky at times.

The solution to both problems as noted before on the list, is to make sure all objects are solid entities with no common or open edges. Picture trying to make a yellow sphere of fog with a second red fog sphere inside. If you try this, what happens is you get a sphere of yellow fog, but it has a hole in it where the red should have been. This is the canceling effect. What you do now is to set the inner sphere to the same attributes as the outer one. You now have created a true hollow fog object. The trick is to now use a third sphere, make it a red fog, and put it inside the hole. You have to be careful to make sure it is just a little smaller than the hole. Try to make it about 0.001 units smaller. An easy way is to duplicate the inner surface of the sphere and then scale it down slightly.

I included a uuencoded object you can test render (please refer to IMLarc61.lha at IML landfill for these uuencode objs). It contains 8 CSG spheres...

```
RIGHT.LARGE      - Large yellow fog.
RIGHT.UPPER      - Small yellow fog inside.
RIGHT.LOWER      - Small red fog inside.

LEFT.LARGE       - Large yellow fog.
LEFT.UPPER       - Small yellow fog inside.
LEFT.LOWER       - Small red fog inside.
LEFT.UPPER.OUTER - Inner surface of LEFT.LARGE surrounding LEFT.UPPER
LEFT.LOWER.OUTER - Inner surface of LEFT.LARGE surrounding LEFT.LOWER
```

When rendered, the object on the left renders correctly, showing a yellow fog sphere with a red splotch of fog in the bottom corner. The top yellow fog does not show up because it is the same color and density as the larger sphere.

The right sphere however, renders incorrectly. It shows a solid, shaded red sphere in the bottom, and at the top is a hole where the smaller yellow sphere should be.

Now Imagine is still not doing for quite correct. For one, this trick does not work for global fog! I tried surrounding a fog object with a shell that was the same density and color as the global fog, but it simply caused the fog object to vanish completely! I was hoping this would allow the use of fog objects with global fog, but no luck. Secondly, and more important, the above example with red fog inside is still not what should happen. The object on the right SHOULD render correctly. In reality, you do not chop holes in fog and stick other peices of fog inside. The two fogs should add their fog properties together. I have no idea what goes on inside Imagine, but I can take a guess that each ray has a fog/transparency flag that gets toggled when a ray hits a surface. What they need is not a flag, but an array of flags to keep track of how many layers of fog they have penetrated. Perhaps link this to the reflection resolve paramater in preferences. Then we could have true additive fog. You can fake it by manually adding the attributes together and settign the inner fog object to that.

BTW, I tried a negative fog length and it resulted in a totally invisible object. I wasn't sure WHAT I expected, but figured it was

worth a try. :-) I also ran these tests in Imagine 2.0 and 3.2 to test for differences. Other than 3.2 being about 25% slower to render than 2.0 they worked the same.

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1.71 SECTION 7 - Rendering and the Project Editor

16] The config file says something about "oct-tree level". What ←
 EXACTLY is

this about?

The oct-tree stuff is an optimizing gig that Imagine does while ray tracing.

It sub divides the world up into cubic areas - the oct-tree level tells the renderer how much to keep sub dividing things (this is what's going on when Imagine says, "Initializing"). A high oct-tree level works great for most objects, but for very simple objects (like, just a single, simple primitive) the renderer over does the sub-dividing. A lower level number would be more effecient for the simpler objects.

The oct-tree area is directly connected to the global world size. Setting the global world size to 0, 0, 0 makes Imagine take it's best guess at a world size for the oct-tree.

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1.72 SECTION 8 - Essence Settings and Other Attributes

1] Electrical Arc (Essence)

Here's how to make an electrical arc between two rods, like something out of Frankenstein's lab.

- 1] Start with a plane with 255 R,G,B on Color and a light blue (or whatever color you want the arc to be) in Filter.
- 2] Use Ringfract as follows:
 - Set the Z axis to point out of the plane, (rotate 90 on X)
 - Low Trans Start=30 Low Trans Width=5
 - Hi Trans Start =40 Hi Trans Width =5
 - Set the color to 0,0,0 for RGB.

Leave other settings at defaults
 Place the axis of Ringfract in the middle of the bottom edge of the plane.

3] Now use Swapcrf to swap the color and filter values. Do this by setting all parameters to 0, and then setting the following values to 1:

```
Filt -> N Color = 1
Refl -> N Refl = 1
Color -> N Filt = 1
```

Now when rendered, there should be something similar to an electrical arc (or maybe some sort of plasma). To have the arc grow, rotate the Ringfract axis on X up or down so that the plane and cylinder do not intersect at 90 degrees. If you animate this it looks like the arc gets taller until the arc breaks (i.e. the plane no longer intersects Ringfract's cylinder in a curve, but instead in two lines).

Also setting the plane to bright will make it look correct in dim scenes.

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1.73 SECTION 8 - Essence Settings and Other Attributes

2] Veined Marble (Essence)

The veinedmarble texture is used twice, once for large, widely spaced veins. The second use is for finer, closely spaced veins.

For veined green marble set the object color to 40,80,40 for Red Green and Blue respectively. The texture veins are a gray-green color.

Text#1	Text#2	Parameter	Text#1	Text#2	Parameter
800.0	300.0	Initial Scale	4.0	5.0	Turbidity
7.0	7.0	# of Scales	0.9	0.98	Color Level
0.4	0.4	Scale Ratio	120.0	120.0	Color Red
0.6	0.6	Amp Ratio	150.0	150.0	Color Green
0.4	0.4	Time Ratio	120.0	120.0	Color Blue
0.0	0.0	Time	0.0	0.0	Fade 0..1
1.0	1.0	Sharpness	0.0	0.0	
20.0	10.0	Vein Spacing	0.0	0.0	

Rotate the second texture 45 degrees around the X and Y axes with respect to the first texture. You may want to rotate the first texture as well.

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1.74 SECTION 8 - Essence Settings and Other Attributes

3] Rough marble/rock (Essence)

This uses 2 textures, one for a main color variation, and the other for the bump/roughness. This is very effective for creating stone surfaces. Try these settings on a primitive plane.

```
Object Attribs  R   G   B   Value
Color          = 136 118 128
Specular       = 153 134 132
Dithering      =                               255
Phong          = On
All others at 0.
```

Texture 1: fractalcolor		Texture 2: bump	
Parameter	Value	Parameter	Value
Initial Scale	15	Initial Scale	5
# of scales	5	# of scales	4
Scale Ratio	0.4	Scale Ratio	0.5
Amplitude Ratio	0.4	Amplitude Ratio	0.5
Time Ratio	0.4	Alt. Adjust	3
Time	0	Fade 0..1	0
Base->1 Trans	0.3	Axis placement left at default	
1->2 Trans	0.6		
Color 1 End	1		
Color 1 Red	70		
Color 1 Green	60		
Color 1 Blue	60		
Color 2 Red	255		
Color 2 Green	240		
Color 2 Blue	240		
Fade 0..1	0		
Axis placement left at default			

When rendered an off gray stone will be created. Great for caverns, dungeons and so on. Just slap it onto the walls or columns to give it good-ol' natural look.

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1.75 SECTION 8 - Essence Settings and Other Attributes

4] Soap Bubble (Imagine 2.0 and higher)

```
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 data in each column:

```
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 complete bubble bath!

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1.76 SECTION 8 - Essence Settings and Other Attributes

5] Spaceship Panels (Imagine 2.9 and higher)

This uses the RADWIND, TUBEWIND, or RECTWIND textures to create multicolored spaceship panels:

- Add a primitive sphere with it's default values.
- Apply the RADWIND texture (or other 2 textures depending on the shape of your object)
- Make these adjustments to the texture variables:

Column One	Two	
1	210	*These params will will give you panels that are randomly colored from the two color ranges defined in column two.
3	210	
60	210	*Play around with some of the variables to get the effect right for you.
0	190	
1	190	
0	190	
0	-1	
0	0	

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1.77 SECTION 8 - Essence Settings and Other Attributes

6] Bark, mountain, stone effects (Imagine 2.9 and higher)

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.

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1.78 SECTION 8 - Essence Settings and Other Attributes

7] Solar Corona, By Cyrus J.Kalbrener (Essence)

This uses 1 sphere, 3 disks and 2 Essence textures.

- First use varyabsrgb to create changes subtle changes on the suns surface between white hot and light yellow.

- Then use a disk for the corona, rotate the object axis so that the y axis was perpendicular to the surface of the disk and add the cylindturb texture with the z axis extending perpendicular from the surface of the disk. We used cylindturb because we could translate the texture along it's z axis to create the illusion of movement much more effectively than radialeturb.
- Then add another disk and place it less than 1 unit behind the first, apply the radial Impulse texture to create the glare around the sun.
- Now apply radial to another disk, this time making it black to blot out the stars behind the corona that would show through the glare (it looks pretty unrealistic without it).
- Make sure all objects are bright, and parent the second and third disks to the first. We can save the sun itself as one object, and the corona group as a second object. In the stage editor track the corona to the camera so that it would always be perpendicular to the camera (only good if the camera is moving a little bit).

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1.79 SECTION 8 - Essence Settings and Other Attributes

8] Solar Corona, By Scott Kirvan (Imagine 2.9 and higher)

This uses the FIREBALL, NEBULA and GHOST textures to create.

- Add a primitive sphere with it's default values, turn on bright.
- Apply the FIREBALL texture
- Make these adjustments to the texture variables:

Column One	Two
0	0
255	0
255	0
100	0
200	0
30	0
0	0
0.4	0

Size: (86, 86, 86)

- Add a primitive sphere with it's default values except for the size values, they should be, at least (75, 75, 75)
-

Color: (255, 85, 0) Fog length: 0.01

- Apply the NEBULA texture
- Make these adjustments to the texture variables:

Column One	Two
325	0
1	0
0	0
5	0
0.2	0
1	255
1	255
0	100

Size: (4.5, 4.5, 4.5)

- Apply the GHOST texture
- Make these adjustments to the texture variables:

Column One	Two
1200	0
1	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0

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1.80 SECTION 8 - Essence Settings and Other Attributes

9] Sludge, By Scott Kirvan (Imagine 2.9 and higher)

This uses the DINOSKIN texture:

- Add a primitive cylinder (size: 88, 88, 175)
- Make these adjustments to the attributes variables:

COLOR	FILTER	SPECULAR
R 255	255	38
G 255	255	38
B 255	255	38

Hardness	Index of refraction	Phong
20	1.50	

- Apply the DINOSKIN texture.
- Make these adjustments to the texture variables:

Column One	Two
10	0
10	0.5
10	0
2	0
0.3	190
0.6	1.73
2	0.5
1	0

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1.81 SECTION 8 - Essence Settings and Other Attributes

10] Marble, By Rob Freundlich

Make your object a pale white (190-ish on all the RGB sliders), high Shiny value, high Hardness, low Roughness, Specular just a few shades below the object color, ummm, possibly others as well.

Apply two wood textures. The textures are rotated with respect to each other. Both have very wide bands (and a low number of bands) and a large Variation value (for "burl" effect, according to Understanding Imagine). The color of each texture is a darker shade of grey than the object, and the two textures have slightly different colors.

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1.82 SECTION 8 - Essence Settings and Other Attributes

11] Starfield (Imagine 2.9 and higher)

We all know that Imagine's starfield is very cheesy at best. Here is a great solution for Imagine 2.9 and higher 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:

```
Color 1: (255, 255, 255)   V1: .53   Size: .25
Color 2: (100, 100, 100)  V2: .55
```

Make sure the camera is somewhere in the center, and render. Voila! A great Starfield!

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.

This actually gives a good looking starfield with almost no RAM consumption. Plus, you can easily set the colors and frequency.

As a suggestion,

- 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.

This is called "stellar parallax", and it will never happen in real life, simply because all the stars are so far away that you basically can't move fast and far enough to make their relative alignments change in this kind of obvious way.

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1.83 SECTION 8 - Essence Settings and Other Attributes

12] Photon Torpedo (Imagine 2.9 and higher)

In Detail, create a default primitive sphere. Copy it, scale it down to .8, Paste it and group the 2 objects together. The larger sphere's attributes's should look like this:

```
COLOR
R 255
G 0
B 0

Fog length      Phong      Bright
125
```

Then Add a FogPaint Texture with the following data:

T: .8

```
Denser Color: 255, 100, 0
2nd Color: 255, 0, 0
```

Scale the axis to be just as big as the sphere.

The smaller sphere's attributes should look like this:

```
COLOR
R 210
G 15
B 15
```

```
Phong    Bright
```

```
Light:
```

```
Color: 500, 0, 0
Point Source
Controlled Falloff
```

```
FireBall texture:
```

```
Color 1: 255, 15, 15
Color 2: 200, 30, 0
The rest of the settings are 0.
```

Axis size should be slightly larger than the sphere.

Load this object into Action after setting the # of frames. Add the Spike effect on frames 2 (right after the torp exits the torpedo tube) to the last frame that the object will be in the camera's view. You might want to tweek the Spike settings. Set up the motion in Stage, and you're all set. Render and serve.

```
-----
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```

```
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-----
```

1.84 SECTION 8 - Essence Settings and Other Attributes

13] Spaceship shield, By Charles Blaquiere (Essence)

To do a Star Trek-like "shield absorbs energy blast and dissipates it", you need to create a sphere for the shield. You then use Shellturb combined with SwapCRF to vary the transparency of the texture and make the energy blast visible. Here's an example:

- Create a standard Imagine sphere. Scale in Z by 0.5.
- Give it a color of 255, 255, 255 and click on Bright. Add the Bandturb (not Shellturb) texture.

- Edit the texture as follows:

Column One	Two	
0	0.4	Axis position: 110, 0, 0
20	0.4	Alignment: 0, -90, 0
30	0	
20	0	
10	0	
5	0	
4	0	
0.4	0	

- Add the SwapCRF texture. All parameters should be 0, except Color -> N Filt which should be 1.
- Add the Solid texture. Leave all parameters at -1 and set Color to 50, 255, 200.
- The texture order should read, from top to bottom: Bandturb, SwapCRF, Solid. If not, use the Priority button to make it so.
- States/Create DEFAULT, click Textures/Brushes on.
- States/Create START, click Textures/Brushes on (This is not a typo. Unless I'm mistaken, you should refrain from using the default state in an animation, which is why I had you create an identical state).
- Change the texture:
Time to 1 Fade to 1 Position to -50, 0, 0
- States/Create END.
- In Action, morph from START to END over N frames.

You'll see an energy blast hit the right side of the image, where the ship inside the shield would presumably be pointing, and travel along the shield, dissipating as it goes along.

How does it work?

The base object is white, and gets a turbulent band of black applied to it using Bandturb. Then, SwapCRF turns this color information into `_filter_` values -- black means no filter, white means fully transparent. This makes part of the shield visible. All that's needed is to give the visible part of shield a color using Solid. Finally, we create two states, START and END, which allow the texture axis to travel from one end of the shield to the other. The END state also has Bandturb's Fade parameter set all the way to 1, so that the texture loses strength as it travels along the shield. Just add a ship inside the shield, and a starfield in the background. The effect is beautiful.

Bug alert:

Imagine 3.1 doesn't remember texture parameters and axis

settings very well when you use States. Until that bug is fixed, you will need to create two separate objects, Shield-start and shield-end, and morph from one object to the next. No big deal.

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1.85 SECTION 8 - Essence Settings and Other Attributes

14] Spaceship shield, By Michael Hazlett (Imagine 2.9 and higher)

What it will do is simulate a phaser hitting the front and that portion of the shield will show nothing else, this uses standard Imagine 2.9 textures without any Essence ones.

- Create a primitive sphere, scale it to envelop your Starship.
- Give it a color of 0,0,0 and click on Bright.
- Make it a fog object ie: with a length of 50.00.
- Add the Bandturb texture.
- Edit the texture as follows:

Column One	Two	
0	0.4	Axis position: 81, 0, -0.9
20	0.4	
30	0	
20	0	
10	255	
5	0	
4	0	
0.4	0	

(The main difference with Charles Blaquiere tip is that the colour you put on the texture is the colour of the shield, usually green :)

- States/Create START, click Textures/Brushes on.
- Change the texture:
 - Time to 1
 - Fade to 1
 - Axis Position: 67, 0 -0.9
- States/Create END.
- In the Action editor morph from START to END over how many frames you like; you have to reverse the states to dissipate the shield.

You'll see an energy blast hit the front (or wherever) of the shield flare up (and if you want) dissipate; you can change how transparent the shield is by changing the fog length :)

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1.86 SECTION 8 - Essence Settings and Other Attributes

15] All purpose ground cover (Imagine 2.9 and higher)

Make an irregular shaped mountain or whatever and make these adjustments to the attributes variables:

COLOR
R 15
G 162
B 6

Dithering
255

- Apply the FUZZ texture.
- Make these adjustments to the texture default values:

Column One	Two
0.1	0.6
0.2	15
0.05	140
0.3	15
1	0
4	0
0.2	0
0.8	0

- Apply the PEENED texture and make these adjustments to the attributes variables:

Column One	Two
1	0
1	0.5
0.1	90
0.5	90
1	0
4	0.6
0.2	1
-0.3	0

- Apply the DISTURBD texture with default values.
- Apply the CRACKS textures as follows:

Column One	Two
0	90
0.2	80


```

0.2    0
15     0
0      0.2
0      0.5
-0.1   0.3
-0.1   0.8

```

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1.87 SECTION 8 - Essence Settings and Other Attributes

16] Steam engine, shafts of light (Imagine 2.9 and higher)

Try this out if you want steam, shafts of light, smoke:

- Make a cube and go to the attributes requester.
- Make the object color a shade of white; the filter values are 125, 125, 125.
- Add the COOLFIR texture:

Column One	Two
0	0
0	0
0	0
0	255
0	255
0	255
0	1
0	3

The texture axis should have the positive part of the Z axis slightly smaller than the object. Scale the X and Y axis by 2 or 3 from their natural state.

You can animate it by rotating around the Z axis or moving along the X and Y axis.

If there are a lot of overlapping layers on the object, make sure resolve depth (preferences editor) is quite high, 9 or so, otherwise You will get black areas on the object.

You can render this in scanline.

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1.88 SECTION 8 - Essence Settings and Other Attributes

17] Fun with Fuzz texture, By G. de Beaumont (Imagine 2.9 and ←
higher)

The "Fuzz" texture appears to be ANOTHER one of those undocumented Imagine features. Anyway, I've done some experimentation with the "Fuzz" texture, here's what I know.

Fuzz - Basic features:

It's a "Space Filling" (Impulse terminology) noise type texture. That is, the texture changes along all three axis.

In its most basic form (equal X, Y, Z sizes and low magnitude and velocity noise values), it produces fuzzy globules (approximately spherical masses).

Space between the fuzzy globules shows underlying textures and attributes on the object.

The texture axis orientation (relative to the object) is not particularly important.

Fuzz - parameters:

X, Y, and Z sizes:	determines size of the fuzzy globules;
Noise 1 & 2 mag/vel:	determines how disturbed the fuzzy globules become (functions similar to other Imagine noise type textures);
Dispersion:	determines the number of fuzzy globules;
Fuzz clip:	appears to affect the spacing of the fuzzy globules;
Fuzz R, G, B color:	determines the color of the fuzzy globules;
Fil./Refl. adjust:	sets the filter and reflect attributes of the fuzzy globules;

Fuzz - General observations:

Increasing the clip value (0.9 - 1.0) can result in overlapping globules with unpredictable results.

Decreasing the clip value to 0 results in zero globules.

The default parameter values produce a nice "TV Static" appearance.

Higher magnitude/velocity values result in a wispy smoke type of appearance (see sample parameter values below) similar to that achieved using the CLRNOIZ texture.

Intermediate magnitude values, low velocity values and repetitively applying the texture can produce a scattered cumulus cloud

pattern with the appearance of depth (see below).

Wispy Smoke (a la fuzz):

- Add a default plane.
- Set the object color to 0, 0, 0. Make it bright.
- Adjust the perspective zoom control (Z) such that the plane takes up most of the view.
- Apply the FUZZ texture (using the following parameter values) and quickrender:

Column One	Two
30	0.4
30	100
100	100
0.6	100
2.8	0
5.8	0
0.3	0
0.7	0

Scattered Cumulus Clouds (a la fuzz):

- Add a ground plane.
- Set the color to 135, 206, 235. Make it bright.
- Adjust the perspective angle (A) view such that it looks straight down on the ground plane. Set the zoom ratio (Display menu, Perspective, Zoom ratio) to 0.3.
- Repetitively apply the FUZZ texture to the ground plane (4 times) using the following parameter values:

Apply the FUZZ texture (priority 1) as follows:

Column One	Two
1000	0.5
1000	245
1000	245
2	245
0.1	0
2	0
0.1	0
1	0

FUZZ texture (priority 2):

Column One	Two	
1000	0.5	Axis position: 0, -40, 0
1000	220	
1000	220	
2	220	
0.1	0	
2	0	
0.1	0	
1	0	

FUZZ texture (priority 3):

Column One	Two
250	0.5
250	245
250	245
2	245
0.1	0
2	0
0.1	0
0.6	0

FUZZ texture (priority 4):

Column One	Two
250	0.3
250	215
250	215
2	215
0.1	0
2	0
0.1	0
0.6	0

Transform priority 4 texture 0, -40, 0 position.

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1.89 SECTION 8 - Essence Settings and Other Attributes

18] Water (Imagine 2.0 and higher)

You could start with a plane or a ground and make the following adjustments to the object default attributes:

COLOR	REFLECT	FILTER	SPECULAR
R 0	100	0	255
G 255	120	0	255
B 255	140	0	255

Dithering	Hardness	Roughness	Shininess
0	125 (Or more)	20	0

Then apply BUMPNOIZ texture as follows:

Column One	Two
_____	_____

```

100      0
  20      0
  10      0
   0      0
  0.6     0
   0      0
  0.2     0
   0      0

```

Bump-mapping and bump textures do not modify the geometry of the object; they simply add highlights and shadows as if the object `_were_` bumpy. Your lake would still remain a flat plane, with no points to stick out.

You should position the primary light source in front of the camera to obtain specular highlights.

Maybe this is not very helpful, but I thought You might find DINOSKIN texture useful in this case too. It is a very flexible texture which can produce loads of other kind of surfaces than dino skin. The shape of the bumps can be modified to a great extend by adjusting the noise values. Also, You have control of how "widely" the bumps are colored by adjusting the color clip value. So You can certainly make some kind of whitecaps with it without having actual modelled bumps in the object.

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1.90 SECTION 8 - Essence Settings and Other Attributes

19] Castle brick, By Paul Rance (Essence)

It uses CEDARDSHINGLES and VARYELBRIGHT Essence textures:

- Apply the FUZZ texture as follows:

```

Top width: 30.0           Rand shape vary: 0.3
Bottom width: 30.0       Grain scale: 1.79
Shingle length: 15.0     Grain sharpness: 0.18
Horizontal spacing: 31.0 Grain bump adj.: 0.56
Vertical spacing: 16.0   Grain red: 75.0
Edge width: 0.4          Grain green: 79.0
Bump adj.: 5.8           Grain blue: 73.0
Row offset: 0.48         Fade: 0.0

```

- Apply the VARYELBRIGHT texture as follows:

```

Vary scale size: 2.07
Variation: 0.2
Random seed: 1234.5

```

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1.91 SECTION 8 - Essence Settings and Other Attributes

20] Cloth, By Paul Rance (Essence)

It uses SEAWAVE Essence textures:

- Apply the SEAWAVE texture as follows:

X im. units: 28.0
Wind speed: 20.0
Bump adj.: 0.5
Time: 0.0

The important bit with this texture is instead of the Y axis pointing out of the texture as normal, turn in 90 degrees so it runs in parallel to the top surface of the object.

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1.92 SECTION 8 - Essence Settings and Other Attributes

21] Fabric, By John Prusinski (Imagine v2.9 and higher)

Just playing around with the Fuzz texture I discovered (as I was working on a backdrop curtain for a stage set) that by setting the Fuzz color close to the base color but lighter (in this case light magenta over purple) and cranking the specularility of the object while keeping it in the same color range (in this case VERY light magenta) and the hardness down, I was able to get (by playing with the texture size) a very believable range of fabric textures from coarse wool blanket to fine velvet (which in my case was just what the doctor ordered)!

Not sure if this would have the same effect with a smooth object like a floor or a primitive, but it works great for objects with lots of folds in them to catch the light.

Here it is an attribute I used successfully for the green felt surface of a billiards table:

Apply FUZZ texture as follows:

Column One	Two
30	0.6
1	0
0.01	140
10.01	100
1	0
4.01	0
0.2	0
1	0

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1.93 SECTION 9 - Miscellaneous

1] What the heck is BTW, IMO and other weird abbreviations...

BTW is an abbreviation for "By The Way".
 IMO is an abbreviation for "In My Opinion"
 IMHO is an abbreviation for "In My Humble Opinion"
 IML is an abbreviation for "Imagine Mailing List"
 :) is a sideways smiley face
 :(is a sideways frowny face
 ;) is a winking-eye face etc...

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2] My rendering times and even my refresh times in the editors ↔
 are much MUCH

too slow, even with an accelerator. Is there any basic tricks or hints that are often overlooked that might help me out?"

Always be sure to MERGE your objects. This eliminates multiple faces, points and lines. Some objects have a VERY large number of these and it can slow your times down by up to 1/2!

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3] When does one get good enough so that they don't render ugly pictures! ←

Practice with a simple objects (to cut down trace time) over and over and over. Varying lighting & color etc. This will allow you to get the effect you want which is only a technical problem.

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4] Hires Video modification for Amiga Imagine From James R. Walker ←

***Note: The following explains how to modify the actual executable file of Imagine. Do this at your own risk! If you have any problems or end up trashing your copy of the program it is your own fault. It is highly recommended that you make a backup copy of the program before you mess with it.

Ok, here's how it works... (If you don't have an Amiga, don't do this!)

Get a filezapper type program. (NewZap DPU FileZap Hex etc...)

Look up your version of Imagine on the chart below.

Edit the executable at the bytes indicated in the chart. The block #s and byte #s are shown in decimal. The hex numbers in parenthesis are the hex versions of the block numbers. The bytes to modify are, of course, in hex. Replace the resolution you find there with the resolution you want. Then save the new file. (I don't have to remind you to keep a backup of Imagine on hand!)

Notice that Imagine automatically doubles the vertical resolution for use in interlace mode. So, if you want vertical resolution of 462 then you must tell it to give you 231. (231 = 00E7 in hex)

Imagine Version #	Horizontal	Vertical
-------------------	------------	----------

FP	1.1	Block 393 (\$189) Bytes 220 & 221 From 02 80 (Example: To 02 BC = 700 in dec)	Block 83 (\$053) Bytes 162 & 163 From 00 C8 (To 00 E7 = 231 dec)
FP	2.0	Block 497 (\$1F1) Bytes 328 & 329 From 02 80	Block 95 (\$05F) Bytes 250 & 251 From 00 C8
INT PAL	2.0	Block 500 (\$1F4) Bytes 124 & 125 From 02 80	Block 94 (\$05E) Bytes 42 & 43 From 01 00
FP PAL	2.0	Block 497 (\$1F1) Bytes 388 & 389 From 02 80	Block 95 (\$05F) Bytes 244 & 245 From 01 0
INT	2.9	Block 1561 (\$619) Bytes 486 & 487 From 02 80	Block 119 (\$077) Bytes 480 & 481 From 00 C8
FP	2.9	Block 1529 (\$5F9) Bytes 82 & 83 From 02 80	Block 95 (\$05F) Bytes 168 & 169 From 00 C8
FP PAL	2.9	Block 1529 (\$5F9) Bytes 146 & 147 From 02 80	Block 95 (\$05F) Bytes 162 & 163 From 01 00
FP	3.0	Block 1667 (\$683) Bytes 60 & 61 From 02 80	Block 126 (\$07E) Byte 425 From 64
FP	3.1	Block 1765 (\$6E5) Bytes 424 & 425 From 02 80	Block 131 (\$083) Byte 343 From 64

Block + Offset is commonly used with most disk editors, but some use the Absolute Position instead. Remember to divide the height of the screen by 4 first, and that you can't use values higher than 127 due to Impulses use of signed character storage. 127 will give you screen height of 508. I don't think its easily possible to hack Imagine to use an unsigned character to get a higher screen size. Anyone?

One Final Note: Imagine PC users have a whole different program than Amiga users. This modification will not work on the PC version. I would guess that a similar modification for the PC version would be more complicated, given that VGA modes are more complicated than Amiga modes.

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5] What are particles? (Note: Particles were add in Imagine 2.9)

There are a couple of different meanings and interpretations of what particles and particle animation software should do. In general, a particle is an object, or point in 3D space that is then controled by parameters mimicking real world physics. For example, take a point in 3D and apply motion to it as if it were under gravity. The result would be it would move downward increasing in speed. So you can use particles to simulate wind, exploding, melting and other things that move points in different ways.

Particles can also be objects or simple polygonal shapes rather than just points. In imagine, you can make a 'particle object' by modeling a normal object with faces. Then, using the particle requestor in the Detail Editor, specifiy that all faces/polygons of the object be replaced by cubes, spheres, tetrahedrons and so on...or even other objects. When you go to render the object, each face will be replaced with the particle you have chosen.

This means in Imagine, you can make objects created out of many 'particles' even though you don't use any particle type of motion. This is true since you could now take that object, and just animate it normally using standard key frame techniques and so on.

However, Imagine does have a new method for applying the motion control over these particle objects, (or even normal objects, since it will simply affect the faces). In the Action Editor you can now use the particle effect. This lets you specify how the particle/faces of the object will be affected over the course of an animation.

In general, particle systems allow one to simulate complex motion easily. They allow one to create many particle objects and to have their motion defined by mathematical properties.

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6] Everything about motion blur, By Mark Allan Fox

I thought that I would devulge the information I know about this subject as well as why I sincerly doubt that Impulse will include this feature in any of the upcoming upgrades. I will also give some hints as to how to simulate motion blur (actually it really isn't simulating, it is the real thing) using Imagine (or any other rendering program for that matter) and an image processing package.

Motion Blur - What is it? How do we get it?

The human eye does not see motion as most computer renderers see it. The human eye does not see motion as a continuous set of instantaneous pictures. The human eye sees motion through persistence of vision. Our eyes are constantly taking visual data from our surroundings, the data our eyes feed to our brains is not sampled.

This is a difficult effect to achieve on the computer. There are algorithms that allow a computer to achieve real motion blur, but these tend to be really slow if your using a large number of polygons. They get even more complex, and even slower, if you start moving objects along spline paths (if you're interested, and have access to a good library, check out Computer Graphics, Volume 17, Number 3, July 1993, Temporal Anti-Aliasing in Computer Generated Animation). Much faster ways of approximating motion blur exist. These approximations hide some of the temporal-aliasing (aliasing over time) while the real motion blur method completely eliminates it.

Some programs use a method much like the way Imagine casts multiple rays while ray-tracing to eliminate regular (spacial) aliasing. This method is called distributed ray-tracing. While Imagine (3.0) can cast many rays through the area of a pixel to approximate the pixel's average color value, motion blur casts many rays over time through the area of a pixel to determine that pixel's average color value (note that both methods can be combined without necessarily increasing the rays cast. Realistically the number of rays should be increased, perhaps by a factor of two, because when combined the two methods tend to have a negative impact on each other's approximations).

Distributed ray-tracing is fairly easy to implement when ray-tracing. It becomes infinitely more difficult when using a scanline renderer (so difficult, in fact that I won't even discuss it).

Motion Blur - Why Impulse probably won't implement it?

As pointed out above, motion blur is hellishly hard to implement in scanlining (because scanlining does hidden surface removal on a line, actually a plane, that passes through a row of pixels). I'm sure that this method can, and has, been implemented, but by a company much larger and richer than Impulse (like Pixar).

Problems exist in the distributed ray-tracing method as well. For this method to work it must have information about every objects position over time (or at least the frame to be traced and the two adjacent frames). Imagine's global effects are given access to much information about a single frame, and they can be used to control the renderer (as in depth of field), but I'm guessing that they can't access anything but the information about the current frame. So, Impulse would have to over-haul Imagine to implement motion blur. If you look at versions 2.0, 2.9, 3.0 and soon 3.1, you'll notice that almost all the new features are add-ons and really aren't integrated into imagine as a whole. It's great that Impulse planned far enough ahead to allow Imagine to be so modular that these new features are just added-on. Unfortunately, I really don't think Imagine's modularity goes far enough to allow an easy addition of motion blur. So until Impulse completely rebuilds Imagine (something, I for one, think is due) I sincerely doubt that we will see motion blur in Imagine. Of course I sincerely hope that I am absolutely wrong in the above and that Imagine isn't designed the

way I think it is, then perhaps we might see motion blur in one of the next few updates.

Motion Blur - How do I do it on my own?

Motion blur is quite easy to approximate on your own. However, it does have costs, namely, increased rendering time (everyone knew that one was coming), and an increase in storage space for the individual frames before they are compiled into an animation. There is a slight increase in the space the animation will take too.

Simply put to achieve motion blur render more frames than you actually need. So, depending on the amount and speed of the motion in an animation, you render perhaps 3 times as many frames as you want to be in your animation. So if you have a 10 second animation (300 or 240 frames) render 900 or 720 frames. Then use an image processing package to average 3 frames into one. So for frame 1 in the animation you will average frames 1,2 and 3 (DTA does this on the PC, the command for compiling the above example into an FLC file would be <dta pic*.tga /a3>)

The real trick here is to figure out how much motion blur you need, if you need it at all. Generally, I find that if an object moves across the whole screen in one frame I will want about 30 sub-frames per frame (big hint: avoid the above case). So if it moves across half the screen I will want about 15 sub-frames per frame. It's also nice to always use an odd number of sub-frames. That way you know the objects exact location at any given frame (in the middle sub-frame).

Another problem arises when working on looping animations. The first and the last frame will not look correct. What you have to do is tack on some extra frames before the first and after the last frames. The number you add depends on the number of sub-frames you are using. If N is the number of sub-frames you are using you have to add $(N/2)-1$ frames to each end of the animation. You then have to set up in the action editor so that the first $(N/2)-1$ frames look like the last $(N/2)-1$ frames and vice-versa.

Sometimes you have a scene where motion blur is only needed for a few frames or to one degree or another. This is where scene planning comes into play. Personally I haven't had enough practice in doing this to tell anyone how to achieve this. I have had some success at this, I just haven't yet realised a good method of approaching the problem. A good work around is to plan your camera angles so that you cut from one degree of motion blur to another when the camera changes views. If you have no choice but to have one consistent camera angle then start drawing time-lines, make lots of copies of the whole project (one for each degree of blur), and think hard about what your going to do before committing yourself to the final render. Of course if you have a Pentium 100 and a couple gigabytes of hard drive space you may be able to use brute force and just do everything at the maximum needed degree of blur (not recommended, as you'll save yourself more time by setting up everything the hard (or is that the easy) way, especially if this is a long animation).

If you have more interests in motion blur try Computer Graphics: Principles and Practice, Fundamentals of 3D Computer Graphics, the

comp.graphics, comp.graphics.algorithms, newsgroups, or contact me.

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7] 3D stereograms, By Gary Beeton

We all know that Imagine allows you to create stereo pair images for use with special 3D glasses. But did you know that Imagine 3 will, with the help of shareware, let's you create 3D images that do not require glasses and that you can also print?

I'm talking about SIRDS (Single Image Random Dot Stereograms) or sometimes called Stareogram; you know, those posters made of dots which, when you look (persistently) straight through them, will reveal extruding shapes.

It's easy! All you need: a shareware SIRDS generator (I'm not sure about the PC, but for the Amiga there's a bunch of them in Aminet under gfx/3d), Imagine 3.0 and a scene.

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.

The 3-D option: X-Specs "driver"

The 3-D option in Imagine is designed to produce a format which is viewable using 3-D LCD shutter glasses called X-Specs. The X-Specs "driver" interleaves the top and bottom halves and synchronizes the right/left lenses with the interleave refresh rate of the display. The top and bottom halves appear squashed because each represents one field (half of the data for a full frame). Unfortunately for Imagine PC users, I think X-Specs are only available for the Amiga. This would appear to be a vestigial "feature" from Impulses' attempt to make the PC and Amiga versions have the same look and feel.

I don't think there is a way to have Imagine separate the images into separate files. To overcome this problem I would try doubling the project's vertical resolution and make the aspect ratio 2:1. Then use an image processor to reset the aspect back to 1:1 to unsquash, then separate the images. An alternate method would be to manually reposition the camera for each left and right image (this will be a big pain if you intend to animate though).

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1.100 SECTION 9 - Miscellaneous

8] Working with bitmaps, By Douglas Smith

I find that the best sort of image to work with is obviously one made up of lots of lines, some of the best are those nice little painting illustrations that are always part of the instruction sheet for model kits.

If you're using one of these, set your scanner to text mode, 200dpi seems to work best and scan. Then clean up the image in DPaint, this is the key step, so don't skimp, get an image made up of smooth sharp lines.

If you are using a colour image, you need to get it into two colours, for this either start drawig on top in DPaint, then stencil your new lines and rub out the image. One method that can work, is to use an Emboss command (have a look at PBM tools), this will

effectively outline different blocks of colour, you can then just touch it up in DPaint. Beware that you tend to loose a lot of dimensional accuracy doing this unless you have a really hires image, so be careful.

If the drawing is to scale, mark a scale on it, a simple graduated bar, preferably one horizontal and one vertical round the part of the image that you are interested in. When you clean up the drawing make sure these scale marks are clear. You can later use these marks to scale the bitmap to an imagine grid.

Now use ConvertIFF/ILBM, say no to the add faces requester, and in a minute or so all the lines will appear. Now all you have to do is to go into pick points mode and tidy it up a little more. Save this.

If you have a plan, front and side view you can position these objects so they are visible in their respective window, but not visible in the other windows, i.e position the front view so it is say, 500 units in front of the world-centre etc. then redraw speeds are quite nippy.

Using this method may be a bit more memory intensive than using a bitmap, but you can zoom in to see finer detail. Also the images can be to a known scale and you can scroll the windows about without loosing the image.

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9] What are N.U.R.B.S?

Non-uniform rational b-spline (NURBS). It's a special type of spline that allows more intuitive control over surface modelling than a lot of other spline methods. Surfaces have control points that are used to deform the surface of the object which is represented by mathematical formulas rather than polygons.

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1.102 CLOSING - Closing statements and Disclaimer

Hopefully this document is useful to people out there. Once ↔
again, if there is
anything you want added/changed/deleted, please e-mail as listed at the top of
the document.

What follows is a small disclaimer so no one gets sued for information that is
harmful or accidentally incorrect or misleading. (If you find a mistake...please
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1.103 Gabriel S.

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      /\_
|   | "cn01@novell.dima.unige.it"
| O | "G.Scibilia@agora.stm.it"
|   | "2:332/211.24@FidoNet.org"
| O | "Imagine Mailing List, IML FAQer"                ae(-_^)ue
|___|          _  _  _  _ Wizard signing off

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1.104 Ernesto Poveda Cortés

Hi, my name is Ernesto Poveda and i am currently studing ↔
Computer Science at
'Universidad Politecnica de Alicante' (Spain). This is the 3rd FAQ i convert to
amigaguide, and i am very proud if it. I also made the guide & html versions of
the Fabulous "Dare 2 Imagine" by Shane Davison.

My hobbies are Imagine and Amiga :-).

I only put this marvelous doc into amigaguide. Nothing more. The original is
from

Gabriel S.

.

For anything you may wish to comment about this production, i can be reached at:

a00448@dtic.ua.es

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