Front-Ends for POV-Ray

Well rendered

POV-Ray gives you the power to create beautiful virtual worlds and the right front-end makes the tool easy to use, at the same time reducing development time and increasing the fun factor. BY FRANK WIEDUWILT

POV-Ray, the "*P*ersistence *O*f *V*ision *Ray*tracer" [1], is a unique ray tracing program. But its command line interface has caused users occasional headaches as the number of parameters are quite confusing. The following article introduces a couple of tools that help you optimize the power of POV-Ray by prompting you for critical parameters and launching the rendering process at the press of a button. Two of the candidates offer far more than just simple front-end functionality and provide you with a **WYSIWYG** display for creating complex scenes on screen.

The other programs will unfortunately mean you tackling the POV-Ray scene description language. Box 1 describes how to install the raytracer. We tested all our candidates with POV-Ray 3.1 and the brand new POV-Ray 3.5.

The Candidates

Our test candidates are *Peflp* and *tclPov*, which were programmed in **Tcl/Tk**, and their **GTK** counterparts *gPov*, *PovFront*, and *Truevision*. The KPovmodeler tool rounds off the field. Some of these front-ends are no spring chickens. Only KPovmodeler and Povfront are still being regularly updated, but bugfixes for all the programs mentioned here are published at irregular intervals.

These tools aim to save you typing in the POV-Ray commands – either by prompting you for them in a dialog or by means of sliders, however, the offered functionality by the individual programs is varied: Peflp, gPov and tclPov only offer common options. If you intend to delve deeper into POV-Ray's treasure trove, you might like to consider PovFront instead. KPovmodeler and Truevision stand up to comparison with Windows front-ends for the ray tracer. The decisive factor is their ability to help the user to compile scenes without prior knowledge of the POV-Ray scripting language.

Peflp

Peflp, the "*POV-Ray* Front-End For Lazy People" requires both a pre-installed

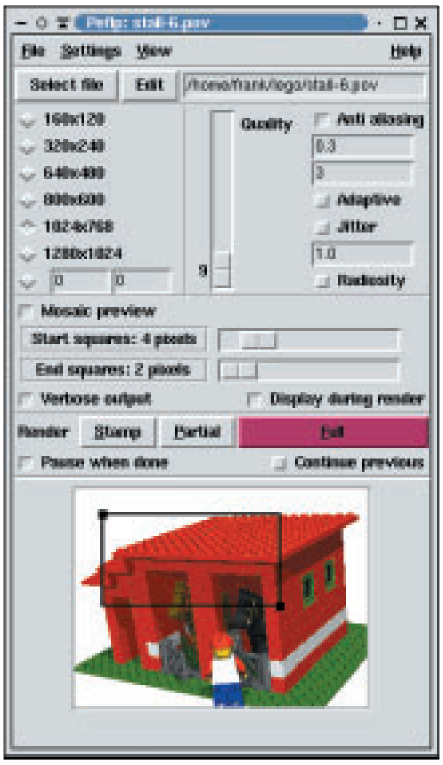


Figure 1: Peflp

Tcl/Tk environment and the *ImageMagick* tool collection to convert pre-rendered scenes. Installation is simple, just expand the *peflp074.tgz* archive and su to *root* to copy the program file *peflp* to a directory in your **path**, for example */usr/local/bin*.

If after typing *peflp &* the program complains about not being able to find the *defaultstamp.gif* file, simply copy this file from the *peflp* archive to the *~/.peflp/stamps* directory (you may need to create the directory prior to this step). When you first launch the program, you are also prompted to enter the path to POV-Ray.

The POV-Ray file you want to render is one of the most important parameters, of course. Additionally, you can choose the resolution (Figure 1) and opt to use *Anti Aliasing* or define quality features for the image you are creating. The option *Mosaic Preview* allows you to view a low resolution image of the result that will be gradually enhanced.

You can choose *Settings / General Options* to define the editor that you want to use to edit your POV-Ray files when you click *Edit*. You can also specify the program you want to use for converting the rendered images and the directory where you will be saving your work.

It is also useful to render a small thumbprint, or *Stamp*. Peflp offers this option in the lower part of the screen. This allows you to gain a first impression of the lighting and composition without having to wait while a full-scale image is rendered. You can use the preview to select a part of the image that you want to render in a higher resolution – just click on *Partial* to do so.

GLOSSARY

WYSIWYG: *The "What You See Is What You Get" model requires that the on-screen display closely resembles the final (printed) output.*

Home directory: *A directory used for storing files and configurations for a user. The shell can abbreviate the home directory to ~.*

Tcl/Tk: *Tcl is a scripting language that (in combination with the TK GUI toolkit) can be used for developing GUI programs.*

GTK: *A C program library containing the GUI elements that was originally written for the image processing tool, Gimp.*

Path: *The PATH environment variable contains the directories in which the OS will look for programs or scripts allowing the user to omit the path.*

Box 1: Installing Povray

The archive containing the current Povray version 3.5, *povlinux.tgz*, is available on the project website [1] . Use the following syntax to expand the archive *tar -xzvf povlinux.tgz* or alternatively a program such as *ark* or *guitar*. After changing to the directory created by this process, *povray-3.5*, call the install script by typing *./install* – you need to be *root* to run the script. This copies the required libraries to */usr/local/lib* and the executables *s-povray* and *x-povray* to */usr/local/bin*. *s-povray* uses the *svga* library and does not need an X Window system; *x-povray* was design for use with X.

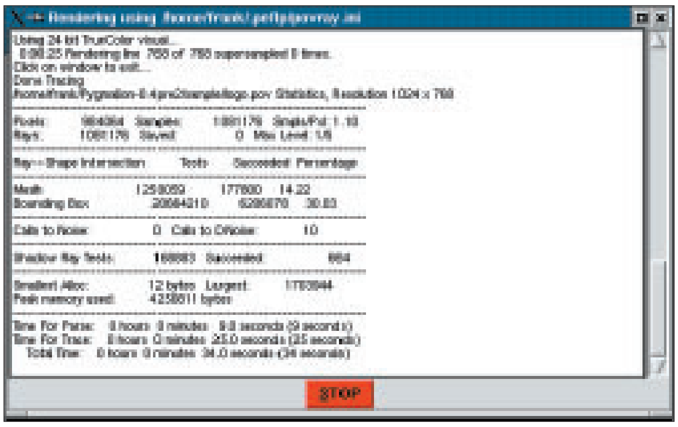
Finally, working with user privelges, copy the file *povray.ini* from */usr/local/lib* to *.povray.rc* in your **home directory**:

```
cp /usr/local/lib/povray.ini
~/.povray.rc
```

Peflt is a program without a lot of bells and whistles that does exactly what it promises: that is, it simplifies the POV-Ray interface. However, this is not the program to choose if you want to fine tune a rendered scene; the feature set is far too small.

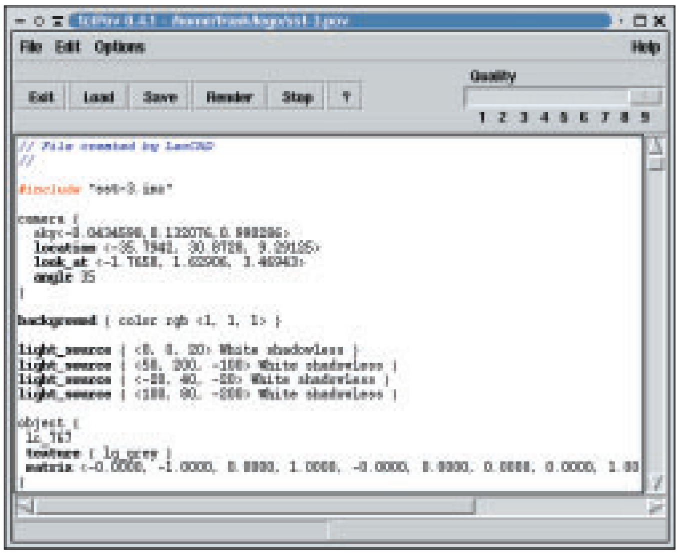
tclPov

The archive file, *tclPov-0.4.1.tar.gz*, is only a few kilobytes in size. It contains an installation script *install.sh*, that you can run (as *root*) in the directory where you expanded the archive. You will be prompted for an installation directory (*/usr/local/bin/tclpov* makes). The files you need to run the program are then copied to the directory you specified.



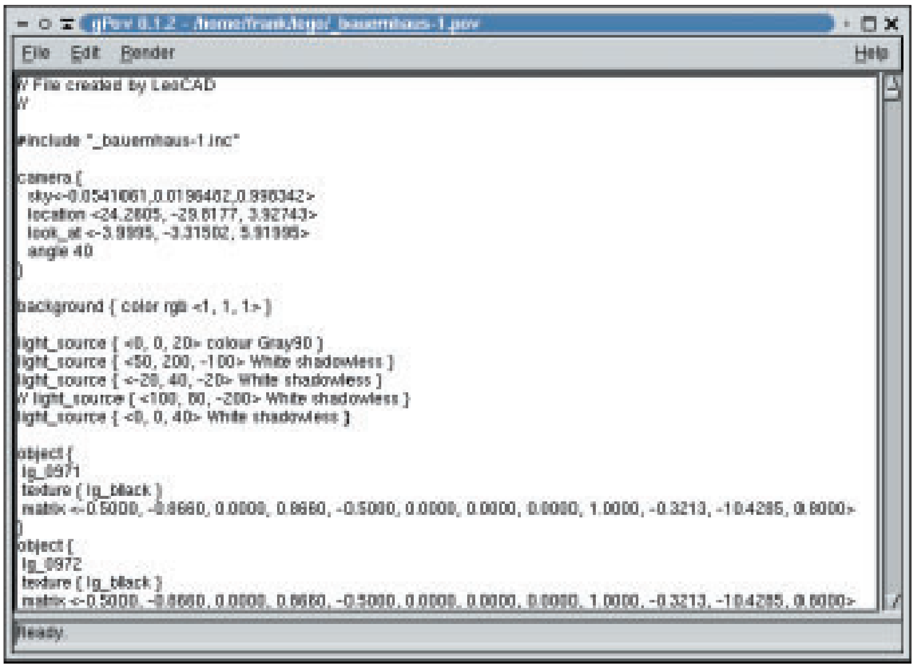
```
Using 24 bit TrueColor visual...
 0:00:25 Rendering line 768 of 768 supersampled 9 times.
Click on window to exit...
Done Tracing
/home/frank/Pygmalion-0.4pre2/sample/logo.pov Statistics, Resolution 1024 x 768
----------------------------------------------------------------
Pixels:        984064   Samples:       1081176   Smpls/Pxl: 1.10
Rays:         1081176   Saved:               0   Max Level: 1/5
----------------------------------------------------------------
Ray->Shape Intersection        Tests       Succeeded  Percentage
----------------------------------------------------------------
Mesh                         12530059     1777600     14.22
Bounding Box                 20084210     6208870     30.83
----------------------------------------------------------------
Calls to Noise:             0   Calls to DNoise:           10
----------------------------------------------------------------
Shadow Ray Tests:      168883   Succeeded:                664
----------------------------------------------------------------
Smallest Alloc:      12 bytes   Largest:              1703944
Peak memory used:    4258811 bytes
----------------------------------------------------------------
Time For Parse:    0 hours  0 minutes   9.0 seconds (9 seconds)
Time For Trace:    0 hours  0 minutes  25.0 seconds (25 seconds)
    Total Time:    0 hours  0 minutes  34.0 seconds (34 seconds)
```

Figure 2: Peflp rendering a file


tclPov 0.4.1 - /home/frank/logo/ssl_1.pov
File Edit Options Help
Edit Load Save Render Stop ?
Quality
1 2 3 4 5 6 7 8 9

```
// File created by LeoCAD
//

#include "set-3.inc"

camera {
  sky<-0.0434598,0.132076,0.990296>
  location <-35.7941, 30.8728, 9.29125>
  look_at <-1.7658, 1.62906, 3.40943>
  angle 35
}

background { color rgb <1, 1, 1> }

light_source { <0, 0, 20> White shadowless }
light_source { <50, 200, -100> White shadowless }
light_source { <-80, 40, -20> White shadowless }
light_source { <100, 90, -200> White shadowless }

object {
 lc_763
 texture { lg_grey }
 matrix <-0.0000, -1.0000, 0.0000, 1.0000, -0.0000, 0.0000, 0.0000, 0.0000, 1.00
}
```

Figure 3: Tclpov



```
// File created by LeoCAD
//

#include "_bauernhaus-1.inc"

camera {
  sky<-0.0541061,0.0196462,0.998342>
  location <24.2605, -29.6177, 3.92743>
  look_at <-3.9995, -3.31502, 5.91995>
  angle 40
}

background { color rgb <1, 1, 1> }

light_source { <0, 0, 20> colour Gray90 }
light_source { <50, 200, -100> White shadowless }
light_source { <-20, 40, -20> White shadowless }
// light_source { <100, 80, -200> White shadowless }
light_source { <0, 0, 40> White shadowless }

object {
 lg_0971
 texture { lg_black }
 matrix <-0.5000, -0.8660, 0.0000, 0.8660, -0.5000, 0.0000, 0.0000, 0.0000, 1.0000, -0.3213, -10.4285, 0.8000>
}
object {
 lg_0972
 texture { lg_black }
 matrix <-0.5000, -0.8660, 0.0000, 0.8660, -0.5000, 0.0000, 0.0000, 0.0000, 1.0000, -0.3213, -10.4285, 0.8000>
```

Figure 4: gPov

You can launch the program using the following syntax:

```
/usr/local/bin/tclpov/tclpov &
```

If the *bad interpreter* message is shown, this means that the program could not find the Tcl interpreter *wish8.3*: it should be in */usr/local/bin*. Just type *which wish8.3* to quickly discover where the *wish8.3* is hiding. Then working as *root* create a suitable link, such as

```
ln -s /usr/bin/wish8.3 ↵
/usr/local/bin/wish8.3
```

Some users might find the tclPov GUI slightly over the top (see Figure 3), but the (albeit simplistic) editor that you can use for scene "programing", fills most of the screen. And the **Syntax Highlighting** feature should make your job easier.

Use the *Options* menu to select settings (such as the resolution and anti-aliasing) for the rendering process. This menu also lets you convert the rendered image into a variety of graphic formats.

GLOSSARY

Syntax Highlighting: *This refers to an editor highlighting commands, comments and any variables in a program language by using various colors.*

A short online help describes how to use the program and explains all of the settings you need for POV-Ray.

gPov

gPov from the *gPov-0.1.2.tar.gz* archive is also by the developer of tclPov. The installation of this C program keeps closer to home ground: after pre-installing both the GTK library and the accompanying header files, run the *make* command in the *gPov-0.1.2* directory to create the new program. While logged on as *root*, simply call *make install*. You can then launch the program by typing *gPov &* (Figure 4).

Again an integrated editor is available, but in this case do not expect too many features, not even syntax highlighting.

You are prompted for the rendering parameters, but only for critical values such as the quality, anti-aliasing and image size. You can save any files you create in *jpeg*, *bmp*, *png*, or *gif* format.

The program dropped to the bottom of the division due to its instability, and occasionally crashing with a memory access error after clicking on a button.

PovFront

Following this disappointment, it is time for a far more fully featured program: PovFront. In addition to the Gimp toolkit PovFront requires the *libgtkglarea* library. After expanding the source archive *povfront-1.3.5.tar.gz*), use the *./configure* syntax in the newly created *povfront-1.3.5* directory and then type *make* in a shell to compile the program. In our tests we demonstrated that the program was far more stable when compiled without GNOME support. To do this you need to set the *--disable-gnome*:

```
./configure --disable-gnome
```

flag when launching the configuration script. You can use the third program in this group *make install* to finally install the program – you need to be *root* to do so. The *povfront* & syntax calls the GUI shown in Figure 5.

PovFront provides far more settings than any other program we have looked at so far. The options are available via tabs in the lower part of the main screen. The *Output* tab allows you to select the image size, the output format and the section that you want to render. Use the *Quality* option to select the quality and color depth for the image and to select or deselect anti-aliasing. Use *Library* to define the paths to the libraries which contain the elements that POV-Ray will need to access.

Click on the *Render* button to start the ray tracer. A separate window allows you to view the current state of the image. You can then click on *Abort the last job* to cancel the last rendering job or the *Job control* will open a window with a list of the jobs POV-Ray is currently performing. What is missing is an integrated editor

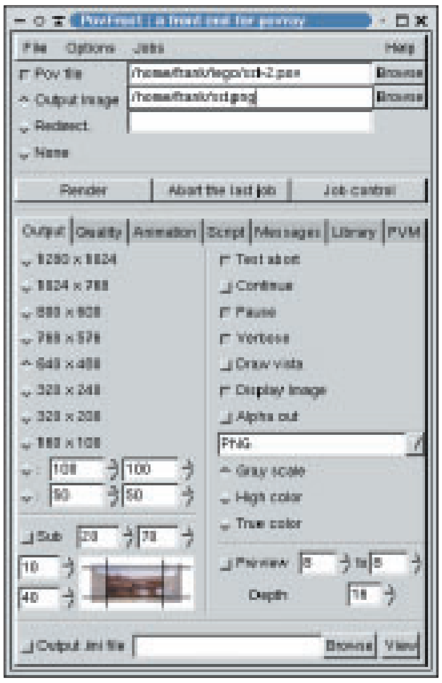


Figure 5: PovFront

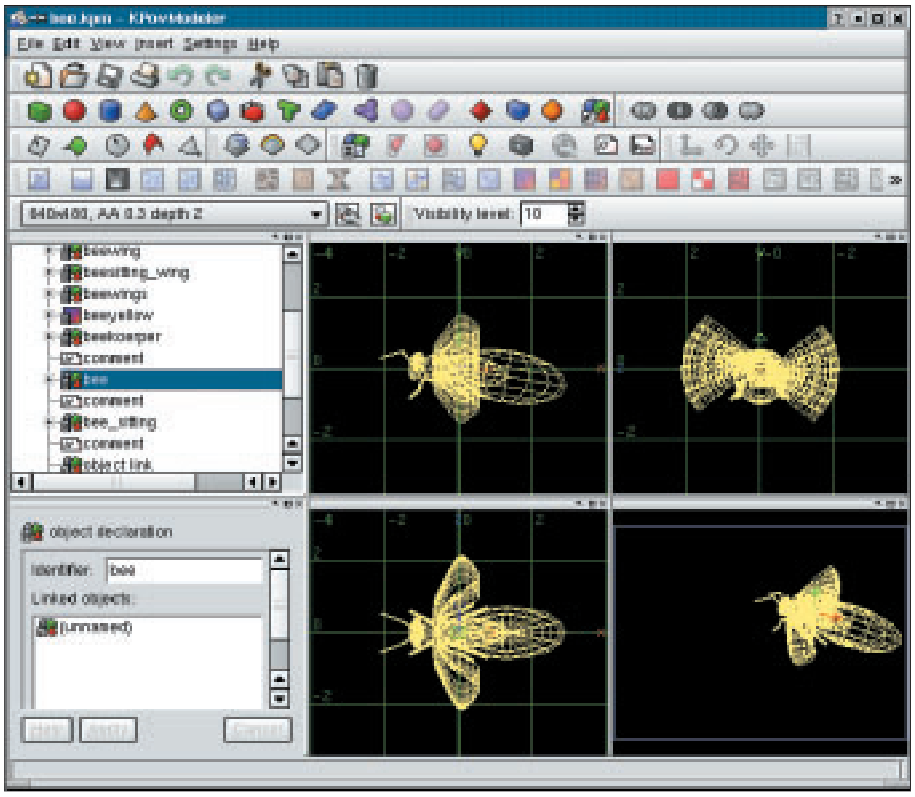


Figure 6: Main working screen of KPovmodeler

that would allow the user to open POV-Ray files for easy editing. Povfront was not exactly stable during all our tests and it often issued memory access errors just before crashing the program when we clicked on certain buttons.

KPovmodeler

The tools we have covered so far were useless without POV-Ray scene files being created elsewhere. KPovmodeler goes a few steps further, providing both a front-end for the POV-Ray command and allowing you to compile scenes.

The program website only offers the sources at present – you will need to compile the KDE software yourself. You will need a current version of Qt 3.0.x and the *kde3-kdelibs* package as well as additionally the *OpenGL*, *glut*, *glx*, and *glu* libraries plus headers.

Before compiling, you need to expand the source file archive. Type *tar -xzvf kpovmodeler-0.2.tar.gz* to do so and then change to the directory, *kpovmodeler-0.2*, and type the folowing commands in this order: *./configure*, *make*, and (again as *root*) *make install*. After completing these steps you can run the program by typing *kpovmodeler* in a shell (Figure 6).

The upper screen area of the program contains some toolbars that provide access to functions for the scene creation and rendering. Below the toolbars and on the left you will see a tree view showing the objects that belong to the current scene. The area on the lower left allows you to edit the selected element. The lower right area provides four different views of the current scene.

KPovmodeler is not just for editing existing POV-Ray files, it also helps you be creative while defining new scenes. All of the major geometric elements are available. Various surfaces and structures can be applied to them. A selection of backgrounds is also available. After you define a scene you can click on *View / Render* in the menu to start rendering the image with POV-Ray. The results will be shown in a separate window (Figure 7).

The KDE Modeler provides you with a useful menu item, *Settings / Configure KPovModeler*, where you can define the individual settings, this is where you will want to define screen colors and starting sizes for the objects you will be inserting.

The program is suitable for creating complex scenes and provides you with a useful interface for inputing objects – even going through the list of features is beyond the scope of this article. You can create and modify scenes without writing a single line of POV-Ray code. Although the version we tested was only 0.2, the program was extremely stable and did not crash once during our test series.

The authors are looking for help with the program documentation. As soon as

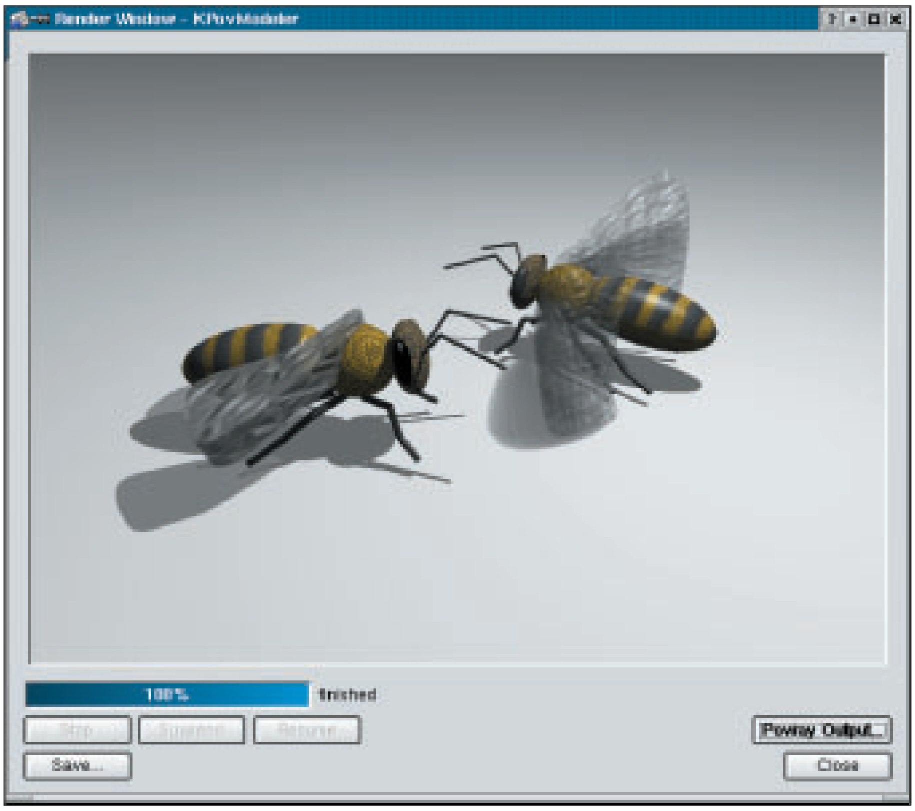


Figure 7: KPovmodeler has completed the rendering process – the output window shows the results

this becomes available KPovmodeler may be *the* solution for visual rendering tasks on Linux.

Truevision

Truevision, which requires GTK and GNOME, is already firmly established in this niche. The program website contains a source archive (*truevision-0.3.10.tar.gz*) that you can expand using the following syntax: *tar -xzvf truevision-0.3.10.tar.gz*. As usual follow the installation trinity, *./configure*, *make* and *make install* in the expanded source directory to compile and install the program – you will need the header files, of course. After following these steps, you can type *truevision &* to launch the program.

The graphic user interface contains no unpleasant surprises, providing a menu and toolbar in the upper area, various views of the model on the lower left. The dialog boxes for inserting and editing individual objects are available via the tabs on the lower right (Figure 8). The *Create* tab leads to a tree view of the available objects. Here you can click on *Create* to insert the selected object. *Materials* provides you with a list of the pre-used materials, where you can opt to create your own surfaces or select an available patina. The *Edit* page shows you the characteristics of the selected object and provides ample opportunity for fine tuning.

There are fewer textures available than in KPovmodeler, but you can still create interesting models. Editing individual objects means toggling back and forth between various tabs, and that can be extremely time consuming if you are working on a complex scene.

Again, Truevision turned out to be somewhat unstable and crashed when we tried to save a scene. And that meant that all our work had been to no avail with the program being unable to load the files we had saved up to that point. Unfortunately, the program also lacks an online help or a manual. Although you can create and edit scenes, this program is so complicated that the initial learning curve will be very steep without external assistance.

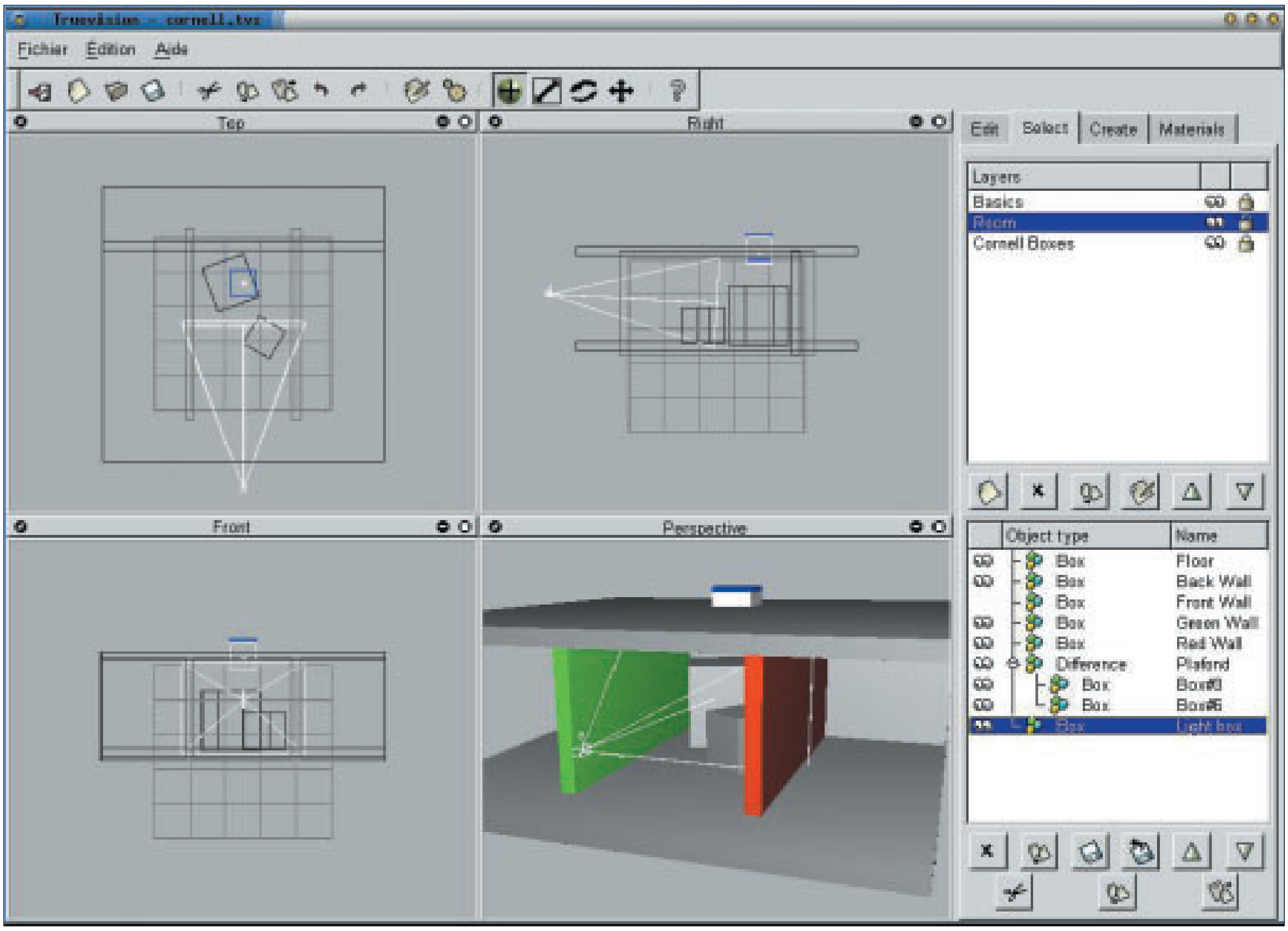
Summary

For producing the occasional POV-Ray scene, Peflp is definitely a good choice, as it is stable, clear and easy to use. PovFront offers all the settings that a POV-Ray user could possibly wish for. The program tends to crash at irregular intervals, which makes productive use impossible. GPov and tclPov both have an integrated source editor that you can use for scene creation, however, our impression was that both programs need some polishing.

KPovmodeler and Truevision are equally suited to scene compilation. Your learning curve will be fairly steep, as they both lack a manual. KPovmodeler was just a nose in front on the stability stakes and is thus highly recommended. ■

INFO

[1] Povray: *http://www.povray.org/*



	Object type	Name
	Box	Floor
	Box	Back Wall
	Box	Front Wall
	Box	Green Wall
	Box	Red Wall
	Difference	Plafond
	Box	Box#3
	Box	Box#6
	Box	Light box

Figure 8: Main Window in Truevision

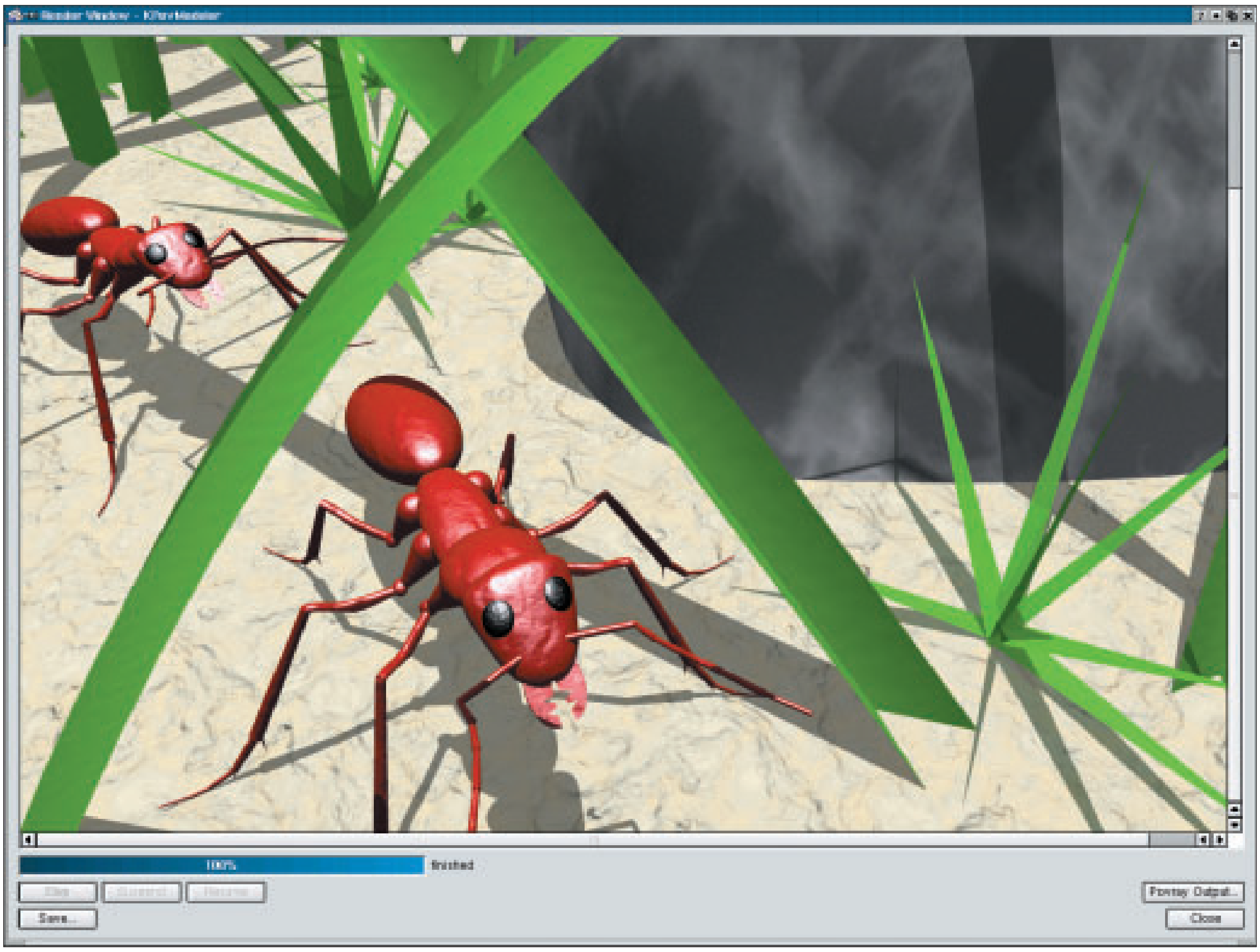


Figure 9: Complex scenes comprising a large number of elements can be created in KPovmodeler and rendered in POV-Ray

Table 1: Overview of Povray Front-Ends

Program	**Peflp**	**tclPov**	**gPov**	**PovFront**	**KPovmodeler**	**Truevision**
Author	Xavier Bourvellec	Chris Hammer	Chris Hammer	Philipe P. E. David	Andreas Zehender	Vincent le Prince
License	GPL	GPL	GPL	GPL	GPL	GPL
Website	*mogzay.multimania.com*	*www.nasland.nu/tclpov.php*	*www.nasland.nu/gpov.php*	*perso.club-internet.fr/clovis1*	*www.kpovmodeler.org*	*truevision.sourceforge.net*
Installation						
Source tgz	x	x	x	x	x	x
rpm	-	-	-	-	-	-
deb	-	-	-	-	-	-
Additional Libraries	Tcl/Tk	Tcl/Tk	GTK	GTK, optionally GNOME 1.4	Qt, KDE 3.0.x (1)	GTK, libgtkglarea, GNOME 1.4
Interface language	English	English	English	English	English	English/Other
Functionality						
Integrated Text Editor	-	x	x	-	-	-
Integrated Preview	x	-	-	-	-	-
Store and Convert Finished Image	x	x	-	x	x	x
Graphics Editor	-	-	-	-	x	x
Help						
Online Help	-	x	-	-	-	-
Manual	-	-	-	-	-	-

(1) KDE Version 3.1 will include KPovmodeler as part of the *kdegraphics* package.