

TVP ANIMATION

User Guide



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- The skull and the countryside used to describe the multi-layer camera (lesson n°10) were created by Peter Wassink.
- The particle presets (lesson n°11) were invented by Manuel Zander.
- The red planet, the tree, the pre-historic paintings, the color picker, the animated brushes «ink» and «tree leaves», the photos and various diagrams were created by Fabrice Debarge.
- All other images are protected by copyright of TVPaint Développement.

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Appendix 1 : The Sketch Panel

Lesson 00

Introduction

Getting to know TVPaint Animation

TVPaint Animation is a program compiled for graphic design and 2D animation. This program is intended for drawing and animation enthusiasts. With its bitmap approach, its objective is to cover the main needs of the artist. It offers a complete range of high-performance tools, the parameters of which may be set, whether for the layman or the professional artist and yet still offers the creative feeling provided by pen and paper.

TVPaint Animation is the animator's home studio.

Based on TVPaint technology, which is renowned worldwide since its success on the Amiga in 1991 and constantly upgraded for ever better performance, TVPaint adapts to all production diagrams, whether traditional, fully digital or hybrid.

Designed to work with all resolutions, it will delight all drawing enthusiasts thanks to its tools which offer limitless possibilities. Your creations are only restricted by the boundaries of your imagination !

Typographic conventions

In order to simplify understanding of the techniques described, this user guide uses the following typographic conventions :

- *Italics* : the names of menus, buttons, tabs, windows, commands, tools (all elements referring to one of the objects present in the program) are written in italics.
- [key] : designates the keyboard shortcuts
- [key 1+ key 2] : designates a key combination. Keep the first key pressed and then press the second key.
- left click / right click: these shortcuts refer to a click on the left or right mouse button.

As you are advancing in the guidebook, you will encounter the following symbols:



TIP

A symbol representing a light bulb indicates tips and hints for using the program.



Remark

A symbol representing a warning sign emphasises information that requires particular attention and indicates an important comment.



Reminder

The reminder symbol characterises any information the explication of which was already given in the guide book.

Lesson 1

Getting started with TVPaint Animation

In this lesson you will:

- Learn to open and close TVPaint Animation.
- Discover the various panels and windows.
- Start a project.
- Access InLine help.
- Set parameter preferences.

After having followed the installation instructions in the Start-up guide, you may now start *TVPaint Animation*. To do this, proceed as follows:

- * Double-click on the desktop icon or use the start menu (for Windows users).
- * Double-click on the applications folder icon or dock icon (for Mac OS X users).

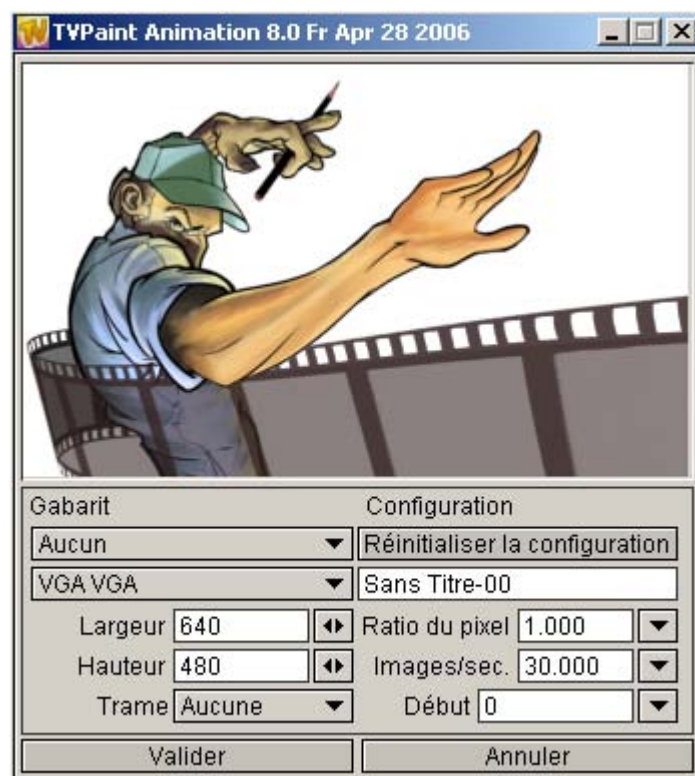
The *TVPaint Animation* program and most of the associated files are saved in the «program» directory of your operating system.

To use *TVPaint Animation*, you may choose between the mouse or stylus.

The latter is more appropriate for persons wishing to have that « freehand » design feeling.

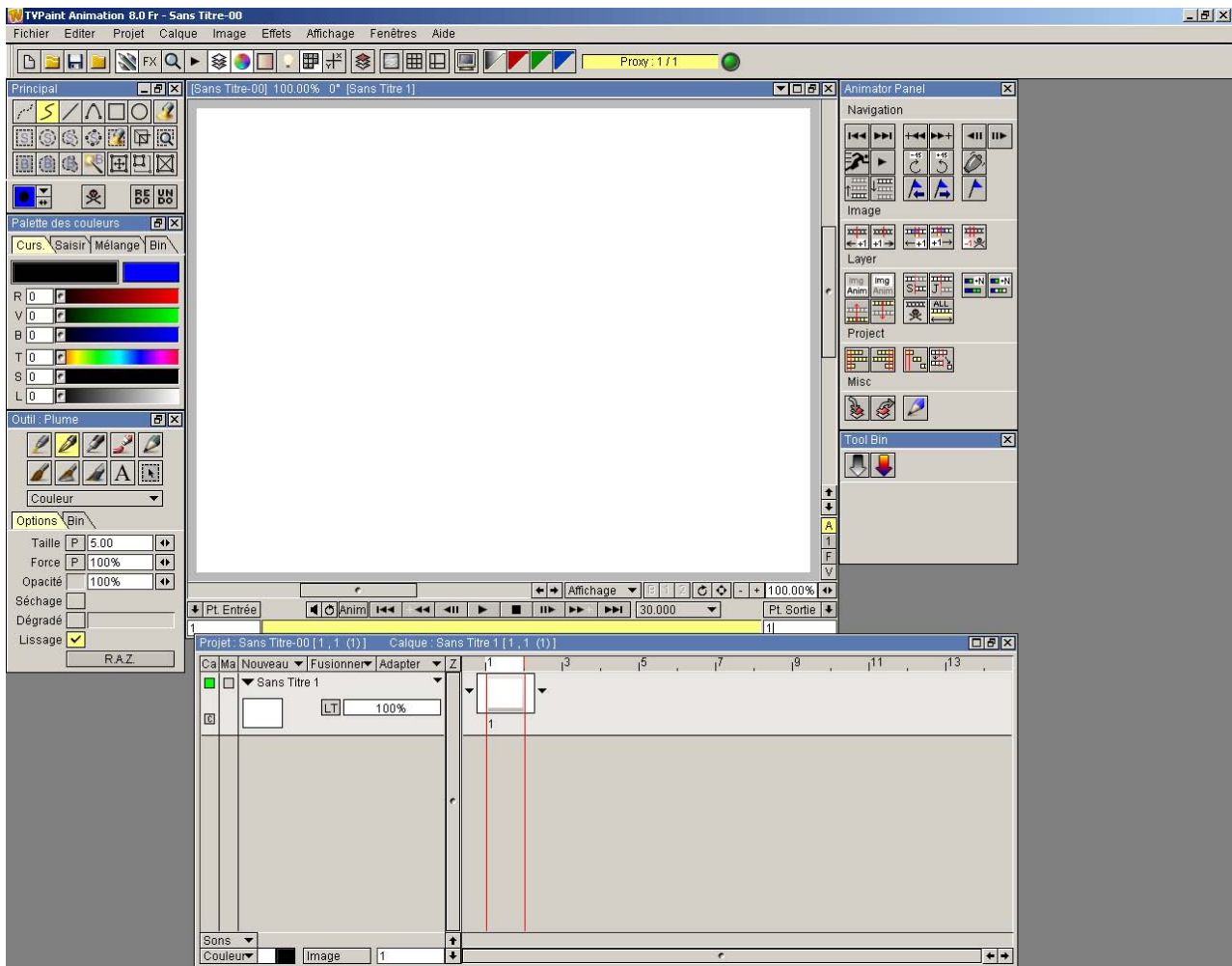
The various program panels

When the program is started, the following screen appears. This screen enables selection of your future workspace and resetting of all associated parameters.



The various options available on this screen will be discussed in further detail elsewhere in this lesson. For the moment, simply click on *OK*.

Once the program has loaded, the following image illustrates what your screen will be like for a display resolution of 1280 x 1024 pixels.



Here you will find a description of the various panels displayed on the screen.

• The toolbar



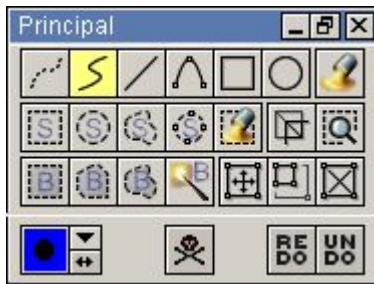
The first icons on this toolbar concern the traditional functions found in all standard software packages: *New* (start a new project), *Load* (load an existing project), *Save* (save a project), *Close* (close the current project).

The following icons are used to open or close various TVPaint Animation panels (display coordinates, light table, timeline, etc.).



To move the toolbar, click and hold the left mouse button, then slide the cursor as required. The toolbar then appears in the form of a panel.

• Main panel



This panel is used to draw segments, ellipses, rectangles, curves,... Brush selection and cutting options are also available here.

• Color picker



This panel is used to select the color in which you wish to work. Distinction is made between the *Apen color* (always referred to as main color) in the left rectangle and the *Bpen color* in the right rectangle.

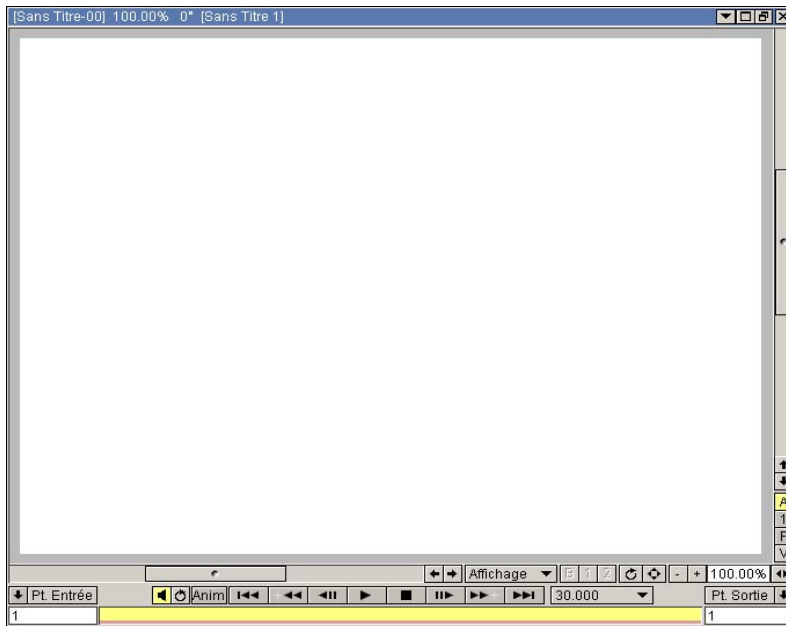
• Toolbox



The toolbox contains a wide choice of buttons corresponding to traditional drawing tools: airbrush, brush, pencil, wet brush, etc.

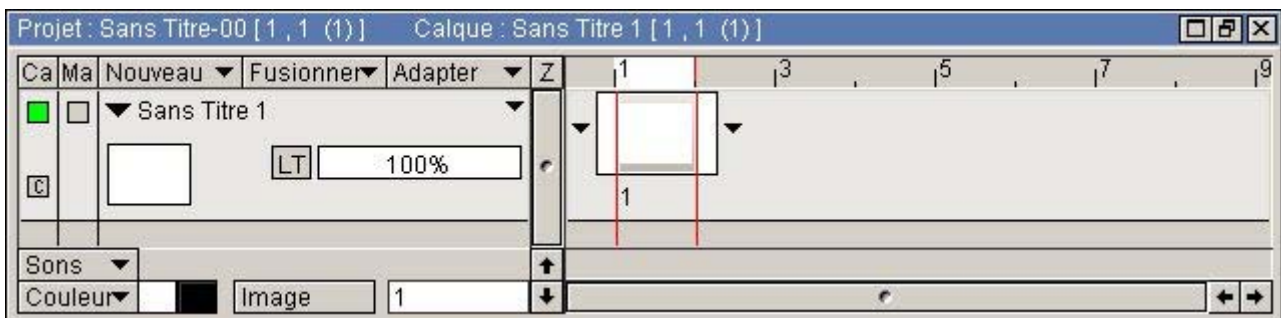
Various parameters may be set: size, power, opacity, etc.

• Current project window



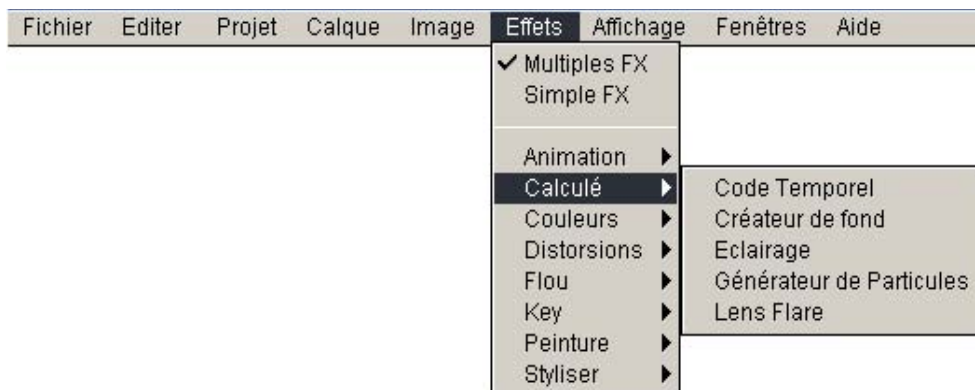
The current project window is the one in which you will be able to express your artistic talents and create a wide variety of animated sequences.

• The layers window



This window is also referred to as the «timeline» by many users. It is used to manage your layers and insert keys for your effects (we will discuss this point in subsequent lessons).

• Main menu



TVPaint Animation has numerous menus located just above the toolbar: *File, Edit, Project, Layer, Image, Effects, View, Windows, Help*.



Each of these menus offers specific options all of which will be described in detail in this guide.

Some useful tips



• Move a window

If for some reason you wish to move a window, this is done by simply clicking on the title bar and then sliding it to the required location while pressing the mouse button.


• Close, minimize or maximize a window

These three buttons, on PC :  and on Mac : , are present on many of the panels and windows, in the top right-hand corner for PC and top left-hand corner for Mac.

* The buttons  /  close the window (keyboard shortcut [Shift+W]).

* The buttons  /  place the current window in front of or behind other windows.

* The buttons  /  are used to minimize the window.

Once minimized, this icon changes to  and may be used to maximize the window again (note that this icon does not change on Mac).

The size of some windows, the timeline for example, may be adjusted: it is possible to adjust their size with precision by clicking on one of the edges.

• Sliders and mini-sliders



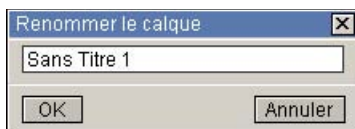
The element above on the left is referred to as a slider. It is located horizontally under some windows (in particular under the current project window) or vertically next to these windows. Click on the arrows with the left mouse button or slide the rectangle to view the content of the window with which the slider is associated, either up and down or left and right.

As you have already guessed: the element on the right is a mini-slider which may be used to vary the numeric value or percentage next to it with a left click and slide of the mouse on the double arrow.



When sliding the mouse on a mini-slider, press and hold the right button to accelerate movement.

• Alphanumeric fields



Each time you rename a layer, project, effect or other element, you will be asked to enter a text in this type of window. Click on *OK* to confirm the name change or click on *Cancel*.

The standard keyboard shortcuts: [Ctrl+X] (cut), [Ctrl+C] (copy), [Ctrl+V] (paste), [Ctrl+A] (select all), [Ctrl+Z] (cancel) are valid in all alphanumeric fields (note that these shortcuts are valid for PC and on Mac computers the user presses the Apple button instead of the Ctrl).

When required they are accessible with a right click on the concerned field.

• Progress bar



Sometimes application of an effect with TVPaint Animation requires a certain amount of processing time. If your computer is carrying out such an operation, the progress bar appears to inform you of the progress of this operation.

If required, the *Stop* button or [Esc] key on the keyboard may be used to stop the operation in progress.

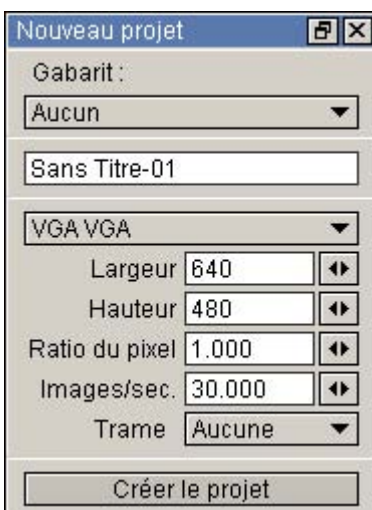
Working with projects

TVPaint Animation works with *Projects* which contain the artist's creations. The notion of project is vast and further details will be provided during the first five lessons.

• Create a new project

The first thing to do when using this program is create a new project. To do this, you may:

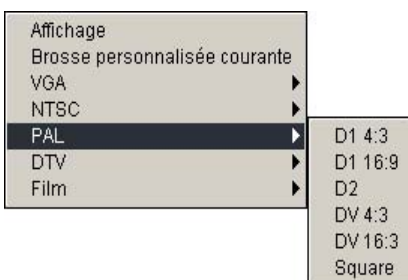
- * Select the parameters of your new project as soon as the program is started when the start-up screen appears.
- * Use the main menu *File*.
- * Use the keyboard shortcut [Shift+N].
- * Click on the first icon to the left on the toolbar.



A panel then appears (see opposite). This panel is used to define:

- * The *name* of your project
- * Its *Width and Height* in pixels
- * The *Aspect ratio*
- * The *frame rate (Images/sec.)*
- * The *Fields* display mode

The *Template* concept will be discussed in lesson 5.

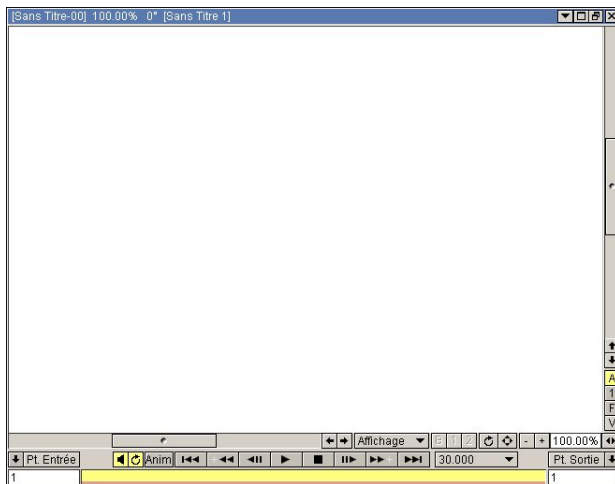


Setting each parameter to create an animation in the format of your choice may prove long and arduous.

Therefore, a popup menu has been added to the panel to allow you to set the various numeric fields according to the most commonly used formats: PAL, NTSC, VGA, DTV, Film, etc.

TVPaint Animation uses all standard formats (even very high definition) both for image width/height ratios 4/3 and 16/9 as well as others.

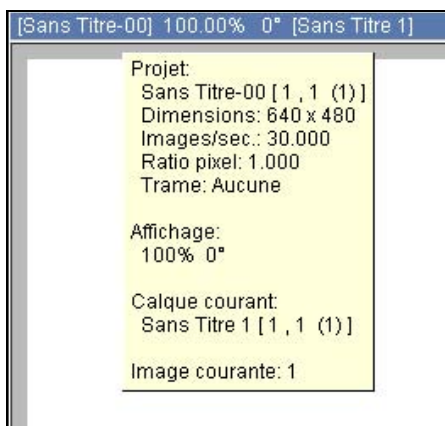
Once all options have been selected, click on *New project*.
A project window then appears on the screen (see below).
It is in this window that you will work and view your creations.



TVPaint animation allows you to work on several projects at the same time.

The maximum number of projects is limited only by the capacity of your computer.

• View data relative to your project



To view data relative to your current project (size, frequency, ratio, etc ...), simply move the cursor over the title bar and hold it there.

A small yellow window then appears with all the information you require.

• Name a project

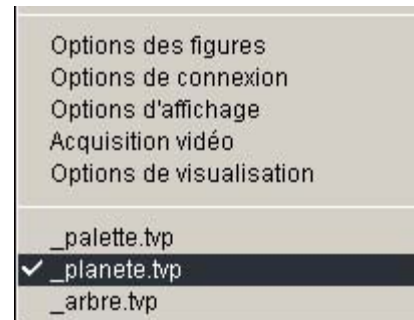
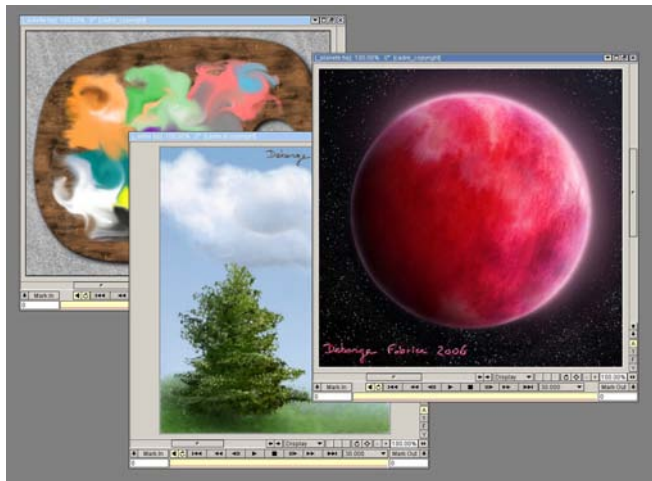
The default name for a new project is «Untitled-00 », « Untitled-01 », « Untitled-02 », etc ... To render these names more understandable, it is possible to rename them as you wish.

To do this, simply use the main menu *Project>Rename*.

• Working with several projects

TVPaint Animation offers the user the possibility to work with several projects on the screen at the same time. The [Tab] key on your keyboard may be used to pass from one to the other.

It should be noted that the names of the projects present on the screen may be viewed in the main menu *Windows*. The checked name is the current project.



• Working in fullscreen mode

It is also possible to work in *Fullscreen* mode by simply pressing the [V] key on your keyboard or by clicking on the toolbar icon indicated below.





When in *Fullscreen mode*, the keys of the numeric keypad may be used to move your project on the screen.

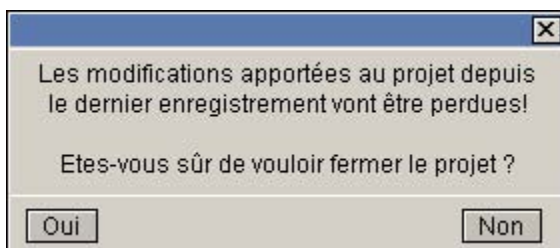
Here again, the [Tab] key is used to switch from one project to another.

To return to windows mode, simply press the [V] key or the icon above again (these options are also accessible via the main menu *View*).

• Close a project

A project may be closed in four ways:

- * Use the  /  buttons at the top of your project window.
- * Use the fourth button from the left on the toolbar.
- * Use the main menu *File>Close project*.
- * Use the keyboard shortcut [Shift+W].



In order to avoid any mistakes, a confirmation message will appear (see opposite).

The main menu *Help*

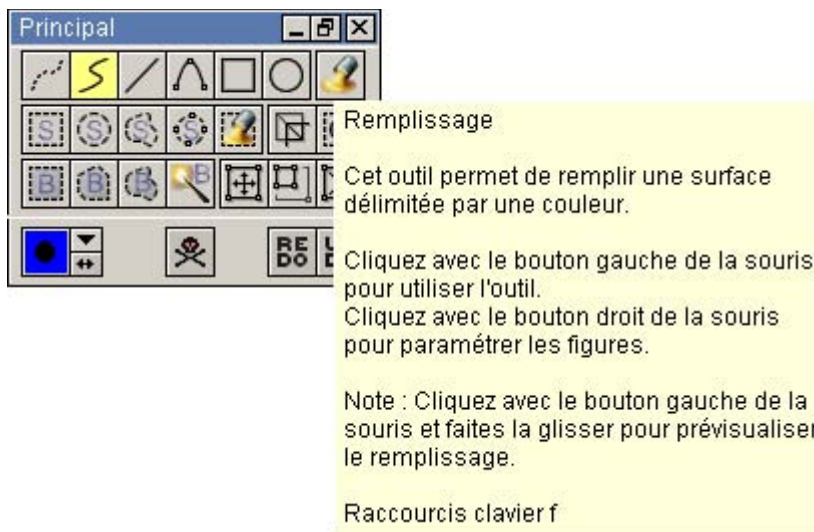
Each menu proposes specific options. At this stage we will take a closer look at the *Help* menu.

• InLine support

At any time, a help function referred to as *InLine help*, is available in TVPaint Animation.

Move the cursor over the icon for which you wish to obtain information (without clicking on it) and a brief description of the icon you are pointing at will appear together with any associated keyboard

shortcut.



Opposite you will find the description corresponding to the *Floodfill* tool. If you wish to reduce the content of the InLine help or prevent it from appearing on the screen entirely, the corresponding options are available in the *Help* menu.

• The *About...* window





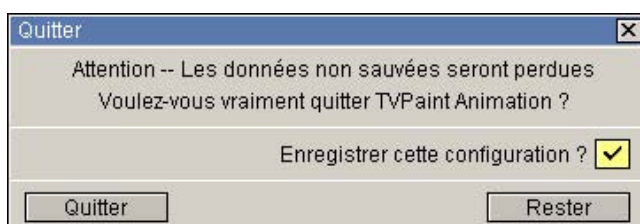
This section provides information about the program:

- * name of developers,
- * beta-testers,
- * date of creation,
- * serial and license number,
- * copyrights.

To quit the program

We will now quit the program. To do this you may:

- * click on the *Close* button at the top of the screen  (PC) or  (Mac)
- * select main menu *File>Quit*.
- * use the keyboard shortcut [Shift+Q]



The confirmation window opposite then appears.

• Save the configuration

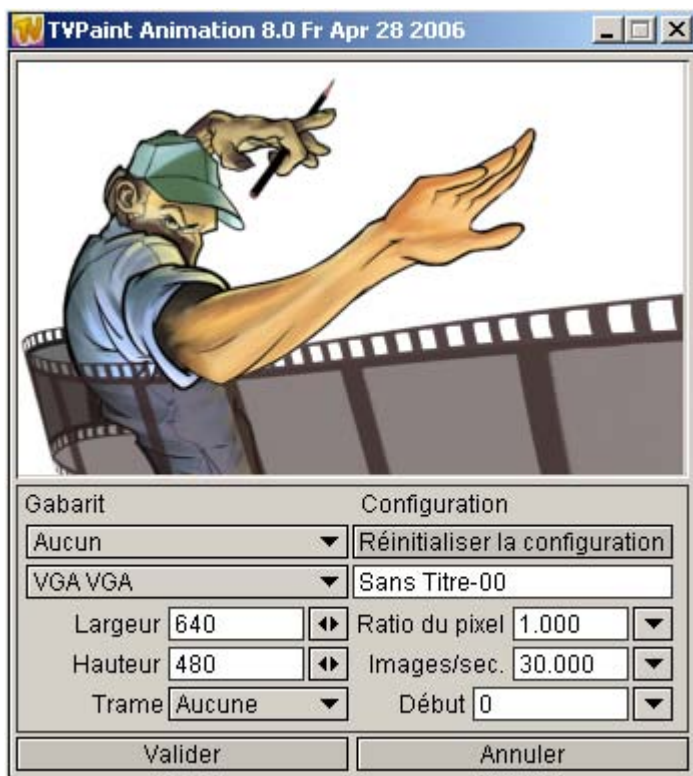
At this point, if you wish to keep the current layout of panels on the screen for next time you open TVPaint Animation as well as the effects, palettes and various settings used (this list will be completed as the lessons progress...), tick the *Save this configuration* box.

You may then choose to:

- * *Leave* TVPaint Animation, or.
- * *Stay* and return to the TVPaint Animation interface.

• Reset the configuration

When restarting TVPaint Animation, the user may reset all program settings to zero (*Reset configuration* button).



Warning: if these settings are reset, all effects, brushes, palettes, shortcuts... used previously will be deleted.

You may only keep them for later use if you have saved them in advance.

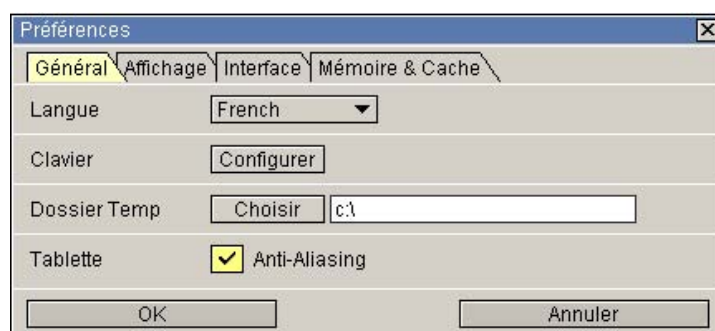
To reset the configuration, click on the dedicated button in the window which first appears when the program is started (see opposite).

The Preferences panel

The *Preferences* panel is accessible via the main menu *Edit*. This function is used to set various user options which enable re-organisation of the interface.

It comprises four tabs: *General*, *Display*, *Interface*, *Memory & Cache*.

• The *General* tab

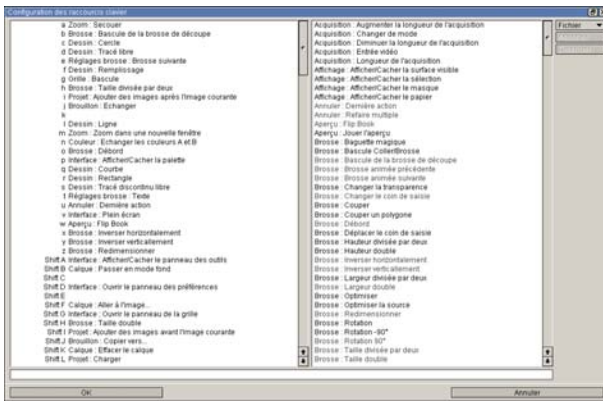


The *General* tab indicated above comprises four sections for a PC and 3 for a MAC.

* The first is used to select the HMI language. At present, the user may choose between French and English.

- The second section is used to attribute keyboard shortcuts to almost all icons and menu options.
-

You have probably noticed that when the InLine help appears, many tools, options, drawing modes, etc. already have associated keyboard shortcuts.



To create your own shortcuts, click on the *Configure* button in the second section.

The window opposite then appears.

- The left-hand column indicates all keyboard keys and key combinations with the associated functions when attributed.
- The right-hand column indicates all TVPaint Animation functions which may be attributed to a keyboard shortcut.
- The *Assign* button is used to assign a function to a specific key or combination of keys (in which case you will create a shortcut for this function). The combination [Ctrl] + *Assign* is used to add a function to a key. The various functions will be executed in the order they were added.
- The *Unassign* button has the opposite effect (in this case it deletes the shortcut).
- The *File* popup menu is used to save the *keymap* on your hard drive, load an existing keymap, clear the current keymap or reset the default keymap.

* The third section of the *General* tab is used to define a temp directory in which temporary TVPaint Animation files may be stored.

- This directory may be modified using the associated text field or using the *Set* button (a file navigator window then opens).
- The temporary files contain data relative to the current TVPaint Animation session. Data relative to your animations is also stored here (for example, the various stages of your work necessary for correct operation of the *Undo* and *Redo options*).
- Inexperienced users are advised not to change the default location.



The faster the data storage device on which your temporary files are stored, the faster TVPaint Animation will work. Always ensure this storage device has sufficient available storage capacity.

* The fourth section of the *General* tab (specific to PC users) is used to enable or disable the *Sub-Pixel* mode for future drawings. This is in direct relation with your hardware and, more precisely, with your graphic tablet if you are using one (we strongly recommend it!).

All the latest models of Wacom tablets work in Sub-Pixel, i.e. the tablet precision is greater than one pixel on the screen. Enabling this function when suitable hardware is used will allow you to use the TVPaint Animation drawing tools with a precision greater than one pixel !

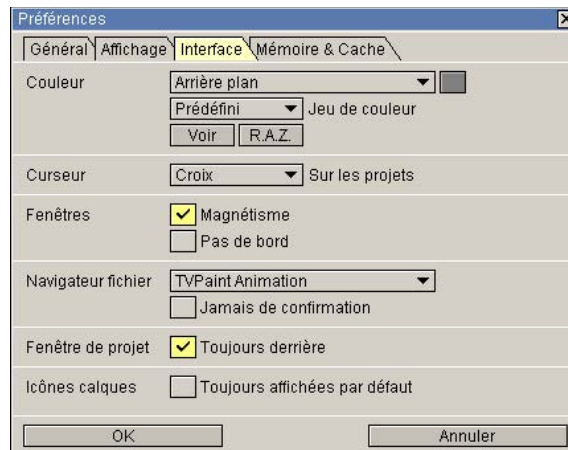
In the contrary case, if your hardware does not support this function, tablet management may be negatively affected (drift between the true position and the position of the cursor on the screen, for example) and will deliver results considerably different to those expected, in particular if you work with a platform of the TabletPC type or in double-screen configuration. We therefore recommend you check the compatibility of your hardware to benefit fully from this function.

• The *Display* tab



The *Display* tab concerns brush display (the latter will be discussed in detail in lesson 4). The *Hide brush* button is used to mask the brushes when they are used as drawing tools. Only the mouse cursor remains visible on the screen and a frame indicates the exact location of the brush. This option is sometimes practical when working on a computer with limited resources: the use and display of large brushes may slow the computer down.

• The *Interface* tab

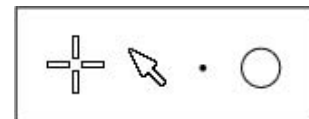


* The first section of this tab may be used to modify the program interface colors.

The default colors used in TVPaint Animation are light gray in order not to interfere with the colors used in your projects. However, you are of course free to modify these colors as you wish.

- The first scroll menu allows you to select the element for which you wish to modify the color (buttons, text selected, sliders, etc.)
- Next to this field you will find a square box indicating the display color of the interface element selected. Simply click on this box and then select any color on the screen to be assigned to this element.
- The *Color scheme* popup menu is used to quickly select a set of predefined colors or the default color scheme for this interface.
- The *Reset* button is used to return to the colors present when your configuration was loaded.
- The *Apply* button applies the colors selected to your current interface.

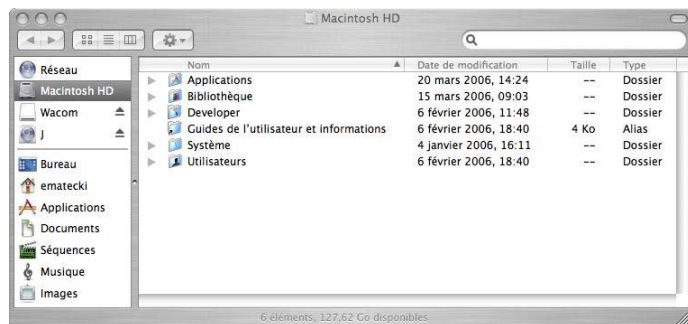
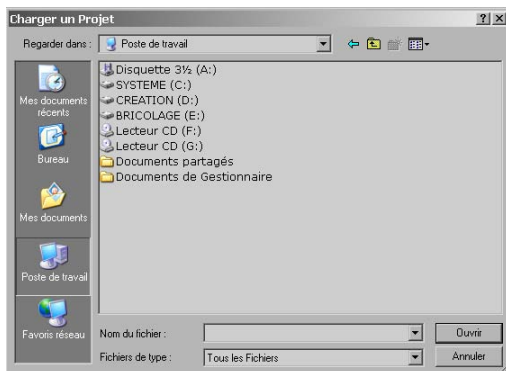
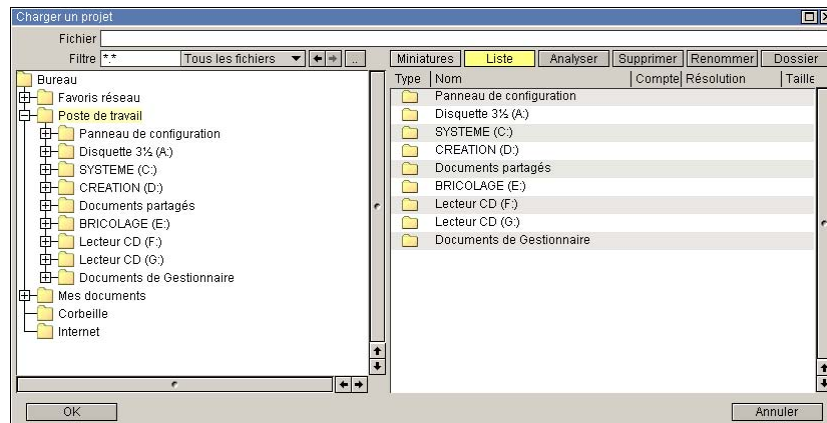
* The second section allows you to choose the *Style* of your cursor. The different possibilities are: cross, arrow, point or circle as illustrated opposite.



* The third section is used to *Magnetize the various windows of your interface*. This renders management of their movement more practical.

You may also choose to display the program without tool or title bars (for windows users), which increases the project working zone.

* The fourth section is used to select which type of file requester is to be used. Below you will find examples of TVPaint Animation specific as well as standard Windows and Mac OS X file requesters.



The TVPaint Animation file requester is common to many software packages developed by TVPaint Développement and is present in your program regardless of your specific operating system.

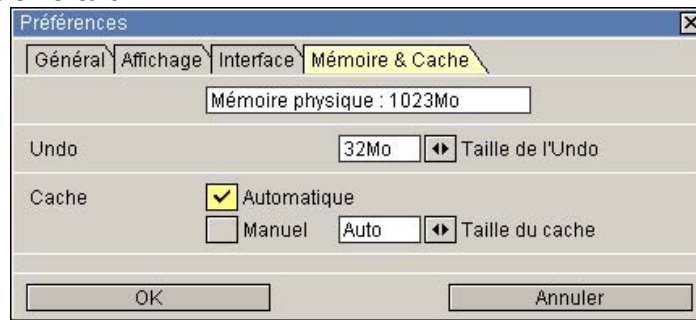
It is the only one capable of displaying previews for files with extensions .TVP .MIR .AUR .DIP.

The *Never confirm* button, when ticked, cancels the confirmation request which normally appears when a file is deleted or rewritten.

* The last but one section contains a tick box used to place the current project windows behind the other interface panels.

* The button in this last section is used to always display the layer icons in the timeline. This function will be discussed in lesson 4.

• The *Memory & Cache* tab



This tab first displays the physical memory available on your computer.

* Just below this field you will find a numeric field and mini-slider next to it. This field is used to attribute the amount of memory you require for the *Undo* option which allows you to «return» to and undo the previous steps when drawing on the screen. The higher this value, the «further back» you may go. However, this default value is largely sufficient.

* TVPaint Animation uses the physical memory of your computer and one or several temporary files as discussed in the *General* tab.

You may want to allow TVPaint Animation to manage this function automatically or impose a maximum cache size to be used (this may be useful if you are working simultaneously with several programs demanding a large storage capacity).

With regard to this point, it should be noted that TVPaint Animation manages operating systems using over 3 Gigabytes of physical memory.



To save your shortcuts, colors or other predefined preferences for later use with TVPaint Animation, do not forget to save your configuration before quitting the program.

Some details

Creation of a new project requires some additional explanations which you will find below:

• Working without the notion of DPI

You may already be used to the notion of DPI (dots per inch).

The DPI is a pixel density unit often used in imaging and printing software packages. The higher the DPI value of an image, the more pixels it contains and the sharper the printed image will be.

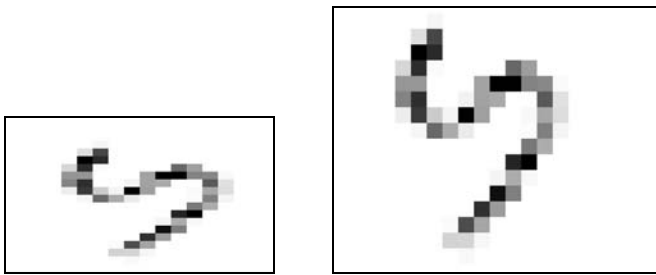
In the animation field, the measurement used is the pixel. The notion of pixels is more practical as it adapts to the specificities of both metric and non-metric systems.

For example: the European PAL format uses a resolution of 720 pixels in width and 576 pixels in height, whereas the American NTSC format uses a resolution of 720 pixels in width and 486 pixels in height.

The global size of your animation in centimeters, meters or inches depends entirely on the TV or cinema screen used to view them.

• The notion of pixel aspect ratio

The pixel aspect ratio is the multiplication coefficient which links the pixel width to the pixel height. Depending on the video formats, the pixels may be either square or slightly rectangular.



Left: (pixel width) = (pixel height) x 2.
The ratio is therefore « 2 ».
Right: (pixel height) = (pixel width).
The ratio is « 1 » and the pixels are square.

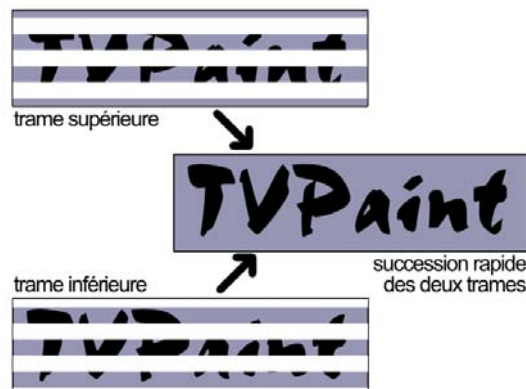
The pixel aspect ratio has a value of 1.067 for the PAL format and a value of 0.9 for the NTSC format.



Avoid confusion between pixel aspect ratio and width/height ratio of a video (4/3, 16/9, ...). The ratio is the width/height ratio of the pixels.

• Video fields

Normally, a video image is composed of two fields which alternate at a speed which is too fast for the human eye, these fields are referred to as upper fields and lower fields. A field is a vertical half-resolution image which contains every other line of the image. Interlacing of these fields is linked with the PAL, SECAM and NTSC standards. In PAL/SECAM, the upper fields appear first, whereas in NTSC it is the lower field which appears first.



This framing technique, even if twice as many images are required for the same video (50 instead of 25 images per second in PAL mode), has been adopted in order to improve the quality of image movement and precision. Taking advantage of the persistence of vision effect, it also allows the user to work with lower resolutions.

The use of video formats with fields is possible in TVPaint Animation.

When creating a project, it is therefore necessary to indicate which of the two fields will be displayed first using the *Fields popup* menu.

The option *None* in this menu is used to create a project without using fields.

Lesson 2

Drawing basics


In this lesson you will:

- Learn how to handle the various tools: airbrush, prnbrush, wetbrush, pencil, mechanical pencil.
- Discover the various facets of the color picker.
- Draw simple geometric forms and floodfill surfaces.
- Study the notions of opacity and transparenence of a pixel.
- Study the notions of "colored background" and layers.
- Use the different drawing modes.

It is very easy to draw using TVPaint Animation.

In this second lesson we will draw a small house (very simple) using the TVPaint Animation tools. In this way we can study the basics which will allow you to express your artistic talents.

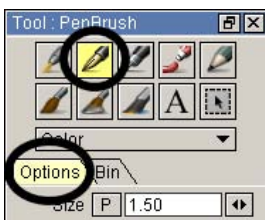
Even if it is possible to draw with a trackball or mouse, it is strongly recommended to use a graphic tabled equipped with a styllet. This tool requires getting used to for beginners but it is much more natural to use it for drawing.

Note : As the  Color Picker icon is new since the 1.1 version, it may not be displayed on some screengarbs of the main panel.

Your first drawing

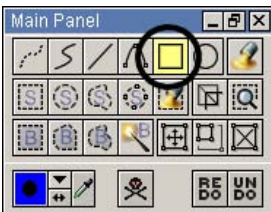
• The first geometric form: trace a rectangle

Once the program is started, proceed as follows: open a project in format « PAL D1 4:3 ».



Click on the *Penbrush* icon on the *Tools panel* (as soon as the tool is selected, the icon turns yellow to indicate that the tool is chosen, see image opposite).

Then adjust the size of the penbrush to 1.5 pixels in diameter.



Select the *Rectangle* icon on the main panel by clicking on it once. Again, the color of the icon changes from gray to yellow once the selection is made.

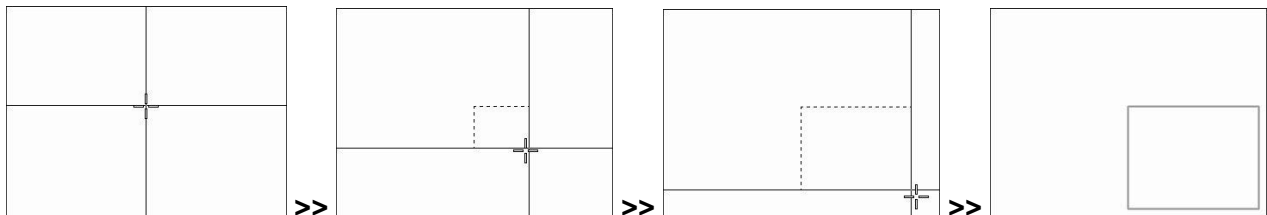
This applies to almost all icons in this program.



Select the *Bin* tab of the color picker and choose a gray color (if necessary, use the slider to get there).

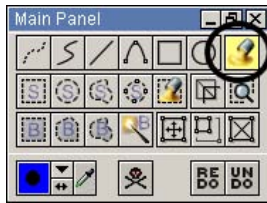
After having clicked on the desired color (or pointed to it if you use a graphic tablet) this color will appear in the main panel and in the color picker as *main* color or color A.

Click on the center of the image and, without letting go of the mouse button, slide it towards the bottom right hand corner. Release the mouse button. A gray rectangle has now been drawn in the current project window (see diagrams below).



• The *Floodfill* option

We will now floodfill this rectangle with color.



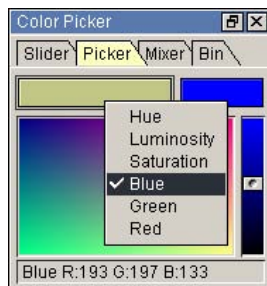
Select the option *Floodfill* in the main panel.



Go to the *Picker* tab of the color picker panel and choose a color as in the diagram opposite: a gray color with a slight yellow hue.

The choice of this color is important for the continuation, in particular for studying the drawing modes.

You will notice that the RGB information is indicated at the bottom of the panel, you can try to get as close as possible to them.



A right click on the same window enables the choice of other ranges, the colors of which vary according to hue, luminosity and saturation or according to the intensity of the colors red, green and blue.




Now click inside the rectangle in the project window and you will obtain the result shown opposite.

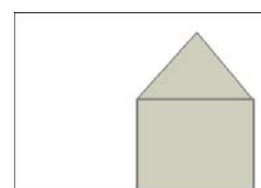
• Recover a color on the screen



It is possible to recover a color among those indicated in the current drawing in order to work with it again.

To do this: either click on the color A (on the diagram opposite: the main color is marked with a circle) or on the Color Picker icon : . The cursor of the mouse or tablet appears with a question mark. You may then point the cursor wherever you want, the color A will change into the color you point at. The shortcut for this action is the key [;].

• Redo and undo ...

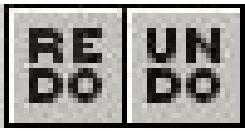


We will now trace the roof of our house.

For this purpose you may use the *Line* tool and the *Floodfill* tool.

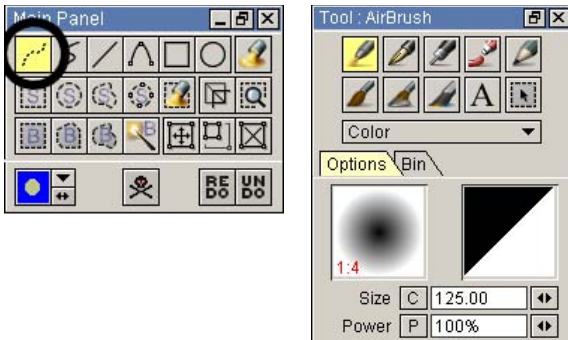
However, attention must be paid not to leave any "holes" before floodfilling in a surface (or the entire screen will be floodfilled!)

Your turn now! You should be able to draw the picture opposite without any trouble.

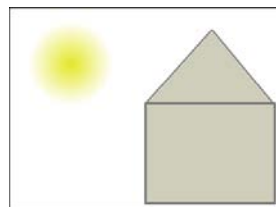


Nevertheless, if you do not like the result you can go back as many times as you want using the option *Undo* (keyboard shortcut [U]) on the main panel. Note that the option *Redo* (keyboard shortcut [Shift+U]) has the opposite effect.

• Notion of layers and colored background



Let's add a sun.
Change the tool by selecting the *FreeHandDot* icon in the main panel and then the *Airbrush* tool (set the size to 125 pixels diameter and the power to 100%).



Using the method described above, recover the color yellow in the *Mixer* tab of the color picker, then click on the white part of the image to draw your sun.
You will obtain the result shown opposite.

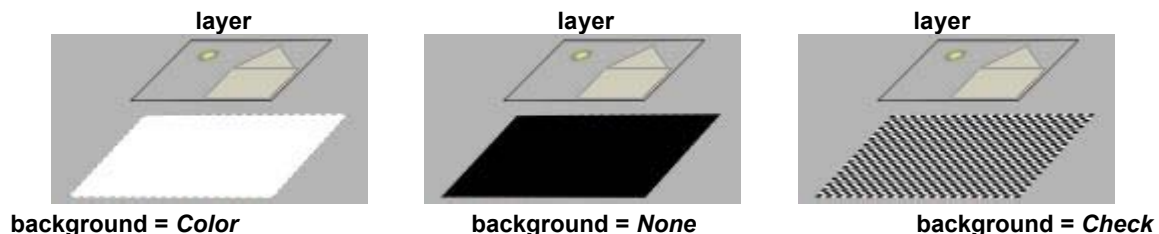
At this point, it seems at first sight that the image is mainly composed of white... in fact, that is not the case!



If the layer window is not visible on the screen, click on the *Timeline* icon on the toolbar to make it appear (keyboard shortcut [0] on the numeric pad).



Now change the option *Color* (bottom left of the timeline...) into *None*, then into *Check* and note the changes taking place in the window of the current project.

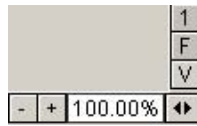
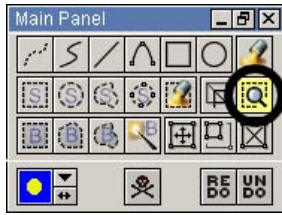


Everything happens as if our house and sun were drawn on a glass plate, the latter resting on a colored background (see perspective diagrams above...).

What we will refer to as *Image layer* in all future lessons is the equivalent of a transparent glass plate placed on a colored background of your choice. You are drawing on this plate and not on the colored background.

It is possible to change the color of the backgrounds *Check* and *Color* in the same way it is possible to recover a color on the screen thanks to the color fields next to the menu.

• Zoom and View options



Stay in "check" mode, we will zoom in on the sun.

To adjust the zoom, you can:

- * Use the small « + » and « - » icons above as well as the sliders.
- * Use the keyboard shortcuts [<] and [>].
- * Adjust the zoom numerically by modifying the percentage in the text zone intended for this purpose.
- * Use the *Zoom* button on the main panel: once enabled, this button may be used to increase or decrease the zoom on an exact point of the current image by simply left or right clicking with the mouse.

Note that there are other options in the project window which may facilitate your task :

- * The button « 1 » enables re-initialization of the zoom to 100 %.
- * A left click on the « F » button re-aligns the image in the project window.
- * A right click on the « F » button extends the project window to display the entire image.

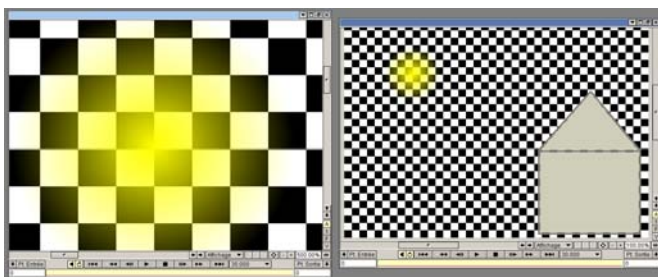


These zoom options are available to make your task easier when working in detail. However, they do not modify the videos, photos and images themselves. You will find them all in the main menu *View* function.


In lesson 1 we learned that it is possible to work with several projects at the same time.

It is also possible to open several project windows for the same project.

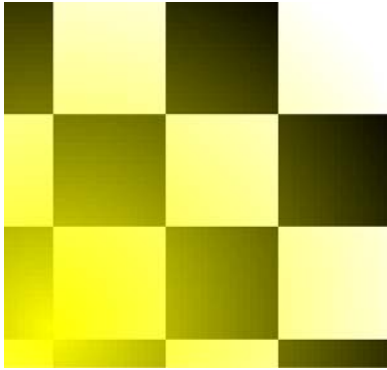
You may use the [M] key of the keyboard or select *New project window* in the main menu *View* function to do this. This is recommended when working with large zoom values and to keep an eye on the entire project.



Note that in this case, any modification made in one of the windows results in the same modification being made in all the other windows of the same project.

The  button of your project window also offers you several very useful viewing options depending on whether you use it with the left button of your mouse or the right button. A left click, without releasing the mouse button, followed by sliding the mouse, moves the image in the same way as the sliders located next to it. A right click without releasing the mouse button may be used to slide the current layer and only this layer to quickly view the enabled layer. This is very useful when you are working with a large number of layers and you do not know which one is enabled in particular when, at the moment you release the button, the layer goes back to its initial position. This function is called *Shaker* and is accessible with the keyboard shortcut [A]. A simple touch on this key will make your current layer shake and reposition it immediately with the aim to rapidly view the current layer.

• Notion of pixel opacity



After having zoomed to approximately 2000% it is to be noted that the pixels in the center of the sun are somehow "yellowier" than those on the outside.

In reality, the pixels making up our sun are all yellow. However, the pixels in the center are less transparent (or more opaque...) than those on the outside.

You will notice that the pixels of the sun let the colors of the check background through with more or less intensity while the pixels of the house are completely opaque: it is impossible to see the check background through the house.

• R,G,B and H,S,L color systems



Open the *Slider* tab of the color picker.

It is possible to define a color from its components

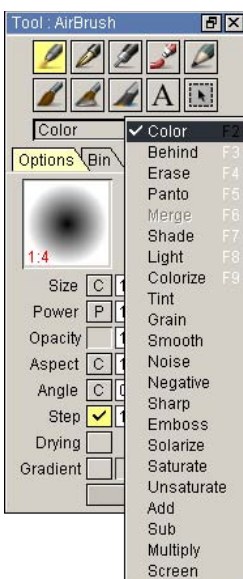
RGB : Red, Green, Blue or from the HSL system: *Hue*, *Saturation*, *Luminosity*. You may move the slider to obtain the desired color or use numeric values.

(Select the color blue to continue the drawing).



If the *Sliders* tab of the color picker is not selected (i.e. on each tab of the color picker except *Sliders*), a line referred to as *Status bar* is visible. This line is used to display the values in the RGB system of the color A (click on this bar to make the color appear in the HSL system).

The drawing modes



There are several drawing modes in TVPaint Animation:

Color, Behind, Erase, Panto, Light, Shade, Tint, Colorize, Smooth, Grain, etc.

We will look at each of them in turn.

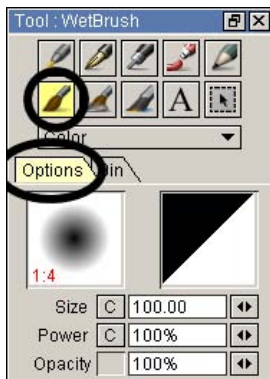
They are available in the scroll menu located under the icons of the *Tool* panel (left click to access it).

If required, you may assign keyboard shortcuts of your choice to the various modes proposed (see lesson 1).



Some modes may not be applied with all tools.

• The drawing modes *Color* and *Behind*

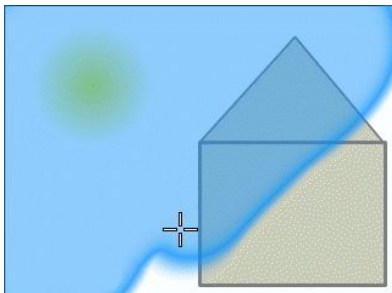


We will now draw a blue sky.
To do this:

- * Select the *Freehand line* icon (in the main panel).
- * Select the *wetbrush* tool (size 100 pixels, power 100%, opacity 100 %)



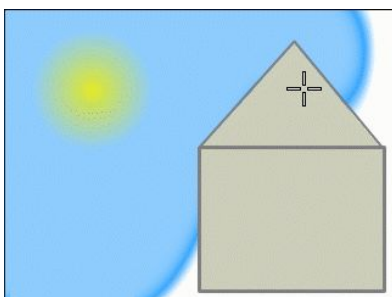
The red «1:4 » indicates that the tool is four times larger than the one visible in the white rectangle to the left.



Wetbrush in *Color* mode

You have already seen the *Color* mode (keyboard shortcut [F2]) as you have been using it since the beginning of this lesson...

When you use the *Color* mode, your line and color are applied over the already existing image.



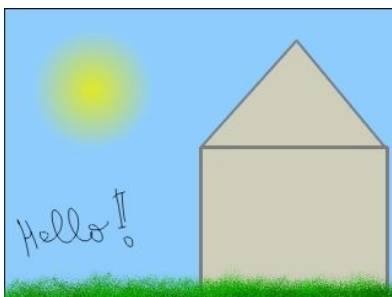
Wetbrush in *Behind* mode

When you select the *Behind* mode (keyboard shortcut [F3]), TVPaint Animation will take into account the already existing pixels from the line as well as their level of opacity. When the option is chosen, the color is only applied to the transparent surfaces of the image.

The color is therefore not applied over the house or over the sun but is partially visible through the latter.

Floodfill in the entire image in blue using this mode.

• *Mechanical pencil* and *Pencil* tools



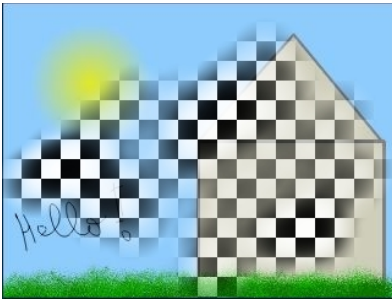
A few words about the *Mechanical pencil* and *Pencil* tool drawing modes to finish off our drawing.

Select the *Pencil* tool(in color mode) and one or several shades of green. They are used to add grass at the foot of the house.

For more precise tracing (e.g. a signature), the *Mechanical pencil* tool is the most suitable.

The drawing above will serve as a basis to study the other drawing modes.

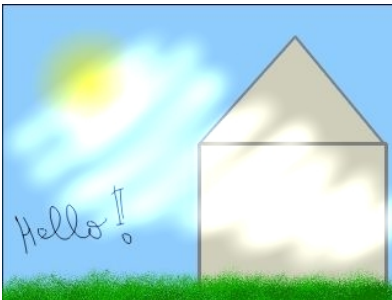
• The *Erase* drawing mode



Airbrush in *Erase* mode (background=check)

The task of the *Erase* mode (keyboard shortcut [F4]), as the name implies, is to erase the pixels of the current layer by making them transparent. Thanks to this mode, it is possible to correct possible faults in a drawing. Opposite, the *Erase* mode is used on a check background.

• The *Shade* and *Light* drawing modes



Airbrush in *Light* mode

As their names speak for themselves, these drawing modes require almost no additional explanation. They are used to brighten or darken the opaque areas of the image where you draw your line.

Just note that the higher the *Power* and *Opacity* of the drawing tool, the more the tracing carried out in these modes will approach opaque white or opaque black.



Airbrush in *Shade* mode

In this example, we used the *Airbrush* tool with a power of 100 % and an opacity of 17 %.



If the chosen background is white or black, do not confuse the *Erase* mode with these two modes : the modes *Shade* and *Light* modify the color of the pixels, whereas the *Erase* mode modifies their opacity.

• The *Saturate* and *Unsaturate* drawing modes

These two modes are used to increase or decrease pixel saturation.

A highly saturated color is a very bright color whereas a less saturated color is rather dull and closer to gray. Here, the *Penbrush* tool was used with an opacity and power of 100% for a diameter of 30 pixels.



penbrush tool in *Saturate* mode



penbrush tool in *Unsaturate* mode

The pixels of the house are gray with a light yellow hue.

The *Saturate* mode will therefore increase their yellow components and render them more vivid.

The *Unsaturate* mode will have little effect on the same pixels as they are already close to gray.

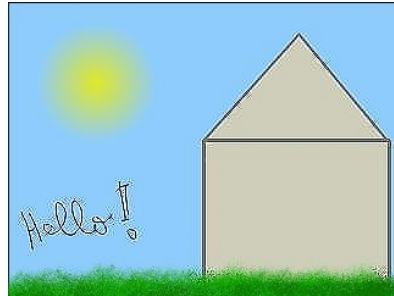
The pixels of the sun and sky are moderately saturated.
 The *Saturate* mode will therefore increase the yellow and blue hues to make them more vivid.
 The *Unsatrate* mode will modify them according to different shades of gray.

• The *Smooth* and *Sharp* drawing modes

The *Smooth* mode attenuates the contours of elements in the image and creates a blurred effect while the *Sharp* mode will accentuate them.



penbrush tool in *Smooth* mode



penbrush tool in *Sharp* mode

• The *Colorize* and *Tint* drawing modes

These two modes modify the color of the pixels:

- * The *Colorize* mode adds the color A while respecting the pixel luminosity of the source image.
- * The *Tint* mode also adds the color A but respects the saturation as well as the luminosity. The more a pixel is close to a gray, white or black color (with all the shades they contain), the less effect the color change will have.

This is visible in the drawing zones corresponding to the grass and the house: they are less affected by the *Colorize* than by the *Tint* mode.

Here the color A is red : R=255, G=0, B=0.

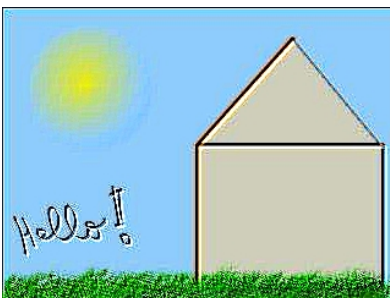


Airbrush tool in *Colorize* mode



Airbrush tool in *Tint* mode

• The *Emboss* drawing mode



Airbrush tool in *Emboss* mode

The *Emboss* mode accentuates the image contours by adding a shadow.

Once the tool is used on the image, it appears to have more volume.

• The *Negative* and *Solarize* drawing modes

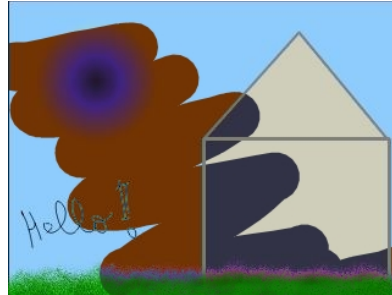
The *Negative* mode inverses the value of the pixels in the source image (the yellow of the sun becomes blue, the black text becomes white, etc.).

The *Solarize* mode gives a slightly different result than the *Negative* mode.

It mixes the negative of the source image with the source image itself and thus imitates the photographic solarization procedure.



Airbrush tool in *Negative* mode



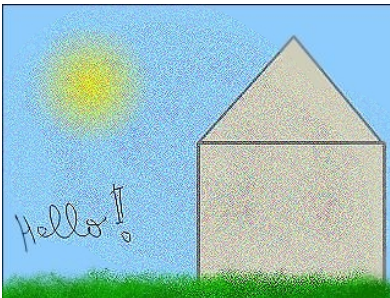
Airbrush tool in *Solarize* mode

• The *Grain* and *Noise* drawing modes

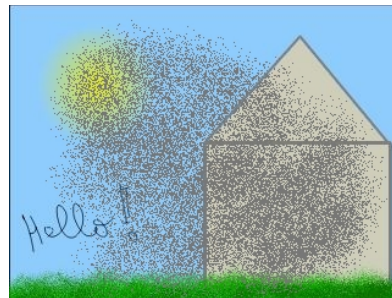
The *Grain* mode adds a multi-colored grain to the current image. This creates a texture imitating a light photographic grain.

The *Noise* mode adds a single-colored grain, the color applied is the color A.

The *Grain* and *Noise* modes themselves also depend strongly on the power and opacity of the drawing tool. Here the color A is a gray color.



penbrush tool in *Grain* mode



penbrush tool in *Noise* mode

• The *Add* and *Sub* drawing modes

The *Add* mode adds the R,G,B values of the color A to the R,G,B values of the source image pixels. The result is the image shown on the left.

The *Sub* mode subtracts the R,G,B values of the color A from the R,G,B values of the source image pixels. The result is the image shown on the right.

Here the color A is purple: R=128, G=0, B=128.



airbrush tool in *Add* mode



airbrush tool in *Sub* mode

• The *Multiply* and *Screen* drawing modes

The *Multiply* mode multiplies the individual values of the R,G,B channels of the source image pixels with the sum of the R,G,B values of the color A pixels. The *Screen* mode inverses the values previously used.

Here again, the color A is purple: R=128, G=0, B=128.



airbrush tool in *Multiply* mode



airbrush tool in *Screen* mode



These last four modes are more useful when they are used with brushes or with certain effects.

We will come back to them in lessons 4 and 10.

Further details

• Color A and color B




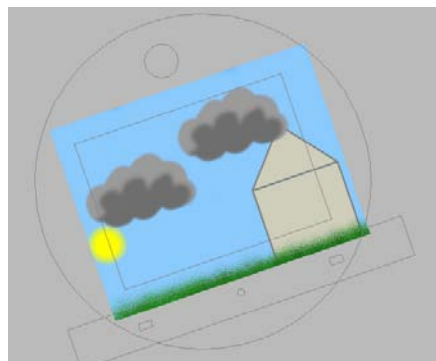
A very good tip:

It is possible to invert the two colors A and B of the color picker using the keyboard shortcut [N] or the  button on the main panel.

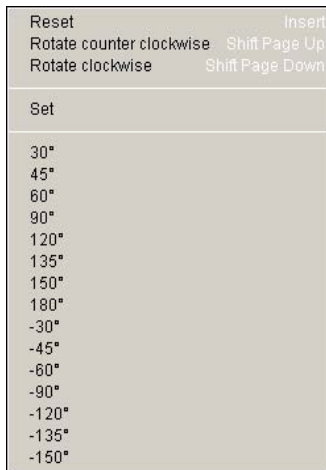
• Rotation of the work top

One of the most useful tools for any artist is the tool that allows rotation of the work top as one would turn a piece of paper while drawing. There are several ways to turn your work top.

The button  located in the project window is used to freely define an angle by left clicking and holding the button followed by a left / right movement of the cursor. You will see the work top rotate in real time and you just release the button once the desired angle is obtained. This free adjustment may also be carried out using the keys [Ctrl+Alt] + left click.



The free adjustment and its *HUD* in the form of a traditional drawing work top



You may also right click on the same button, which will open a menu (see opposite) in which you have the possibility to *reset* the overall angle value (keyboard shortcut [Insert]), *Rotate the view +15°* (keyboard shortcut [Shift+PageUp]), *Rotate the view -15°* ([Shift+PageDown]), manually define an angle value (option *Set*) or choose a pre-defined angle among 15 values all multiples of 15.

Note that *Rotate +/- 15°* will always be rounded off to the prior/next multiple of 15. For example, if you work at first with an angle of 25° and then decide to tilt the project by +15° using [Shift+PageUp], you obtain an angle of 30° and not 40° as 30 is the first multiple of 15 after 25.

• Management of palettes and mixers

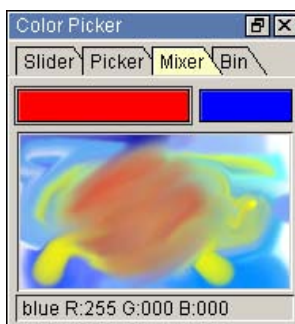


The *Mixer* and *Bin* tabs in the color picker may be used to optimize your choice of color.

A right click under one of the two tabs enables display of a contextual menu which is specific to this purpose and offers many options (see opposite the *Mixer* tab menu).

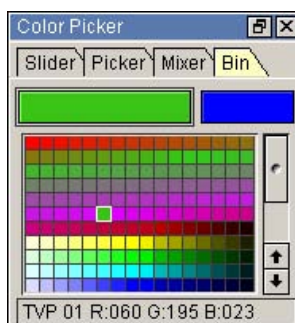
At first you can choose to work with pre-defined mixer surfaces: blue, clouds, inks, dirty, nebula, etc. or pre-defined palettes: TVPaint Animation 1, 2, 3, 4 and gray.

If the mixer and palettes proposed are not what you want, TVPaint Animation also offers you the possibility to create, duplicate, rename and cancel your own palettes or mixers. These options are also accessible via the contextual menus (options *New*, *Copy*, *Rename*, *Delete*).



It is possible to modify the existing or newly created mixers : a left click on the mixer surface incorporates the color *A* to the visible mixer which can then be «spread».

If you are not satisfied with the color obtained, you can delete it with the option *Delete Mixer*.



In the *Bin* tab you have some additional options in the contextual menu: *Replace*, *Swap*, *Spread* and *Delete*.

These options act directly on the current palette.

You may respectively: replace the color in one field by the current color, swap the colors of two fields, spread the colors from one field to another and delete a field.

Once you have created the mixers and palettes adapted to your needs, do not forget to save the configuration when you quit TVPaint Animation. In this way you will have your color parameters at your disposal the next time you start the program.

You can import or export palettes and mixers at any time via the sub-menu *File*. This enables exchanges between users of the software.

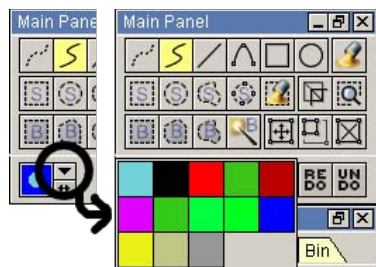
It is possible to return to the default mixers and palettes of TVPaint Animation using the options *Default palette* or *Pre-defined palette* in the contextual menus.

The pre-defined palettes et mixers may be restored by resetting the TVPaint Animation settings to zero.



You should note, however, that the last two operations will delete the palettes and mixers that you have created yourself unless you have exported them previously.

• History of colors



When you draw with TVPaint Animation, the history of colors you have used is accessible with a right click on the color square on the main panel or a left click on the ▼ button (see opposite).

It is therefore very easy to re-use a color that you have recently used.



It is possible to shade the colors A or B by left clicking on the latter in the main panel of the color picker and then keeping the button [Ctrl] pressed when moving the mouse to another color on the screen.

• Drawing splines, segments and circles



This icon on the main panel enables the *FreeHandDots* tool.



This icon enables the *FreeHandLine* tool for continuous lines.



This icon is used to trace *Straight Lines*.

To trace a segment in your project window:

- * Left click on the first end of the segment,
- * Keep the button pressed while sliding the mouse,
- * Release the button when you reach the second end of the segment.



At the beginning of this lesson we learned how to draw a *Rectangle*.



This icon is used to draw *Circles and Ellipses*.

In the current project window, point your styllet to the center of the ellipse to be drawn, then move it to create the ellipse you desire. Press the [Shift] key first to obtain a perfect circle.



This icon offers you access to more complexe *Splines*.

By default it is possible to trace multi-point splines. The latter are also referred to as « Bézier splines by mathematicians. By modifying the options in the *Shape settings* window, it is also possible to trace three-point splines (see following section).

To trace a multi-point spline in your project window: with a few clicks or presses with the styllet on the current project window, you can construct a broken yellow ligne interspersed with knots.



This line is not directly integrated in the drawing: The option *Apply spline* or the keyboard shortcut [Enter] is required to obtain a result (a right click calls up the contextual menu shown opposite).

The purpose of this tool is that offers the possibility to work on the knots.

* A left click on one of the knots followed by a movement of the styllet allows you to move or edit the spline line of the broken line at this point. In the latter case, the tangential lines of the spline appear (see the red spline in the diagram below).

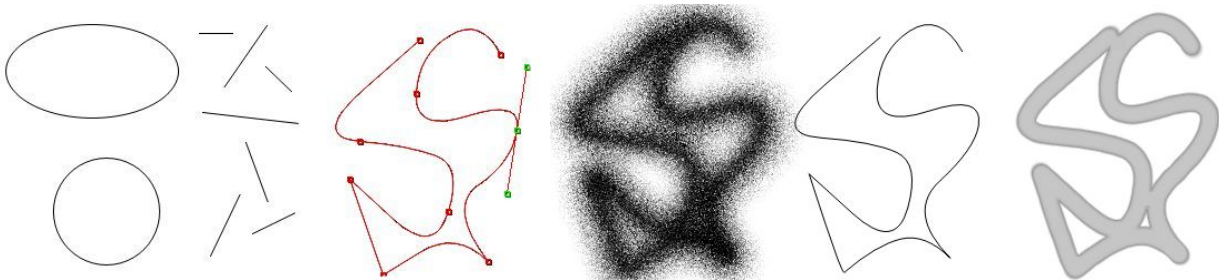
* For more precision: the [Ctrl] key allows you to work on the line of your choice without influencing the position of the second.

* You may also move the spline globally by pressing [Ctrl] + left click outside the spline.

* Finally, it is also possible to close the spline via the option in the contextual menu.

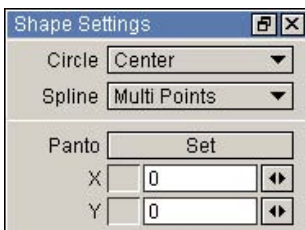


The form of the circles, rectangles, splines ... obtained using the procedure described above, depends on the tool chosen: penbrush, airbrush, pencil, etc. (see above).



circles / segments / Bézier splines (applied using different tools)

• Adjust the *Shape settings*



The panel shown opposite is accessible in the *Windows* main menu or with a right click on one of the seven drawing styles (dot, freehand, segment, spline, rectangle, ellipse and floodfill).

* In the first scroll menu you can define two methods of tracing circles. You may choose to:

- trace your circles by fixing a centre and then a radius.
- trace your circles by defining three points on the screen (geometrically, there is only one circle passing through three non-aligned points in the drawing).

* In the second scroll menu you can modify the nature of the splines you will trace using the *Spline* tool studied previously. You may choose to:

- trace Bézier splines (*multi-point splines*).
- trace *three-point splines*.

To trace a three-point spline in you project window:

- Left-click on the first end of the spline,
- Keep the button pressed while sliding the mouse,
- Release the button when reaching the second end of the spline,
- Slide the mouse,
- Left click when satisfied with the spline.

* The section named *Panto* enables adjusting the vector of the *Panto* mode studied in the following sub-chapter.

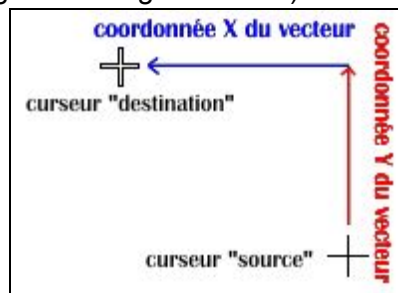
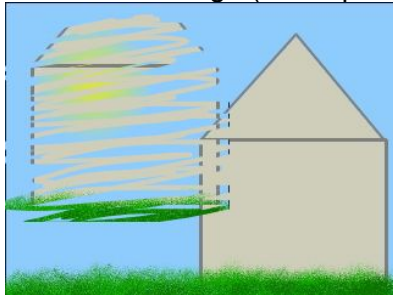
• The *Panto* drawing mode

The *Panto* mode is used to reproduce, by translation of the vector of the X,Y coordinates, all sections of the layer (the X,Y values being those present in the *Shape settings* panel).



It is possible to interactively define the X,Y values using the *Adjust* button (keyboard shortcut [Shift+P]) of the *Shape setting* panel (tracing a segment on the screen will determine the X and Y values).

E.g. for X= -360 and Y= -238 you will obtain, after having used the penbrush to trace a line at the height of the sun in the final image (corresponding to the diagram below) :



• Draw floodfilled shapes

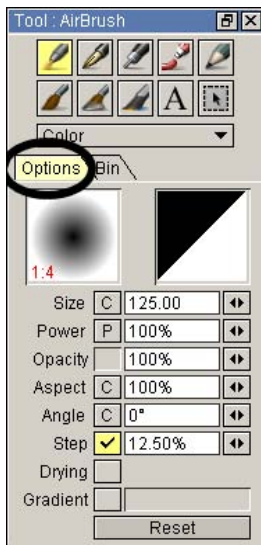


With the exception of the *FreeHandDots* tool, a second mouse click on one of the icons described previously enables the function *Floodfill*. You may thus draw filled disks, rectangles and other floodfilled splines. A second click on the *FreeHandDots* tool enables the *SimplePoint* tool which is used to draw only a single application with the brush.

This is an alternative to the Floodfill option in simple cases.

• Setting the tools

You have numerous variables at your disposal to set your drawing tools. We will describe them in detail except for *Drying* and *Gradient* which are explained in lesson 3.



- * The variable *Size* defines the tool radius in pixels.
- * The variable *Power* defines the color quantity applied by the tool.
- * The variable *Opacity* defines the global tool opacity.

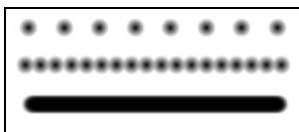
The opacity defines a maximum opacity threshold which the drawing tool cannot exceed.

- * The variable *Aspect* enables flattening of the current tool.
- * The variable *Angle* authorises rotation around the tool Z axis.
- * The variable *Step*, if enabled, manages the waiting time between two applications of the same tool.



In the little window to the left, it is possible to view the effect of the modification of each of the first five variables on the tool.

Some examples to help you understand the notions mentioned above:



See opposite, a straight line traced with, from top to bottom, the percentages 300%, 100% and 0% for the *Step* variable.



TVPaint written with the airbrush tool:
Angle = 90° and *Aspect* = 20%



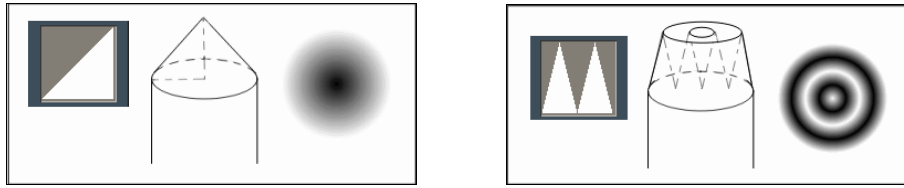
Mechanical pencil tool left without *Smoothing*, right with *smoothing*.



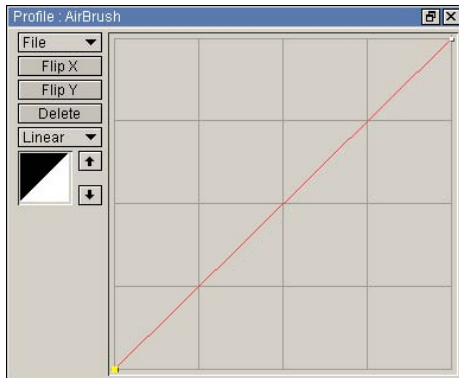
If required, the Reset button resets the settings of the tool displayed.

• Setting of the brush profile

The right field in the tool panel provides a view of the drawing tool cross section. Below you will find two profile examples for the airbrush drawing tool.



left to right: profile, three-dimensional view of the tool and its effect on the screen.



The profile of brushes may be edited in the window shown opposite. Right click on the profile of the tool you are using to make it appear.

You have the choice :

- * to create or delete the points of the spline.
- * to move the latter.
- * to return to the spline along the horizontal or vertical axis.
- * to choose the method applied to connect the points with each other: *Linear*, *Spline* or *Polynomial*.
- * to select a pre-defined profile, if required:

to do this, use the two arrow buttons to scroll the pre-defined profiles and then click on the profile of your choice to display the corresponding spline on the screen.

As for the palettes and mixers, TVPaint Animation offers you the possibility to *Load*, *Save* and *Reset* the profiles (*File* scroll menu).

Lesson 3

Layers spatial management

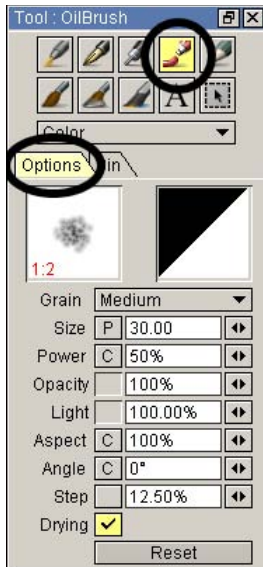
In this lesson you will learn to :

- Use the paper.
- Create a Color Gradient.
- Study the notion of the layer with its multiple aspects.
- Name, move and select layers.
- Assign a color to a layer.
- Manage the global opacity of a layer.

Layers and timeline

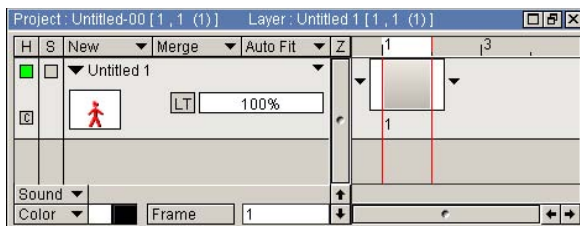
When starting the program, select the template *TVPA – Image Layer fr* so that the newly created project only contains one *Image layer*.

• The *Oilbrush* tool



We'll start by drawing a little man in the center of our image. To do this, use the tool *Oilbrush*, select *FreeHand* and the color red (R=255, G=0, B=0).

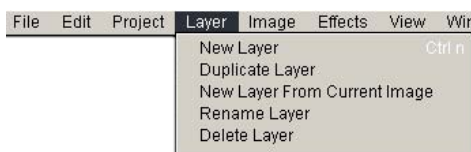
Now display the *Timeline* if it is not displayed yet (shortcut [0]). The following window will appear:



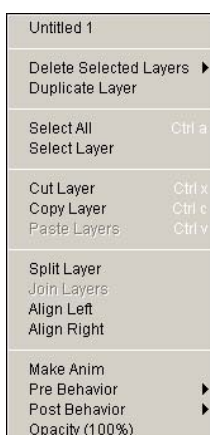
This window shows that our little man was drawn on the layer named «Untitled 1». Indeed, every layer has a name.

• Rename a layer

We will now rename the layer. You have the choice to :



Select *Rename the layer* in the *Layer* main menu.



Call up the scroll menu by clicking on the layer name in the *Timeline* (here : « Untitled 1 »).

Once the scroll menu is displayed, select the name of the layer at the top of the menu and release the mouse.

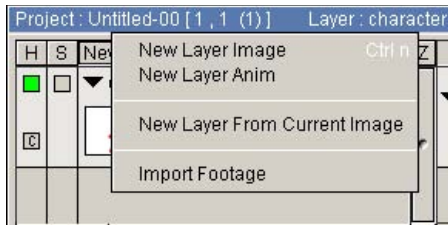


Independent of which method was used, a text window will appear. You may now enter the name («Little man») in the text field and then validate it by clicking on **OK**.

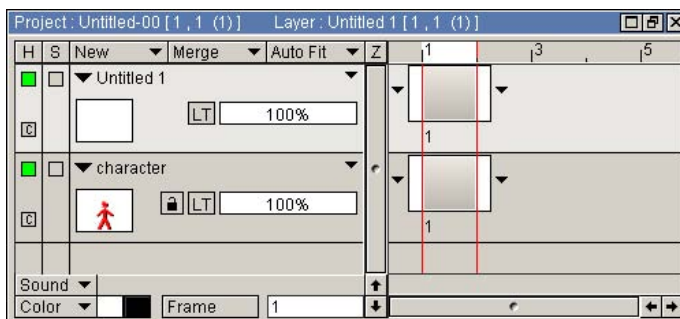
• Create a New layer

TVPaint Animation offers the possibility to work with several layers. With a bit of practice, this will make your work much easier.

To create a new layer you can :



Use the keyboard shortcut [Ctrl+N], select *New layer* in the *Layer* main menu or select *New image layer* in the *New menu* of the timeline (see example opposite).



Our timeline now comprises two layers: the «Little man » layer and our newly created layer, referred to by default as « Untitled 1 ».

You may also rename this layer. We will call it « gray spot ».

• The current layer

The « white » layer in the timeline is called *Current layer*. When you draw in the work window, the modifications are only applied to this layer. The « gray » layers remain unchanged, independent of their position.

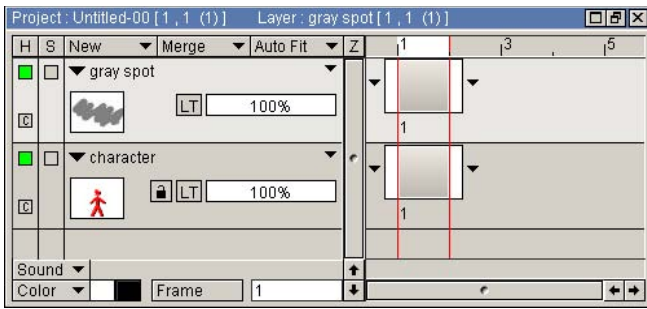
To change the current layer you can:

- * Use the arrow keys [↑] and [↓] on your keyboard.
- * Click on the layer of your choice in the *Timeline*.
- * Select *Current* in the scroll menu which is accessible with a right click in the timeline.
- * Use the shortcut [,] to select the layer by clicking on it. Press [,] then the layer you wish to select. If there is a multiple choice, a menu will appear.

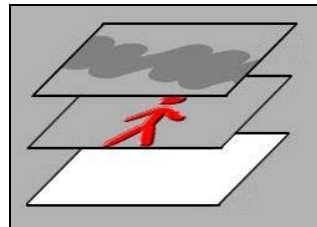
• The advantage of working with several layers



Now draw a gray spot in the center of the image on the new layer using the penbrush tool (radius: 50 pixels, power : 100%, opacity : 100 %, mode : color). At first sight, the gray spot seems to cover the little man. But in reality this is not the case...



When looking at the thumbs in the timeline, we see that the gray spot and the little man are on two different layers. We have thus superposed two layers on our white background, as illustrated in the diagram below.



« Gray spot » layer

« Little man » layer

White background

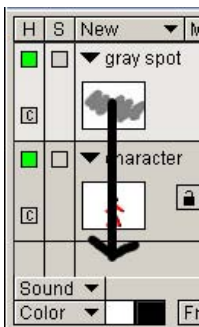
The gray spot therefore does not delete the little man.

If you use the same tool in Eraser mode on the same gray spot, you will note that the little man will reappear!

• Flip layers

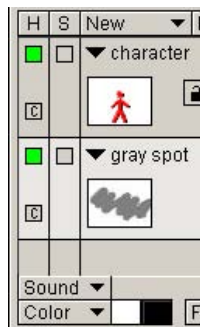
Before continuing with our work, we will flip the two layers. This is how it is done:

left click on the small frame representing the gray spot in the timeline, then slide the cursor on the timeline until it is under the « little man » layer. Release the mouse button.

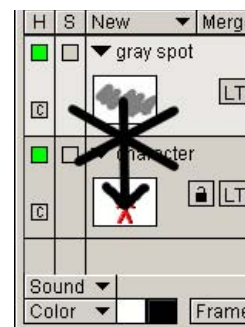


before flip

>>



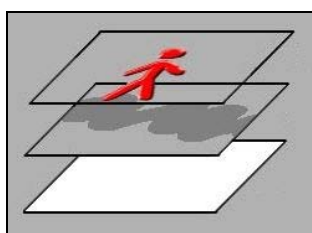
after flip



no flip (merge)



position of layers after flip



« Little man » layer

« Gray spot » layer

White background

We now have the configuration as shown in the diagram above. In the current project window, the little man is positioned on top of the gray spot.

When trying to flip two layers, a frequent mistake made is to move one layer on top of another. This is the process of merging two layers (which will be described in detail later in this manual).

The case being, click on *Cancel* in the merge options window to return to the original layer disposition.



The option *Undo* in the main menu may be used for the modifications made to the project as well as for those applied to the timeline.

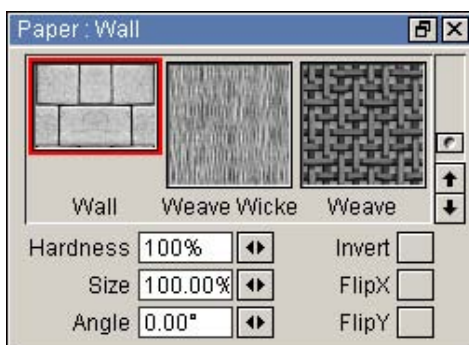
• Erase the contents of a layer



It is possible to erase the contents of a layer without using the Eraser mode.
To do this, just click on the icon of the main panel opposite or use the shortcut [Shift+K].
This option has no effect on the layer named « little man » which is not our current layer.

• Use of a *Paper*

With TVPaint Animation it is possible to accelerate drawing certain repetitive shapes such as a brick wall. Proceed as follows:



* Floodfill in the current layer (« gray spot ») with a dark gray color.

* Open the *Paper* window which is accessible in the *Windows main menu* or with a right click on the *Papers* icon on the tool bar.

* Select any type of wall in the papers window.

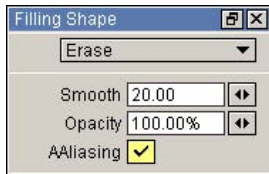
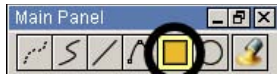
* Change color A for a light color, close to white.

* Floodfill in the « gray spot » layer using this color.



You will note that the paper you have chosen is used as a pattern to paint the layer surface (see drawing above). Our brick wall has been created and the « gray spot » layer may now be renamed « brick wall ».

• Soften the contours of a surface



Let's continue our drawing:

- * check that the « brick wall » is the current layer,
- * deselect the function *Paper* on the tool bar,
- * select the shape *Rectangle Fill* in the main menu, then the icon *Mechanical pencil* in the tool panel.
- * enable the *Eraser* mode,
- * in the option window named *Filling shape* which appears in place of the *tool* panel, set the value in the numeric field *Smooth* to 20 pixels.

* Trace a rectangle in the center of the image. The effect of the prior manipulation is immediate: the edges of the rectangle are less sharp.

* To finish, flip the two layers again.



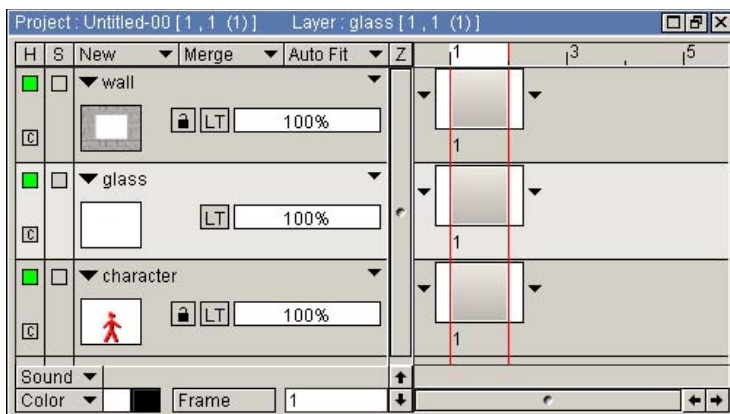
before flip

>>



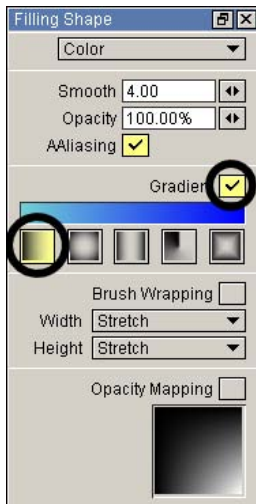
after flip

• Apply a color gradient



Our little man is now behind the brick wall.
We will add a tinted window between the little man and the wall.

* Start by creating a new layer, name it « window » and place it as shown in the *Timeline* above.



* Select the color cyan for color A then a blue color for color B.

* In the *Filling shape* panel, change the *Eraser* mode for the *Color* mode and tick the box *Gradient*.

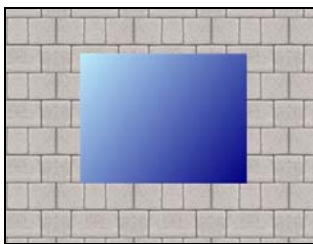
The gradient from color A to color B now becomes visible.

* Draw a *Filled rectangle* in the layer named « window », paying attention that its dimensions correspond to the size of the « hole » in the brick wall.



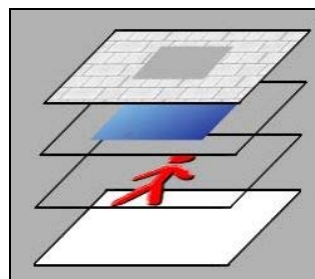
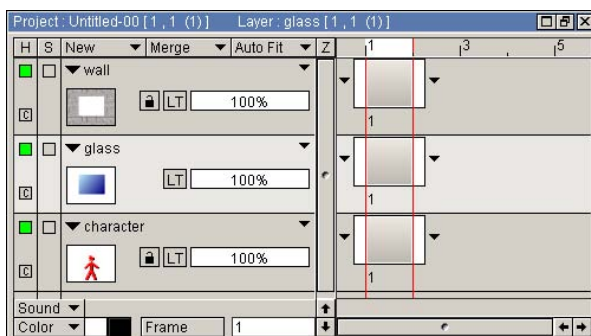
* The cursor shown opposite invites you to choose the *Orientation* and *Extent* of the gradient.

The gradient will be applied along the segment you will trace, from color A to color B.



You will thus obtain the result shown opposite in the current project window.

The perspective diagram and the timeline hereafter confirm the presence of three layers although only two are visible on the screen.



Brick wall layer

Window layer

Little man layer

White background

• Modify the global opacity of a layer

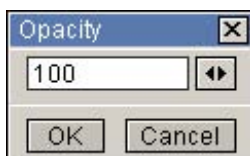


You may modify the global *Opacity* of a layer:

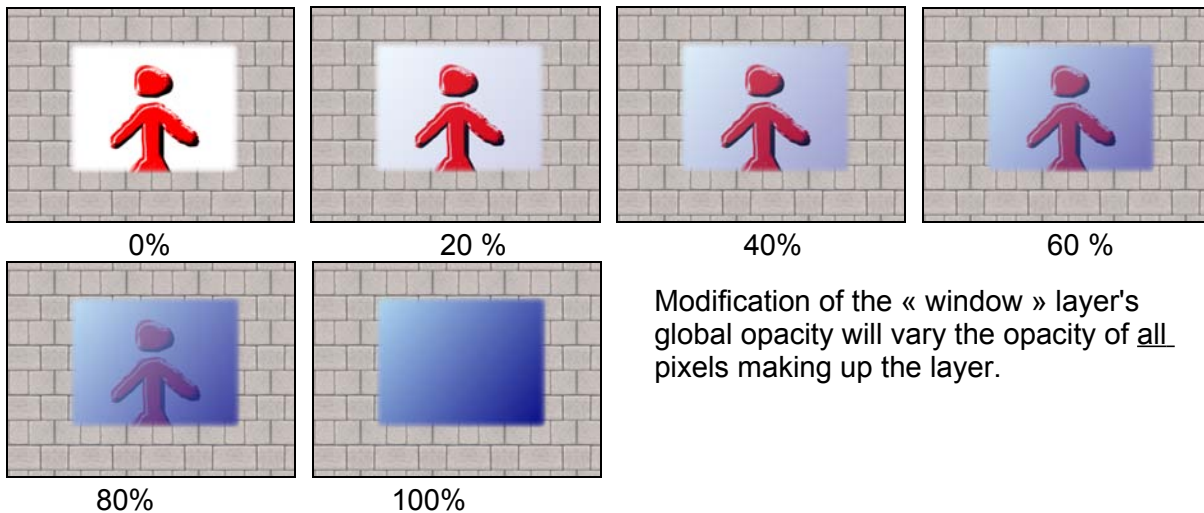
* by left clicking on the white bar corresponding to the timeline.

* by right clicking on the same bar to call up the numeric field shown opposite.

* via the contextual menu of the layer.



Global *Opacity* of the window layer with various values:

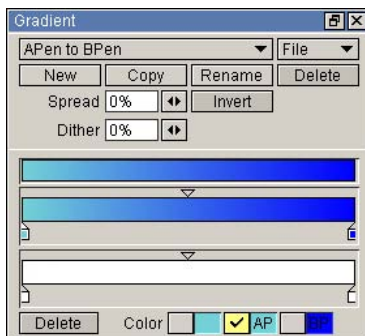


• Gradients and Opacity mapping

The parameters for the pixel opacity of our window may be entered as soon as the gradient is established:

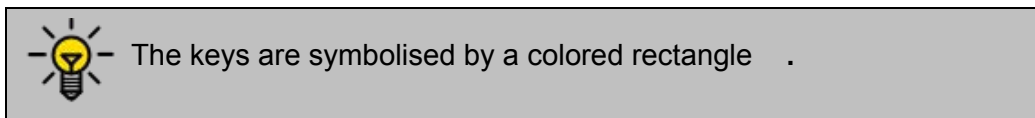
1st method: the opacity gradient.

Erase the contents of the layer named « window » and set its global opacity to 100%. Open the *Color gradients* window (right click on *Gradient* in the panel *Filling shape* or access via the *Windows* main menu).



- * The first horizontal bar represents the aspect of the gradient as it will be displayed on the screen.
- * The second bar displays the colors chosen for the gradient. In our case, the two keys at the end indicate the color A on the left and color B on the right.
- * The third bar indicates the opacity chosen for both colors.

Click on the key to the left of the opacity bar and modify its opacity using the mini-slider *Alpha* to adjust the percentage to around 20%.



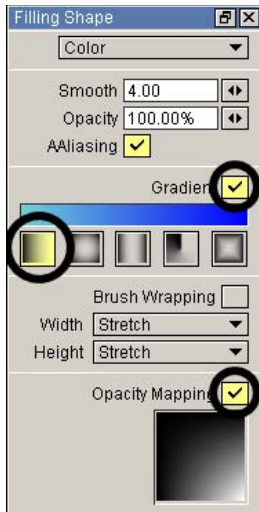
The first horizontal bar changes and its left section becomes transparent (presence of a check under the cyan color).



Now trace the rectangle that represents our window and you will note that the cyan section is transparent while the blue section is opaque.

Note that no modification was made regarding the global opacity of the layer named « window ».

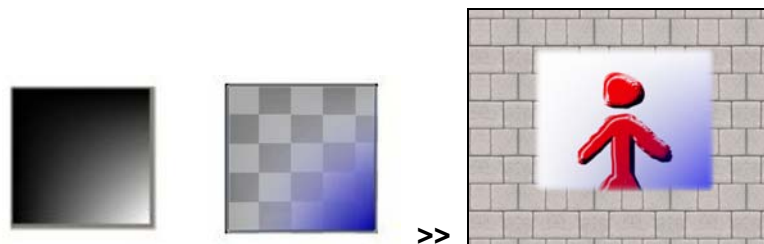
2nd method :



You may also use the option *Opacity mapping* in the *Filling shape* panel.

If you draw a single-colored rectangle after having enabled this option, the opaque and transparent zones are respectively layered on the black and white zones shown in the frame below (see below).

For those who wish to know how to edit your own mapping, this is explained on page 16 of this lesson.



• Display and hide a layer

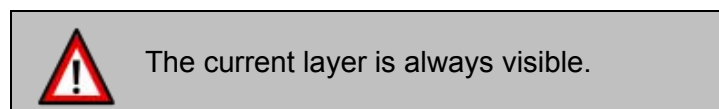


It is possible at any time to only display the layers of your choice.

The layers visible in the project window are those ticked in the first column of the timeline.

The hidden layers are those which are ticked in red in the same column and the name of which is displayed in gray (click on the color fields to toggle a layer from visible state to hidden state and vice versa).

When the icon *H* is ticked, only the current layer is displayed.

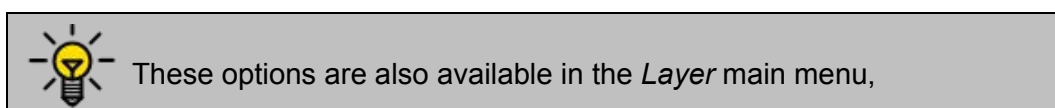


• Merge layers

When it is no longer useful to work with several layers, you have the possibility to merge the layers.



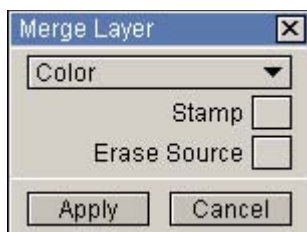
The *Merge* scroll menu in the timeline offers you three options for this purpose.



- * *Merge selected layers* : the non-selected layers are not merged.
- * *Merge visible layers* : in this case, the hidden layers remain intact.
- * *Merge all layers* : the layer resulting from this operation contains the current image.



To select an additional layer (multi-selection): press the [Ctrl] key on the keyboard and left click on its thumb. You may also use the [Shift] key to select all layers between the last selected and the one you are clicking on.



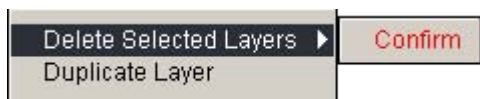
Another possibility is to slide one layer on top of another and call up the merge options shown opposite.

If you tick the *Stamp* field, the merger is made according to the opacity of the layer moved and the color A.

You may choose to cancel or keep the original layer as well as apply one layer on another in color, erase, behind mode, etc.

Further details

• Delete, duplicate a layer



* It is possible to delete a layer, an option which is quite different from erasing its contents... To do this, select *Delete selected layer* then click on *Confirm* in the contextual menu of the timeline (to do this, you may also use the *Layer* main menu).

* To duplicate a layer, proceed in the same way using the same menus.

• Lock a layer

To lock a layer may be useful under several circumstances.

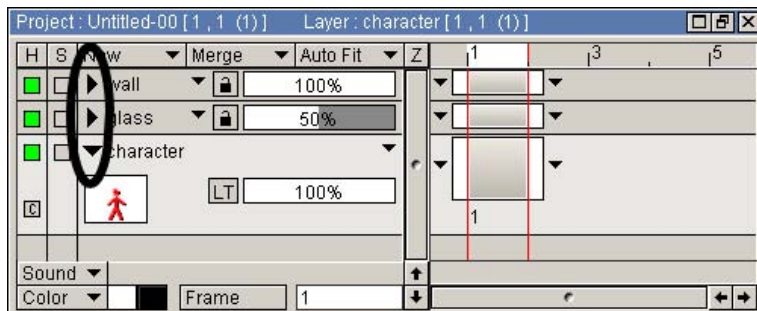
Click on the little padlock located in the timeline in front of the layer to be locked.



Once a layer is locked you may neither draw in it, nor delete it or modify its global opacity, nor select it as current layer.

Click again on the padlock to unlock the layer.

• Reduce a layer

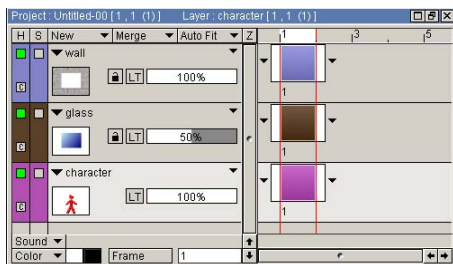


It is practical to reduce a layer when there are too many of them to be displayed on the screen.

A left click on one of the arrows in the black circle on the diagram opposite increases or decreases the size of a layer in the *Timeline*.

The layer itself is not changed in any way but only its name and global opacity are visible in the timeline.

• Assign a color to a layer



Another operation that does not affect the layer itself is to assign a color to a layer.

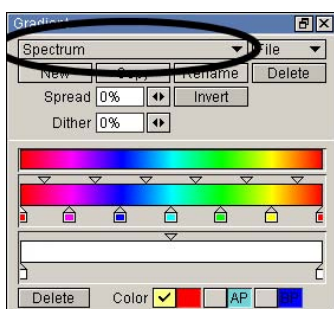
This operation allows you to simply organise and mark the layers using pre-defined colors.

Click on the icon **C** in the first column of the timeline to modify the color of the chosen layer.

• The color gradients

As for the mixers and palettes, there are pre-defined color gradients which you may *Copy*, *Rename*, *Delete*. These pre-defined gradients are accessible in the scroll menu indicated in the image below in the *Gradient* window.

It is also possible to create your own gradients according to your color and opacity criteria:



* A right click on one of the keys of the color bar enables you to either delete the key, to assign the color A or color B to it or to recover a color.

* A right click on one of the keys of the opacity bar enables you to either delete the corresponding key or to set its opacity (or alpha value).

* The number field *Grain* mixes the pixels within the current gradient.

* The numeric field *Dither* functions in the same way as the *Spread* numeric field but uses colors which are not necessarily among those you have chosen, although they are quite close to them (this process is often used in the video sector).

* The option *Invert* flips the current gradient.

* The cursor ∇ enables calibration of the transition zone from one gradient to another.

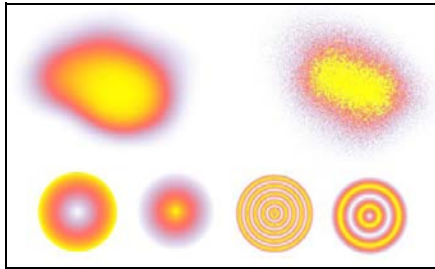
* The scroll menu *File* enables you to load or save your gradients on a memory support. You may also choose to recover the pre-defined gradients of TVPaint Animation if required.



Here again, it is necessary to *Save the configuration* to recover the gradients you have created using this program.

• Color gradients and drawing tools

Color gradients are also useful when working with drawing tools :



Assigning a color or opacity gradient to a drawing tool provides a wide variety of interesting visual effects (see example opposite...).

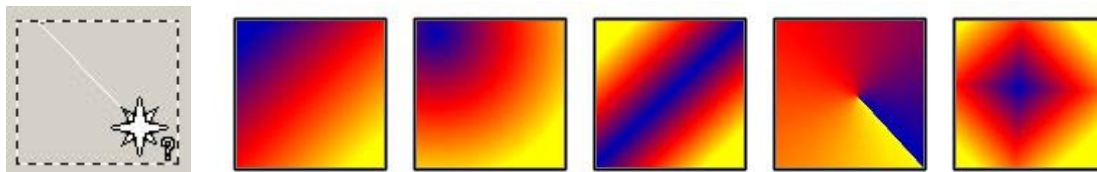
The more power applied to the tool or the more repetition on the screen, the more its color will cover the gradient chosen.

• The different types of gradients



When the *gradient* field is ticked on the *Filling shape* panel, several types of gradients are available to you (click on one of the five buttons on the panel...).

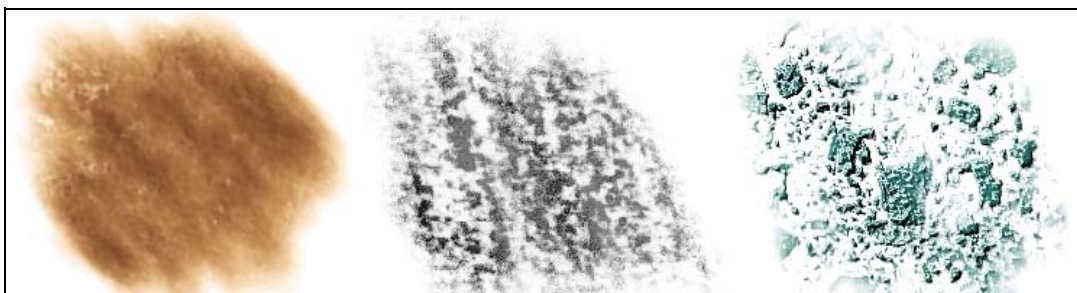
Whatever your choice may be, you will have to draw a vector on the screen to determine the direction and extent of the gradient (see below).



From left to right: the gradients *Linear*, *Spherical*, *BiLinear*, *Radial* and *Rectangular*.

• Another use of papers

Apart from reproducing a given pattern, the papers may be used to simulate tracing on a real paper. The combination of papers with different drawing tools provides very realistic results and enables imitation of different drawing styles: charcoal, painting on glass, lithography, etc. (see below)

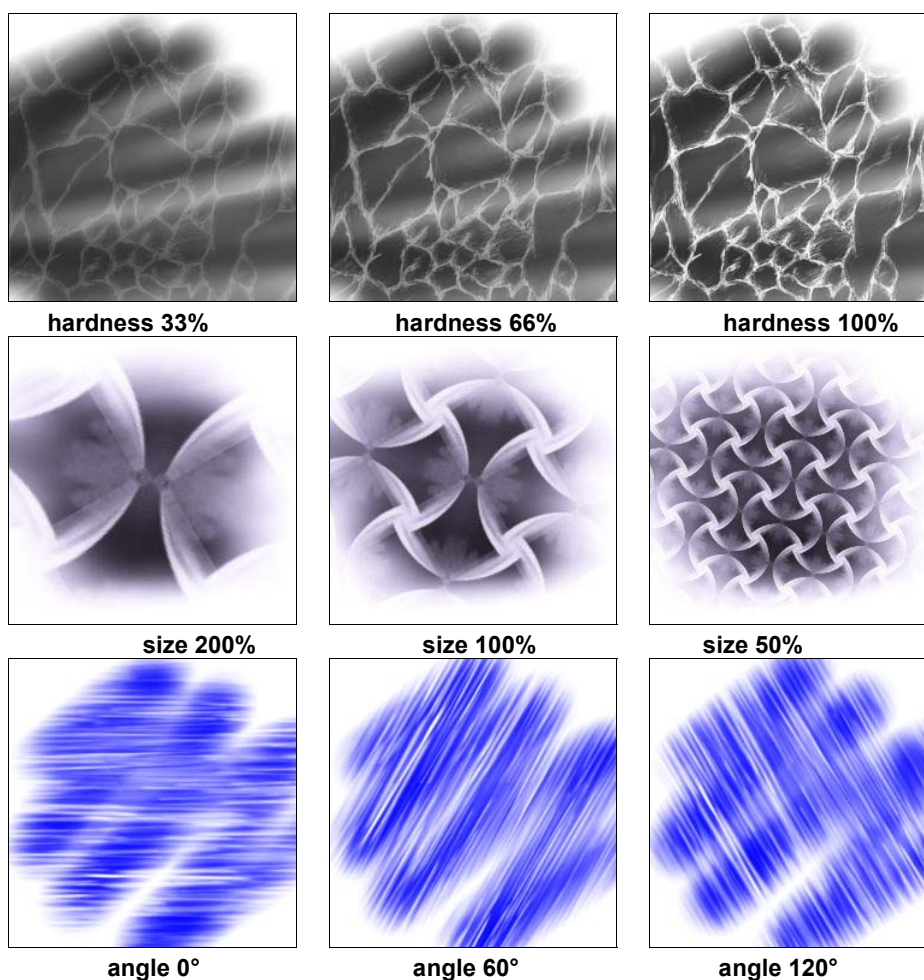


Some images are constructed using many papers.

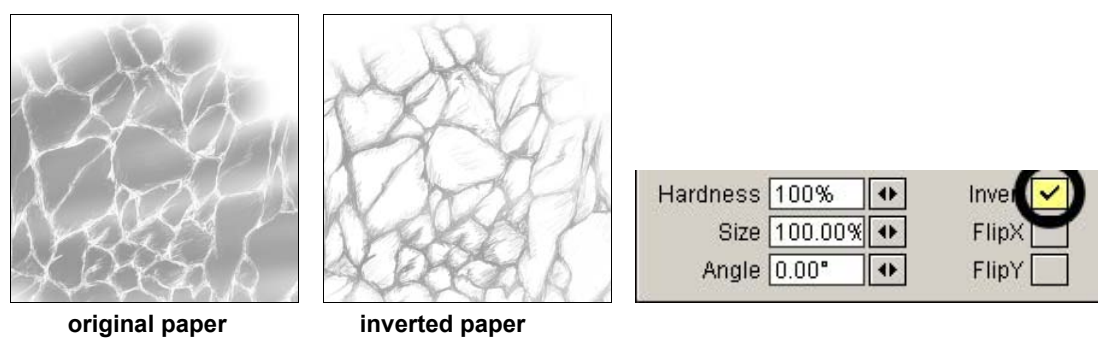
The image opposite, for example, which is available on the CD was compiled using 10 papers.

Numerous options are available in the papers window. You may:

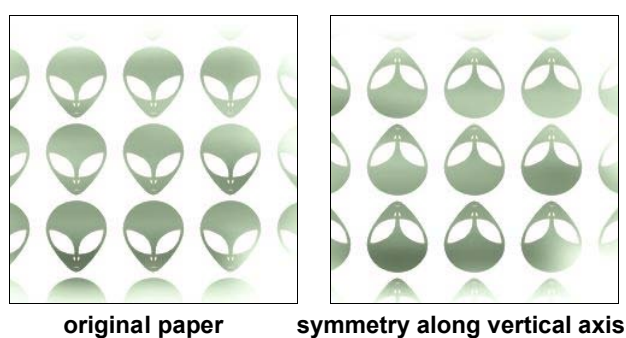
* Modify *Hardness*, *Size* and *Angle* of your papers.



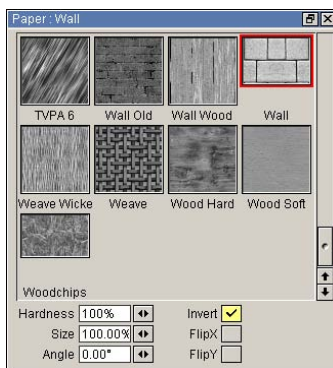
* *Invert the papers* (option *Negative*).



* Create a symmetry along the horizontal axis or vertical axis before application (options *Flip X* and *Flip Y*).

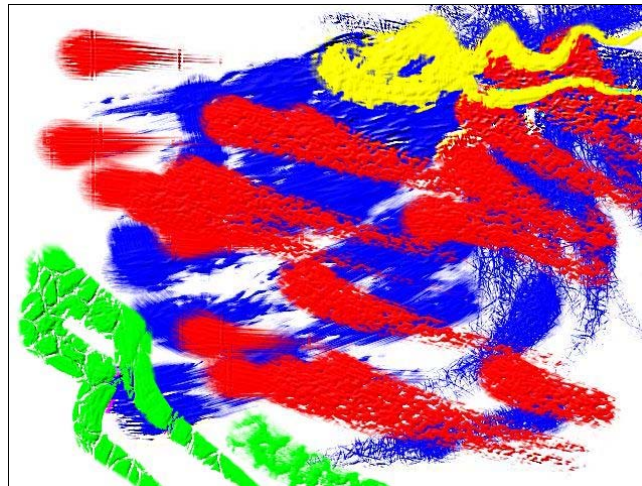
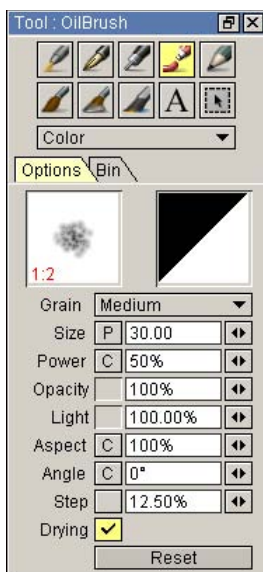


• Create and manage your own papers



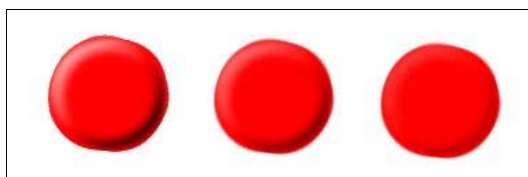
- * Right click on one of the papers in the papers windows to either choose the latter or delete it.
 - * Right click on the part of the window that does not contain any papers to create a new paper from the current image.
- Note that your choices are only saved after closing the program if you have saved your configuration previously.

• The *Papers* and the *Oilbrush* tool



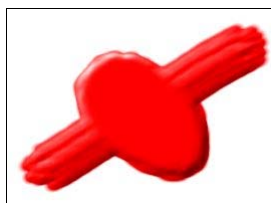
As indicated above, the drawing tool *Oilbrush* also interacts with the various types of papers available (see opposite).

But the *Oilbrush* tool also offers many other functions...

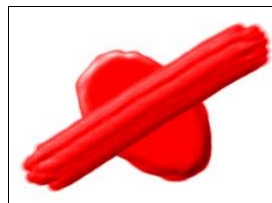


Various light parameters possible

It offers a *Light* parameter which gives volume to the paint (see opposite).



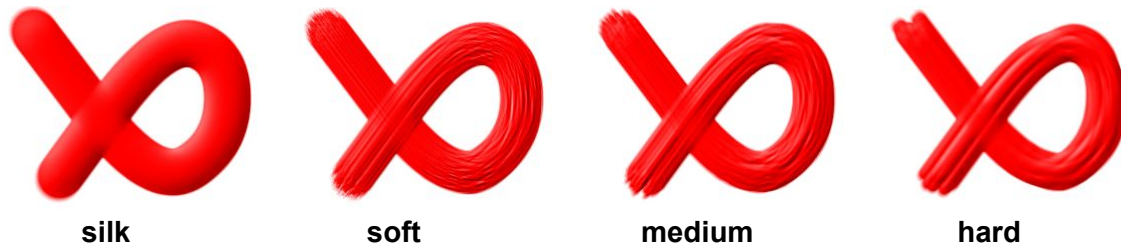
without *Drying*



with *Drying*

By default, the oil paint is not deposited on top of the oil paint already on the layer: it melts into it. However, if you click on the Drying option, the former will be the case.

Note that there are different Grain modes available which are shown below:

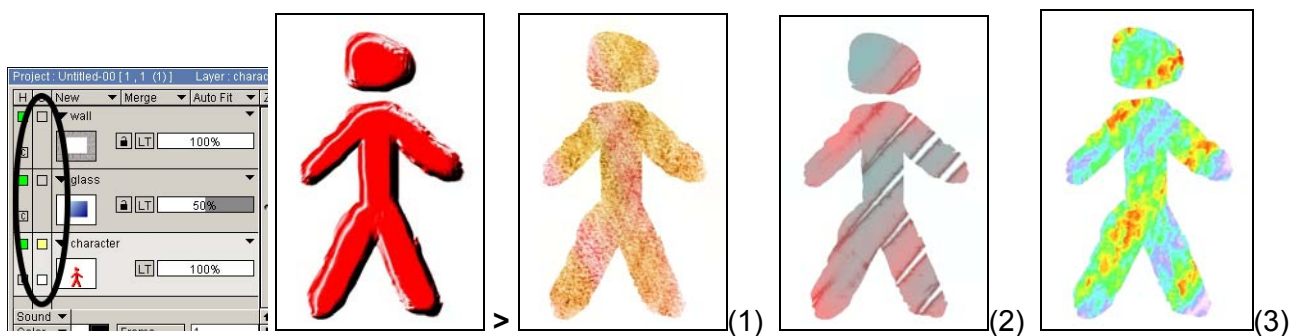


• Using the mask

Using the mask is very handy when handling the layers.

It enables you to draw, on the layer of your choice, the opaque pixels of another layer in exactly the same place.

In this way it is possible, for example, to modify the « texture » of a drawing without changing its shape (see below).



How to proceed :

- * First of all, create two layers in the timeline, then draw the little red man shown above in one of them.

- * Then enable the *Mask* for this layer :

to do this, click on the little gray rectangle in the second column of the timeline on the current layer. The little gray rectangle must turn yellow.

- * Mask the layer with the little red man, then move to the empty layer.

Any drawing will then be limited to the opaque zones of the layer containing the little red man.

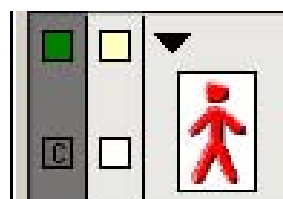
For example, drawing a filled rectangle with color gradient and use of a paper on the screen will display image 1, drawing with drawing tools, gradients, papers and specific modes will obtain the results 2 and 3.

It is possible to flip the mask and only draw on the transparent zone of the layer containing the initial little man (examples 4 and 5 below).

To do this, proceed as described above and click on the button *Flip the mask* indicated in the following diagram (this must then turn black).

Enable the mask - >

Flip the mask - >





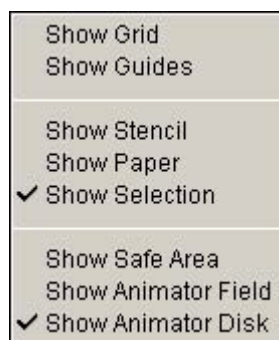
The S button on the timeline enables deletion of all masks or flipping of all masks according to your choice in the menu. It is possible to work with several masks divided into different layers: in this case, the masks are added up.

When a pixel is partially opaque, it may only be partially modified when using a mask. For example, a pixel with 80% opacity can only be painted with maximum 80% opacity when the mask mode is used (if the mask is flipped, it may only be painted with maximum 20% opacity). Finally, you should understand that, when pressing the button *Erase* while using a mask, only the part of the drawing corresponding to the mask will be erased.

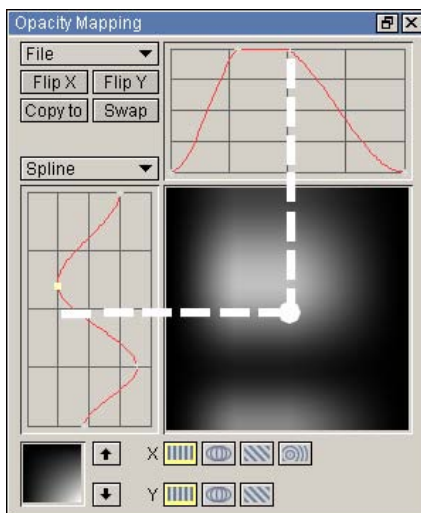
• Display masks and papers

It is possible to display masks and papers on the screen to give a better idea of the project zones on which you are currently working.

To do this, just use the scroll menu *Display* in the current project window (see below).



• Opacity mapping



This window is accessible with a right click on the corresponding field of the *Filling Shape* panel and enables precise definition of the opacity and transparency zones when applying a floodfilled shape.

You may trace the spline of your choice on the X and Y axes by placing points at your convenience. Three types of interpolation are available to connect the points with each other: *Linear*, *Spline* or *Polynomial*.

In accordance with your settings, a new opacity card will be defined.

The two red splines define the opacity of each point of the card as indicated in the dotted example.


The scroll menu *File* enables saving, loading or resetting the opacity cards.


As required, you may flip the two splines corresponding to the X axis and Y axis of the card (Flip button) or return each spline on itself (buttons *Flip X* and *Flip Y*).

The *Copy* button is used to copy the current spline (the one that has a point selected thus yellow) on the other axis. On the image above, the current spline is the Y spline.

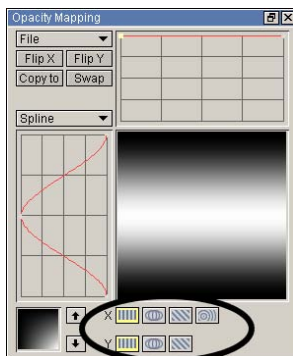
At the bottom left of the window, pre-defined opacity cards are at your disposal.

You may also adjust the mapping by clicking on the image and sliding the mouse.

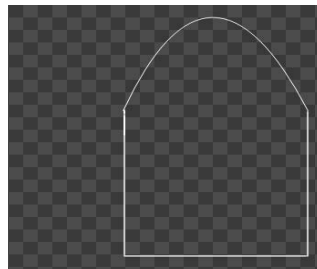
 Here again, you have pre-defined parameters at your disposal. (Press the buttons ↑ and ↓ at the bottom left of the panel, then click on the pre-defined card of your choice.)



The icons at the bottom of the window have a special function. They enable you to choose how the *opacity card* will be applied in the floodfilled shape you will draw.

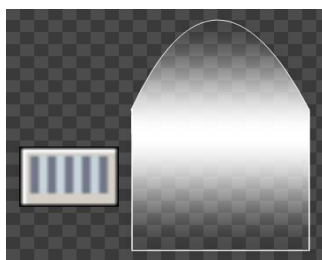


Let's take for example the opacity card (left) in order to floodfill a shape created using the spline tool (see below).

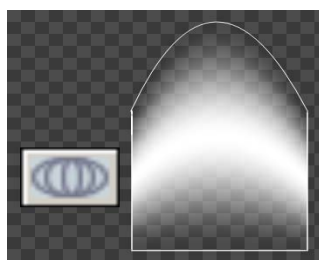


Depending on the options chosen at the bottom of the panel, the opacity card will be applied:

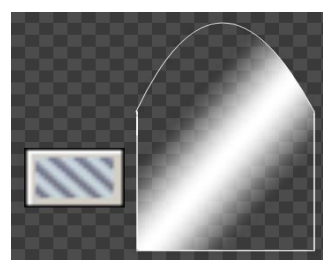
- * without modifications (1)
- * adapting to the shape you will floodfill (2)
- * according to a vector of your choice (3)
- * in a circular fashion along a vector (4)




(1)

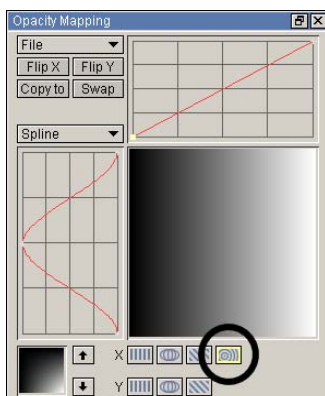


(2)




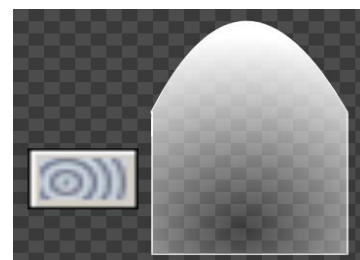
(3)

 For case (3), you must trace a vector on the screen, as you have done for drawing a gradient.



For the fourth option, modify the X spline as shown in the example opposite.

 For case (4), you must trace a vector on the screen. Note that the option on the Y axis is disabled.

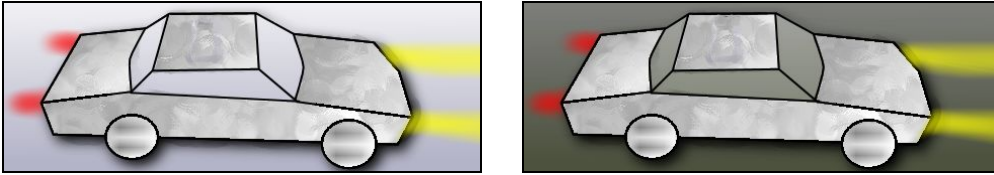


(4)

- **Some remarks for using the *Opacity* function**

The *Gradients and Opacity mapping* functions combined for use in a layer are very useful for creating effects of lighting or transparency independent of the background color or scenery (as they are not part of it).

This is the case for windows, tinted windows, lamps, projectors, etc ...



Above, the opacity gradients were used on a layer to create car headlights. They must no longer be modified when the background color changes, which results in considerable time saving.

Lesson 4

Temporal management of layers

In lesson 3, we handled the layers using the timeline. However, the notion of time did not come up at all.

This lesson deals with the notion of time.

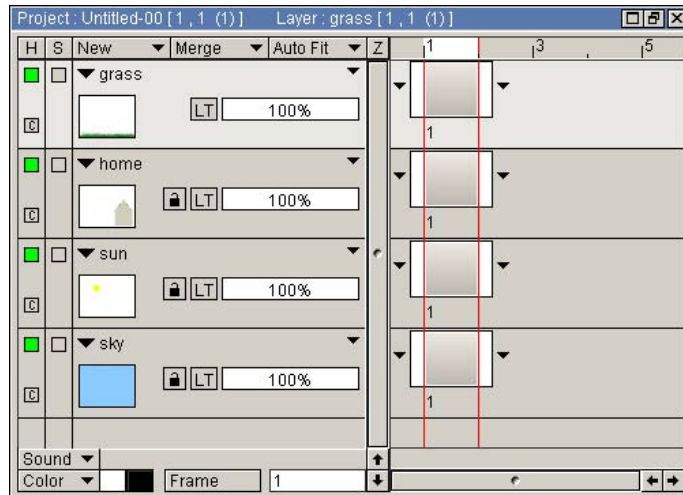
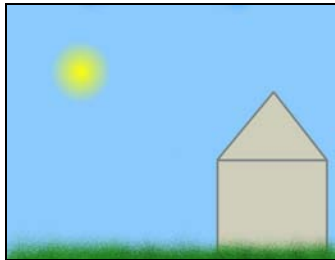
In this lesson you will:

- Study the concept of the animation layer.
- Work with brushes and animated brushes.
- Handle the commands for project viewing.

Animation layers

Start by reproducing the image of lesson 2 in a project not using fields (see lesson 1 for an explanation concerning fields) and don't forget to place the house, sun, sky and grass on four different layers.

You should have the following timeline on your screen:

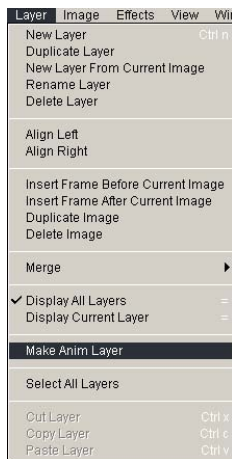


• Creation and concept of an *Animation layer*

Everybody knows how a film is projected in the cinema:

a film roll is placed in front of a powerful projector, enabling display of the pictures on a screen located a few metres away.

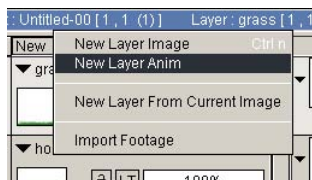
The images are projected at such speed that they give the illusion of movement to the spectator.



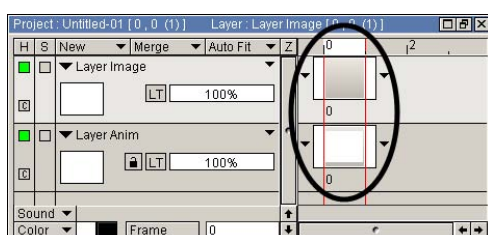
TVPaint Animation works with the same principle: it is possible to create your own virtual film rolls and project them onto your television screen.

In TVPaint Animation we refer to this roll as: *Animation layers*.

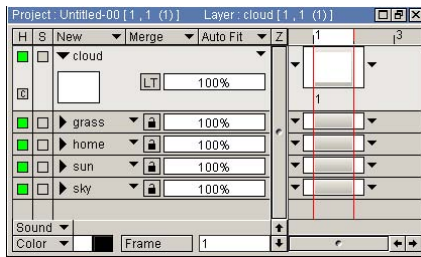
As we will see hereafter: the advantage of TVPaint Animation resides in the fact that it is possible to superpose several rolls (for example: one with a background scenery, another with a character and another with a foreground scenery.)



It is possible to create animation layers using the *New* menu in the timeline.



An animation layer is represented by an icon in the timeline. An image layer only has a gray icon (see encircled zone shown opposite).

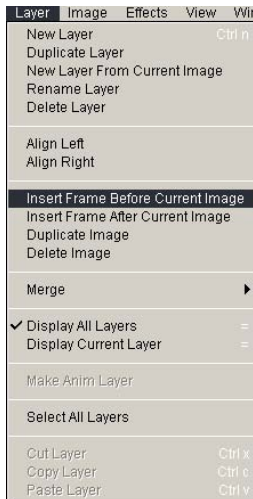


Create an animation layer and name it « cloud ». Place it in front of all the others. You then have the timeline shown opposite.

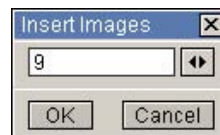


Some layers may be reduced for future timelines (see lesson 3).

• Add images



We have just created a single image (empty...). To make our first film, we have to increase the number of images in our roll. To do this, you can use the keyboard shortcut [Shift+I] or choose *Insert frame before current image* in the *Layers* menu to add frames to the current layer.
Now you just have to enter the number « 9 » in the numeric field. This will give you a total of 10 frames.

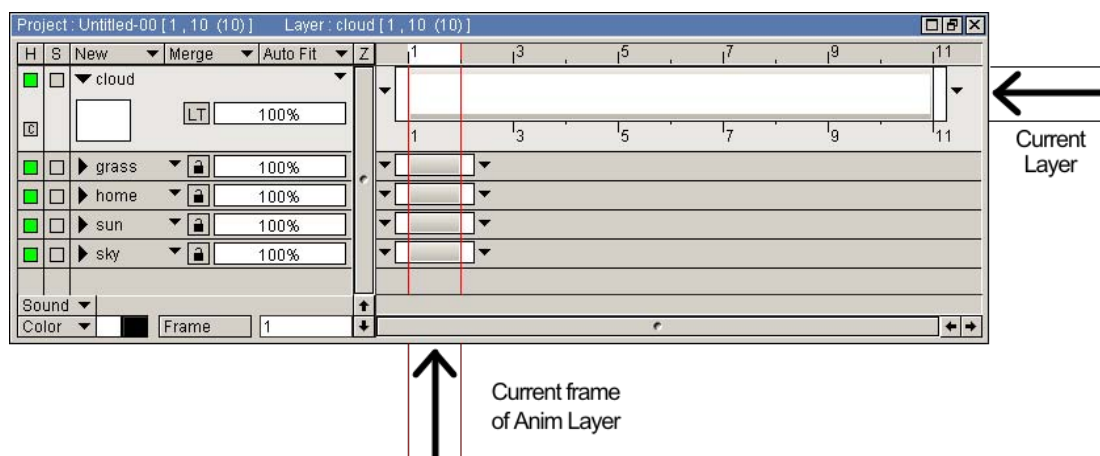


• Movement and orientation within the timeline

Use the [↑] and [↓] keys to change the current layer.
When you are in an animation layer, you can move between the images of this animation using the [←] and [→] arrows on the keyboard.



You may also use the mouse to move inside the timeline, by clicking on the space-time location of your choice.



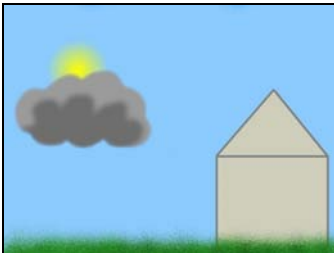
The white square with two red bars enables you to identify the image of the animation layer viewed in the window of the current project.

The title bar contains several indications. From left to right :

- * The name of the project you are working on.
- * The time code of the first and last image of the project (*TimeCode*, or image number).
- * The total project duration.
- * The name of the current layer.
- * The time code of the first and last image of the current layer (*TimeCode* or image number).
- * The total duration of the layer.

If working with time data provided in time units seems difficult to you, click on the *TimeCode* button at the bottom of the timeline. All prior values and time codes are then converted to image numbers. To simplify future lessons, we will from now on work in this way (later, you are free to work as you wish with your own animated sequences).

• Create a brush



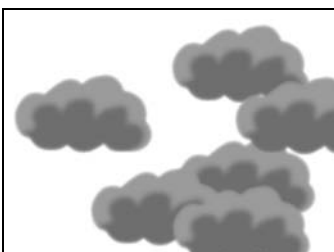
Go to the first image of the animation layer named « cloud » and draw a gray cloud using the tools of your choice.

Then reduce viewing to the current layer (icon *H* in the first column of the timeline or shortcut [=]).

We will create an animation in which the cloud will move from left to right. To do this, we have to make our cloud into a brush.



Select the icon shown opposite from the main panel. This option is used to carry out Rectangle CutBrush. But, what does this mean?



Let's take an example:


trace a *Rectangle* around the previously drawn cloud. When this is done, you will note that your current brush is not one of the standard tools: the cloud itself has become your brush!

Press the stylus on your tablet if you doubt it: the cloud has turned into a paintbrush.

Don't forget to erase your tests before continuing!



Several CutBrush tools are at your disposal in the main panel to simplify your task when creating a brush : *Rectangle CutBrush*, *Polygonal*, *FreeHand* and *Magic Wand*.

See opposite: 

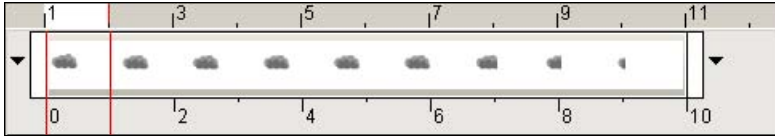
• The first animation

The first image in our animation layer « cloud » contains ... a cloud. The other nine images, however, are empty.

* Go into the second image of this animation layer and apply the brush in order to place the cloud slightly to the right of the cloud on the first image in our animation layer.

* Proceed in the same way for the third image of the animation layer, again moving the cloud slightly to the right of the one in the second image.

* Proceed in the same way to the last image of the animation layer.

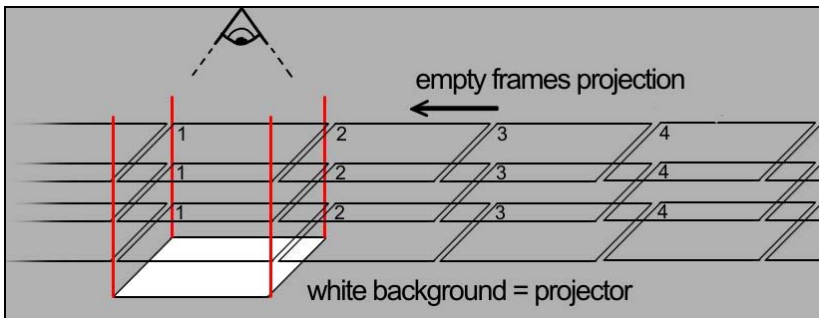


You will note that the corresponding icons of the timeline display the cloud and when you move inside the layer using the [←] and [→] arrows on the keyboard, your cloud will move!

• TVPaint Animation and compositing

Now extend viewing to all layers. Sliding along the timeline again displays the complete scenery for the first image but on the nine following images... there is only the cloud.

We learned how to stack our image layers like transparent glass sheets on a colored background in lessons 2 and 3.



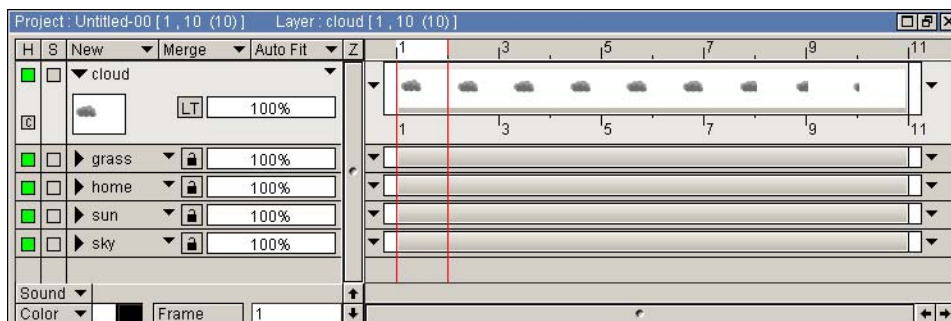
In a way it is possible to do the same here and stack the « transparent rolls » in front of our projector. The white background is used like a « white light » projector.

The image finally obtained is referred to as a « composite » image (composed of several images...)

In the case of our house and cloud, it is possible « to spread » the house and sun as fixed backgrounds or immobile backgrounds in time.

In other words, one of the transparent rolls may be composed of identical images.

The procedure is simple:



Select one of the four image layers in the timeline and use the *Insert frames* option as described above.

Do the same with the other image layers, then move within the timeline again: this time, scenery and moving cloud are still visible.

• Play an animation

Using the keyboard arrows to play an animation is not very practical. You have certainly noticed already: the most suitable options are available in the current project window.

Here are the functions of all buttons available :



the traditional buttons *Play* and *Stop* as you will find on video recorders and camcorders, etc.



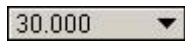
to advance or rewind one frame in the current layer.



to go to the first or last frame of your current layer.



to go to the *previous key* or *next key* (the notion of keys will be explained in the following lessons).



to modify the *framerate* (or *Frequency*) when playing the animation. Note that this value is not necessarily used when exporting your sequences.



Press this button to play the animation in a loop.



If you have chosen a sound track to accompany your project (see lesson 5 pages 25-26), press this button to play it with your project.



the *Anim* button, keyboard shortcut [W] offers you a quick look at your work.

It allows you to play your animation starting a few frames before the current image and stopping a few frames after the current image. Then you come back to the image you were working on just before pressing the button.

The framerate used is the one selected in the project window popup menu.

The number of frames played on either side of the current image may also be set in the preview settings (see page 13 of this lesson).

* The yellow rectangle located in the graduated line underneath the buttons indicates the image and the number of the image currently displayed on the screen.

* The *Mark in* and *Mark out* points:

These are numeric or time values indicating the frame from which the animation will start playing as well as the frame at which it will be stopped.

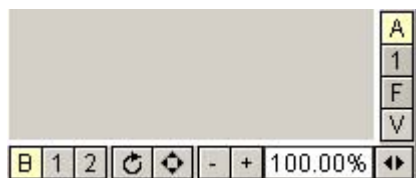
In order for this function to be taken into account when playing your animation, you must enable the corresponding buttons.

Two red and green markers enable identification of the mark in and mark out points.



You may use the arrow buttons ↓ to assign your mark in or mark out point to the current image.

Now let's move on to field projects and/or projects with a ratio other than 1 :



The buttons *B*, *1* and *2* of the horizontal bar are only available when you are working with a project containing fields.

* Button *B* enables display of two fields simultaneously when playing an animation or video.

* Button *1* will display the field which you have defined as the first field.

* Button *2* will display the second field of the current image.



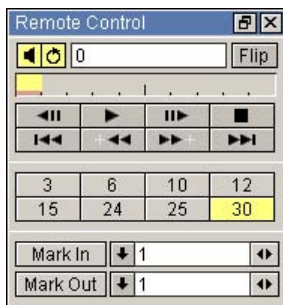
Note that the buttons 1 and 2 may only be used if your project is set to use fields. Furthermore, moving to the next image in a project containing fields will have the effect that the cursor of the current image does not move to the next image but to the next field (as an image is composed of 2 fields).


Button A of the current project window is used to enable/disable pixel *Ratio* display.



This does not modify the current project: only its aspect in the project window will be different.

• The Remote Control

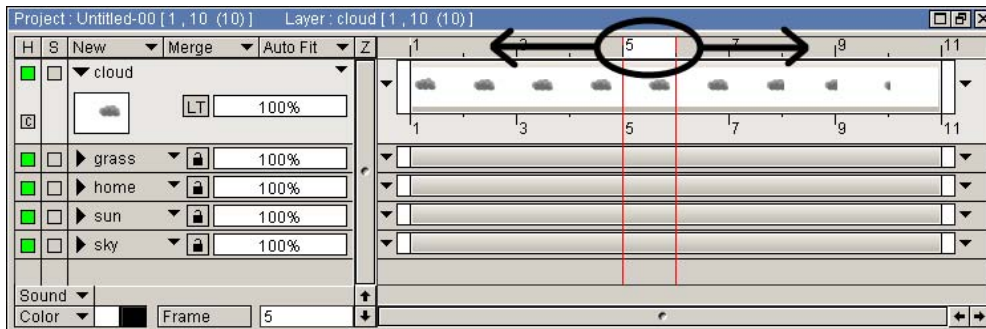


The  icon in the top right hand corner of the current project window is used to *hide/display* the viewing commands described previously.

If required, it is possible to display some of these buttons in a separate window referred to as *Remote control*, which is accessible via the *Windows* main menu. The buttons containing numbers are used to define the play frame rate (in frames per second).

• Other movement methods

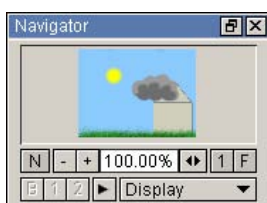
You may use the timeline or project window to move within the project. To do this, just click and slide on one of the rectangles shown below:




If you use the left mouse button, you change the image.

If you use the right mouse button you return automatically to the original image.

• The Navigator



The other buttons, specifically used for navigation on the project surface, are found in the *Navigator* window which is accessible in the *Windows* main menu.

This panel also allows you to have a low quality preview of your sequence/animation which can be useful by pressing the  button.

- * Button *N* shown above is used to open a new project window.
- * The red rectangle indicates the current display area in your window relative to the full image.
- * The *View* popup menu is the same as the one described in lesson 3 page 16.

• Transform an *Image* layer into an *Animation* layer

We will now make the sun move.

It is not necessary to create a new animation layer. TVPaint Animation allows you to transform an image layer into an animation layer.


This option is again offered in the menus reserved for layer handling.

As soon as the sun image layer is transformed into an animation layer, its icons will appear in the timeline.

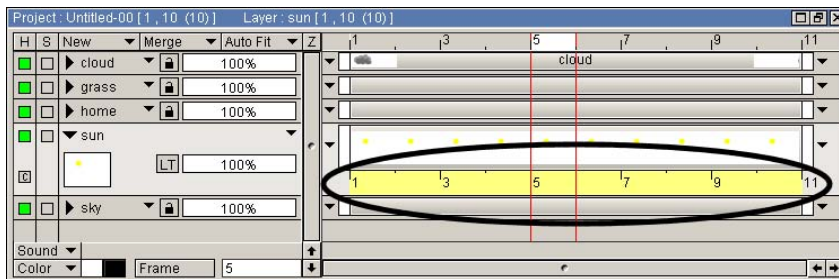
• Select and erase the contents of the images in an *Animation* layer


Select the sun as current brush. As with the cloud, it is now possible to make the sun move up in the sky and leave the screen.

However, before using the brush, the sun must be erased in every frame of our animation layer.

This may be done with the  button on the main panel for all images one after the other, but this may be too time-consuming when working on long animated sequences.

The trick is to select all images of the layer using the option *Select all* in the contextual menu (keyboard shortcut [Ctrl+A]). Your timeline must be displayed as shown below: a light yellow rectangle is present underneath the selected images.



Pressing the  button will erase the contents of all image layers.



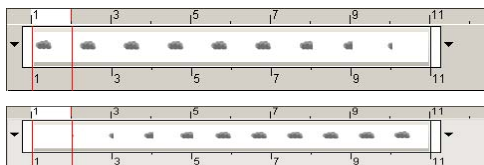
It is possible to only select a part of the layer by clicking on and sliding from the first image to be selected to the last.

You may now make your sun move.

• Flip the images of an *Animation* layer

Some options may speed up your work considerably.

The option named in the title of this paragraph is used to flip the images of a layer in time. It is only available in the layer menus after having selected the images to be flipped in an animation layer of your choice.



This is what happens to our cloud layer: the last image is now first, the last but one is second, and so on ...

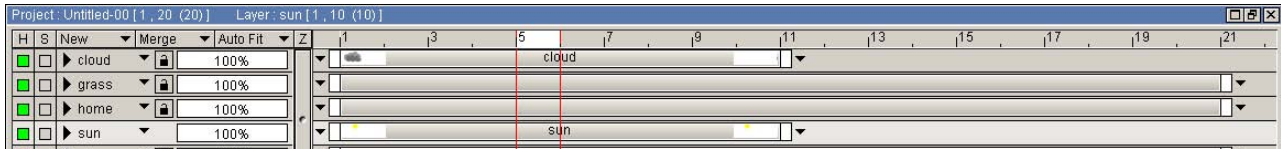
The cloud now moves from right to left.

• Move the layers in the timeline

As with the image layers in lesson 3, it is possible to move the animation layers in space. For example, you may move the cloud behind the house or the sun in front of the cloud (in case of a very high cloud, obviously), etc.

But this is not all: image layers and animation layers may also be moved in time.

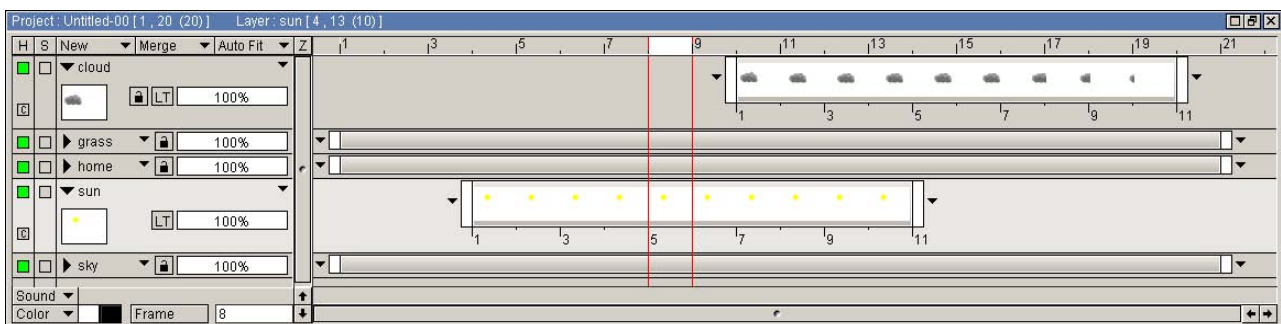
Increase the image layers to 20 frames and the following timeline will appear :



Now click on any image of the «cloud» layer and slide the mouse to the right before releasing the button.

You have now moved your layer in time. Do the same with the « sun » layer.

In the screen below, the « cloud » layer will only be shown starting from the tenth image of the animation and the « sun » layer starting from the fourth image.



The range in number of frames (or in seconds, if you are in *TimeCode* display mode) located at the top of the timeline offers a global identification system, enabling location of each layer in relation to the others within the current project.
The ranges under the frames of a layer (in number of frames or *Time Code*) only refer to these frames.

More details

• Show, hide the icons

It is possible to show or hide the icons of an animation layer in the timeline. You will find this option in the contextual menu of the animation layer (the first and last image are, however, always displayed).

• Similarities with *Image layers*

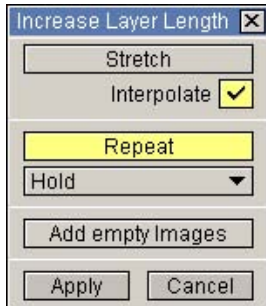
Many of the details regarding the image layers discussed in lesson 3 are also valid for the animation layers:

locking, duplication, reduction of layers as well as assigning a color work exactly in the same way for the animation layers.

The reference images for the masks are those located in the same temporal position as your current image.

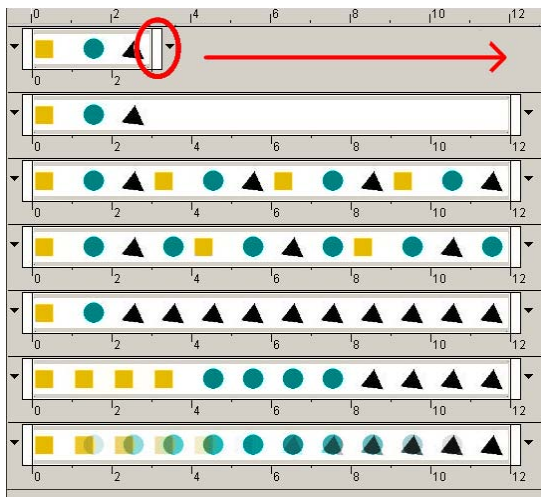
• **Stretch a layer**

We have described how to increase the number of images of a layer by inserting empty images. There are, however, other methods to increase the number of images in a layer.



Click and slide to the right on the tab encircled in red to call up the panel shown opposite.

The example below gives you an idea of the effects produced by the various options.



Original layer to be stretched to the right.

Add empty images.

Repeat: Loop.

Repeat: Ping Pong.

Repeat : Hold.

Stretch without interpolation.

Stretch with interpolation.

Interpolation is nothing but a fade effect calculated and applied by TVPaint Animation to fill the intermediary images which will be inserted between the three original images.



It is possible to stretch a layer to the left by repeating the operation described above with the left tab.

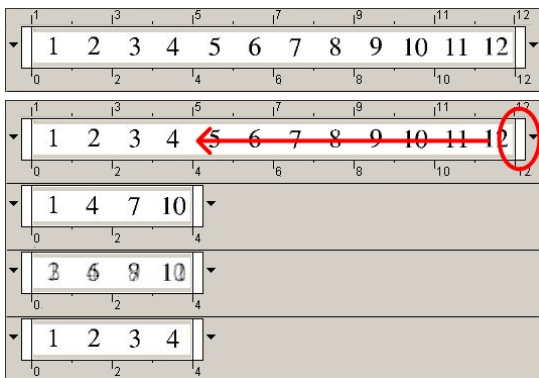
• **Shrink an Animation layer**

It is also possible to reduce the number of images in a layer using an analog method.



Click and slide to the left on the encircled tab to call up the panel shown opposite.

The example below gives you an idea of the effects produced by the various options.



The original layer which will be contracted in time.

Move the tab to the left.

Option *Shrink* without interpolation.

Option *Shrink* with interpolation.

Option *Cut images*.

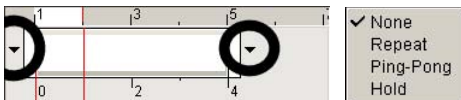
With interpolation, the numbers « 1,2,3 » are mixed in the same image, the numbers « 4,5,6 » in the next, then « 7,8,9 » etc ...

Without interpolation, the intermediary images between images 1, 4, 7 and 10 are deleted.



It is possible to shrink a layer to the left by repeating the operation described above with the left tab.

• *Pre- and post-behavior*



Did you notice the small triangles on either side of the layers?

A left click on the triangles offers you access to the options regarding pre- and post-behavior of the layers.

Let's take the case of post-behavior as an example (pre-behavior works in the same way). You may choose between the options: *None*, *Repeat*, *PingPong* (the last option only applies to animation layers), *Hold*.

These options have the same effect as those offered when stretching a layer. But in the present case, the layer is not stretched and the post-behavior has an infinite effect.

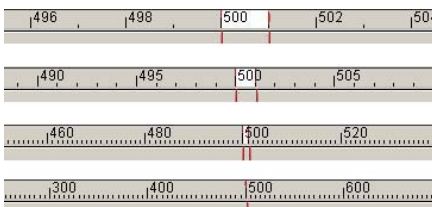


These options are also present in the contextual menu of the layer.

• The *Auto Fit* option in the timeline

When using a very long animation layer, it may be discouraging having to use the sliders continually to only view a section of the timeline.

Fortunately it is possible to modify the timeline scale :

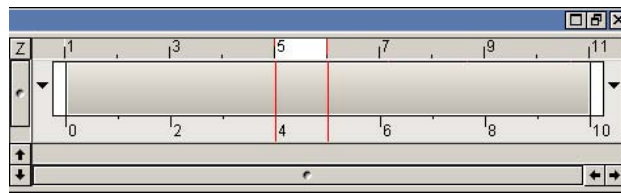


Click and hold the Z button of the timeline to modify its display (stretch or increase the icons from the current image depending on the left or right movement of the mouse or trackball).

The *Auto Fit* popup menu may be used to adjust the size of the icons in the timeline in order to view the entire project, current layer, current image, current selection or keys.

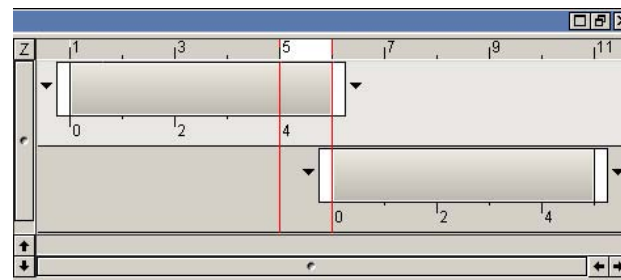
• Split a layer

It is possible to subdivide an image or animation layer into two separate layers. Let's take a look at the image layer shown below:

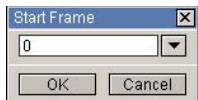


To split a layer in two, you first need to go on to the image in front of the point at which you wish to place the split.

Then select *Split layer* in the layer's contextual menu to obtain the result shown below:



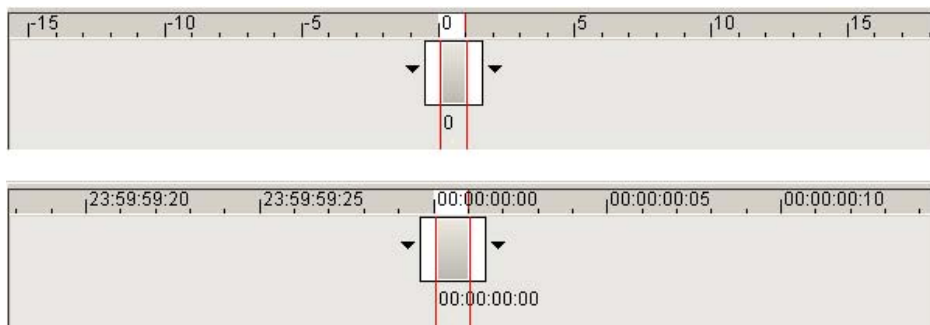
• Start frame, negative images



If you take a closer look at the timeline, you will see that our project starts at image 0 or the time:

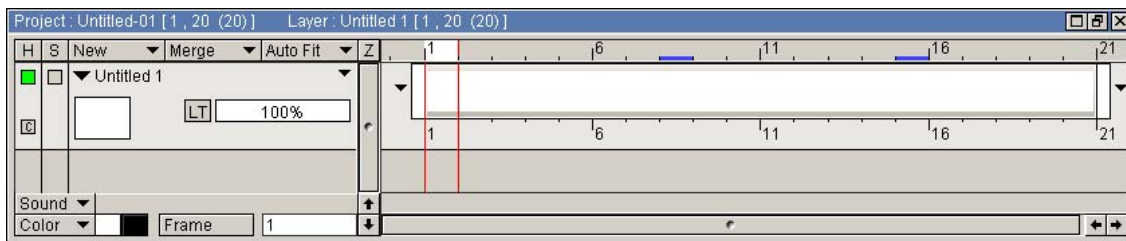
0 hour, 0 minute, 0 second (in *Time Code* mode).

It is possible to modify the start values for our project using the *Start image* option in the *Project* menu (enter the value required in the corresponding numeric field).



You will note that it is possible to place your layers before the image 0 in the timeline using the [Shift] key. You will therefore obtain « negative » images in the timeline or time values close to 23 hours, 59 minutes, 59 seconds.

• Using the *Bookmarks*



It is possible to place *Bookmarks* on the images of your animation layer (circled in black above) using the corresponding option in the *Edit* main menu.

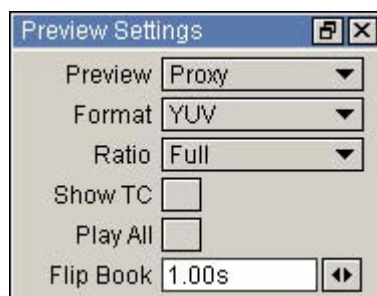
Once the *Bookmarks* are placed, the keyboard shortcuts [Shift+Ctrl+←] and [Shift+Ctrl+→] enable you to move to the closest *Bookmark* to the left or right of the current image.

Finally, the keyboard shortcut [Shift+Ctrl+↑] creates a *Bookmark* for the current image or deletes the *Bookmark* if the current image already contains one.

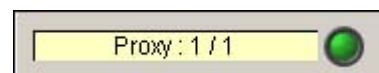
This option provides fast access to key images in your animation without having to modify the zoom factor of your timeline and/or use the sliders.

• The *Preview settings*

The *preview settings* are used to configure the way your computer and program interact to play your animations.

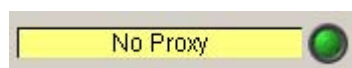


You may open the *preview settings* panel shown opposite via the *Windows* main menu or by clicking on the preview progress bar in the tool bar.



Three pre-view modes are available in the *Preview* popup menu:

* The *Real time* mode respects the duration of your animation when viewing it. It depends on the processing power of your computer. If the computer is fast, all images will be displayed at the framerate chosen by you. In the contrary case, some images are not displayed in order to respect the framerate. In real time mode, the progress bar displays *No proxy*.



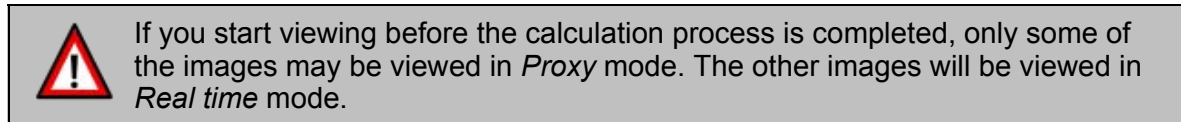
* The *Render* mode does not carry out the calculations required for viewing during viewing. It pre-calculates the viewing in advance, just before playing. This compensates the inconveniences encountered in *Real time* mode for slower computers (jerkiness, image jumps, etc.) but requires a lot of disk space and time for this calculation.

* The *Proxy* mode uses periods of less activity in the program to carry out a pre-calculation for viewing. If, for example, you spend ten seconds without drawing and without using any program options, this time will be used to prepare some of the images for viewing.

The progress bar below shows how many images may be viewed within the project. The small light becomes green when all images of the project are ready to be viewed.



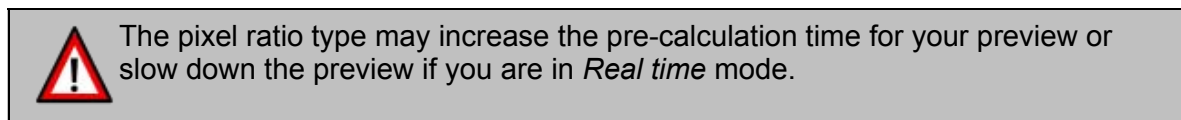
If you modify several images at the same time in *Proxy* mode (for example by erasing a layer), the viewing calculation will be re-started for the number of images concerned.



The *Format* popup menu is used to choose a render mode for the colors *RGBA*, *YUV* for viewing. Your choice will mainly depend on the display requirements of the video device connected to your system for pre-viewing.

The *Ratio* popup menu provides the following options:

- * either a high-quality ratio which reduces the preview speed.
- * or a lower quality ratio and a faster preview.

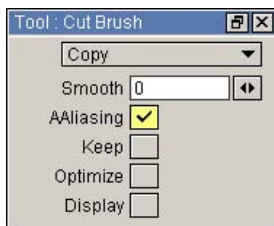


The *Show TC* button is used to display the time code during pre-viewing.

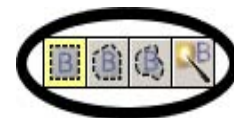
The *Play all* button forces the program to display all fields and images during viewing even if this affects the display frequency of the chosen images.

The *Flip Book* text field enables adjustment of the number of seconds to play on either side of the current image when the **Anim** button is pressed in the project window (see page 6).

• The *CutBrush* tool options



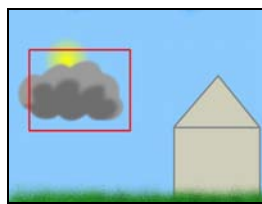
If you select one of the four brush creation icons in the main panel, the *Cut Brush* panel appears in place of the tool menu.



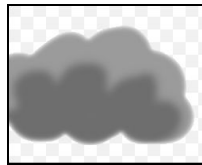
You may:

- * Create a brush by deleting at the same time the area in which it is located on the screen (*Cut* option in the popup menu).
- * *Smooth* the cut brush (see lesson 3: smooth the contours of a surface).
- * With the *Keep* option you may keep the previous brush handle (refer to the following section to study the various handles available).
- * Remove as many transparent pixels as possible around the brush (*Optimize* option).
- * The *Display* option is used to cut your brush through the visible layers. This is referred to as deep cut.

Below, the sun, cloud and sky are placed on three different layers. The current layer is the cloud layer:



area to be cut



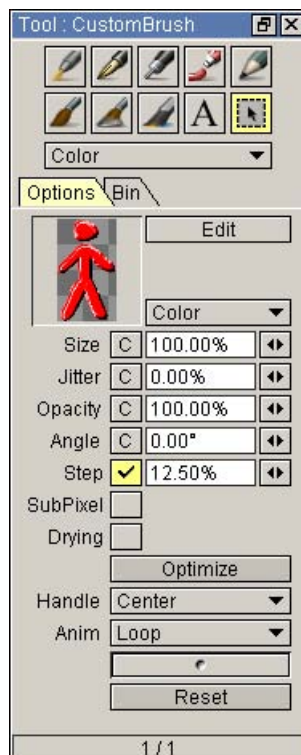
brush obtained
without deep cut



brush obtained
with deep cut

• Edit brush options

Once a brush is cut, it is possible to use it as such. Numerous parameters are available. You may:



- * Use the brush in *Color* mode. In this case the color of the pixels is not modified.
- * Use the brush in *Alpha Stamp* mode: only the opacity of the brush pixels is taken into account, their color becomes the A color.
- * Use the brush in *Luma Stamp* mode: the color of the brush pixels varies from A color to B color depending on the original luminosity of these colors.
- * Use the brush in *Hue stamp* mode: in this case, the hue of the brush pixels becomes that of A color (the luminosity of the pixels is preserved).
- * Modify the global *Size* of the brush.
- * Modify the *Jitter* of the brush.
- * Modify the *Opacity* of the brush.
- * Modify the *Angle* of the brush.
- * Modify the *Step* between two applications of the brush on the screen. This option enables drawing in a discontinued manner.
- * The *SubPixel* option is used for more precision during drawing.

- * The *Drying* option (see end of lesson 3).
- * *Optimize* the brush: i.e. re-align the brush to conserve less transparent areas around the brush.
- * Change the *Handle* of the brush: in other words, change the position of the cursor in relation to the brush which is centered by default.
- * *Reset* the brush settings.
- * The *Anim* option will be discussed later.



The state of the *SubPixel* option shown above will be kept if the *Keep* button is enabled when the brushes are cut.

The illustrations below show the various concepts described on the previous page... Let's take a look at the colors A (R = 5, G = 255, B = 8) and B (R = 255, G = 183, B = 11) below :



An example of the various brush application modes:



Color mode
(original brush)

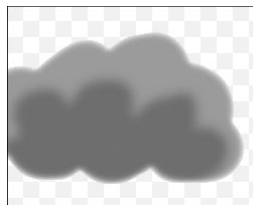
Alpha Stamp mode

Luma Stamp mode

Hue Stamp mode



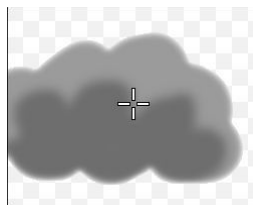
Normal brush



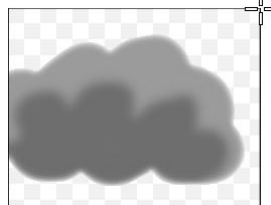
Non-optimized brush



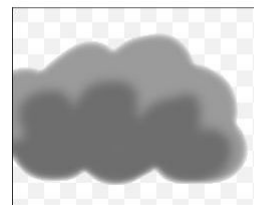
Optimized brush



Centered handle



Handle top right



Handle custom-placed

Traditional drawing modes are applied to the brushes and sometimes provide interesting results:



original brush
(the white pixels
are opaque)



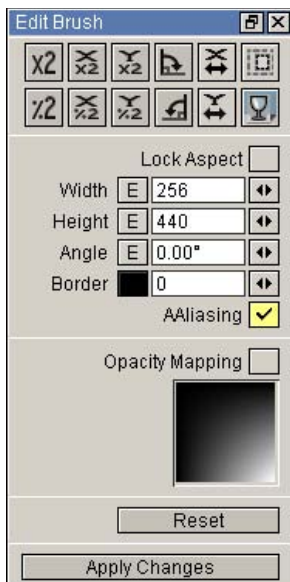
**image on which the
brush will be applied**



**application in
multiply mode**



**application in
screen mode**



Let's talk about the *Edit* button: it is used to display the panel shown opposite. The various buttons from left to right and top to bottom have the following functions:

- * double the size of the brush.
- * double its width or height.
- * turn the brush +90°.
- * flip brush on X axis.
- * optimize the brush.
- * cut brush size in half.
- * cut brush width, height in half.
- * turn the brush -90°.
- * flip brush on Y axis.
- * replace the transparent areas with color *B*.
- * lock the width/height aspect.
- * modify the size of the brush numerically or in the project window.
- * rotate the brush to an angle of your choice.
- * add a border to the brush (you may choose the color and thickness of the border).
- * Anti-alias the brush when modifying size and angle.
- * use the opacity map (see lesson 3).
- * reset all settings to zero and recover the original brush.
- * validate the modifications and use the new brush.

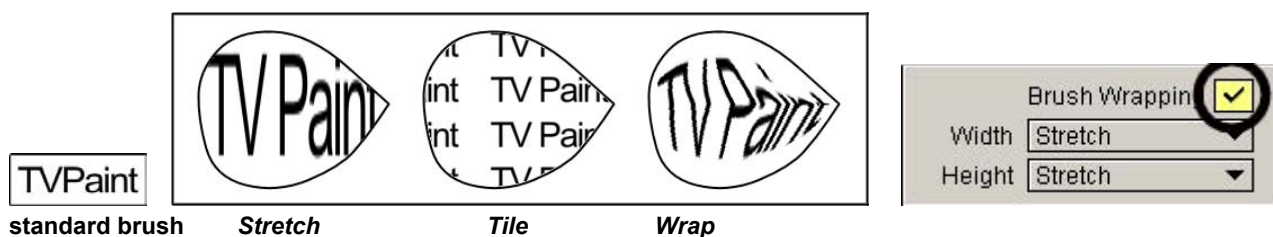
It is possible to obtain all the configurations shown below and many more !!!



• Floodfill using a brush

The *Filling shape* panel appears when you decide to draw a filled surface or floodfill a surface on the screen. This panel enables the use of the brush as a floodfill pattern. The *Custom brush* button enables this function. There are several methods available. Following the horizontal and/or vertical axis, you may:

- * apply the brush while adapting its size (width and/or height) to the surface to be filled, without distorting the brush (if necessary, the whole brush will not be visible) (*Stretch* option).
- * apply the brush at regular intervals without distorting it (*Tile* option).
- * distort the brush so that it takes the shape of the surface to be filled (*Wrap* option).



Note that for this example we used a brush created with the *Text* tool which will be discussed in lesson 6 but the example applies to all types of brushes.

• The notion of *Animated brushes*

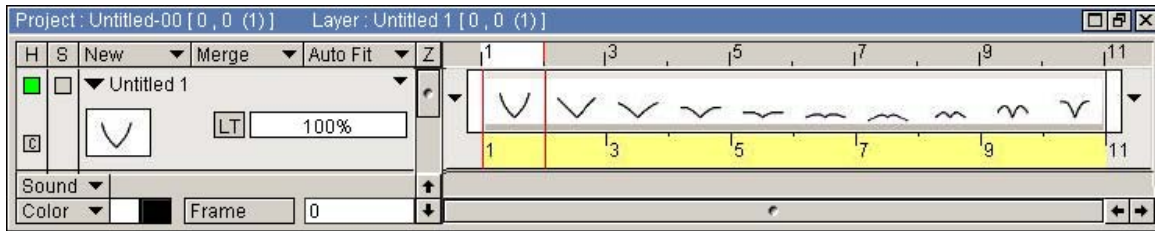
Using the *Deep cut* option which was displayed during the brush cut, we saw that it is possible to cut a brush in space, several layers deep ...

It is also possible to cut a brush in time: this is referred to as *animated brush*.

We will study this notion in detail using examples.

Example 1: We'll put a finishing touch to your animation by adding birds.

* Create an *Animation layer* of 10 images, then create a bird with a different wing position in every image of the layer (see timeline below).

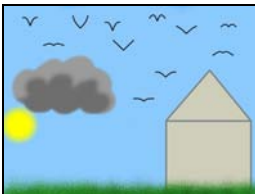


- * Select all the images of your layer.
- * Carry out a rectangular brush cut in a size similar to that of the image.
- * TVPaint Animation will ask you if you wish to cut an animated brush via a small window.
- * Answer yes.

You have just created your first animated brush. We will soon be able to use it:

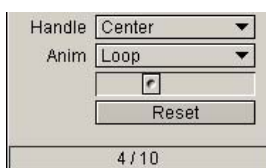
- * Delete the content of the layer you have just created.
- * Use the Edit brush option to reduce the size of your animated brush.
- * Let's now look at the short animation created previously (refer to the first chapter of lesson 5 explaining how to save your projects) with the sun and cloud.

Check that you are working in color mode then click several times anywhere in the blue sky. This is the result:



The birds you have drawn before have become your brush «each in turn» as you place them on the screen!

A few words on parameter setting for animated brushes:



- * At the bottom of the *Tool : Brush* panel you will find the number of the image currently used.
- * The *Anim* popup menu of the *Tool : Brush* panel controls how the images appear.

The images in your animated brush may appear in various ways:

- * None.
- * Once.
- * Start&Once,
- * Loop.
- * Pingpong
- * Random.
- * Stylus pressure.
- * Stylus speed.
- * Stylus direction.

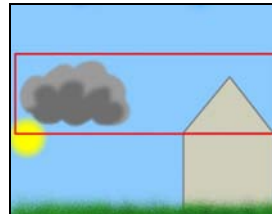
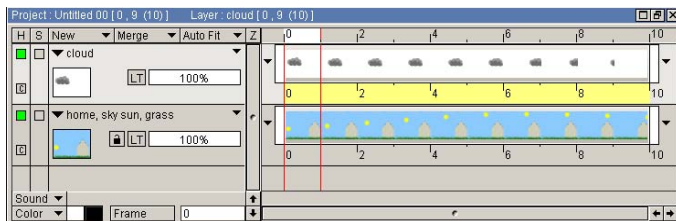


All other options and parameter settings for the brushes studied previously (modification of size, opacity, direction) also apply to animated brushes ...

Example 2 : Reproduce an animation.

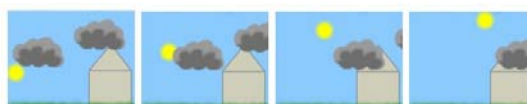
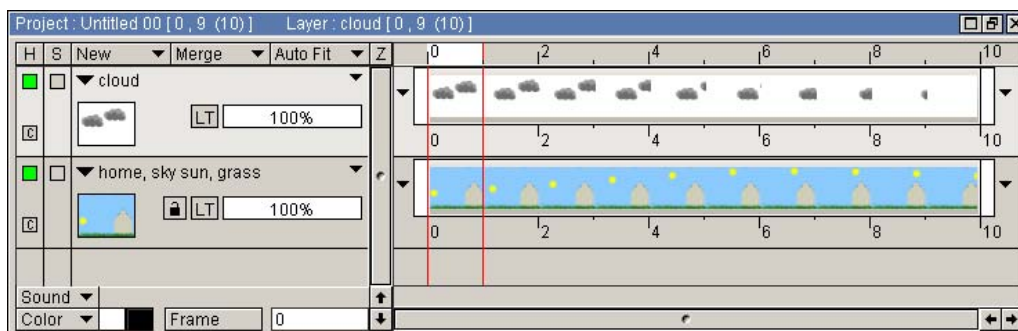
Let's now look at the short animation created with our sun and cloud but without the birds.

* We start by merging all layers except the « clouds » layer and rename the new layer. You will obtain the following timeline:



- * Select all images in your « clouds » layer, then cut a rectangular brush in roughly the same size as the red frame shown above. You just created a new animated brush.
- * Place your « animated brush of the cloud » in the free sky area, just above the house.
- * Press the *Undo* button: the cloud disappears.
- * Check that the « animated brush of the cloud » is applied in mode *Start & Once* from image 5.
- * Select all images of the « clouds » layer.
- * Press [Enter].

You will notice that the images of the animated brush are applied in the given order to all images of the current layer: a second cloud now moves from left to right ...



Did you understand these two examples ? If yes, you can now easily make the wings of a bird flap wherever you want to ...

Lesson 5

The steps to create animated graphics

In this lesson you will:

- In the first section, learn how to handle TVPaint Animation projects (load, save, import, export, etc.).
- Use the light table.
- In the second section, learn, one by one, the various stages involved in the creation of an animated drawing using this program.

Handling projects

In lessons 3 & 4 we studied the concepts of *image layers* and *animation layers* as well as their temporal and spatial specificities.

What we refer to as a *TVPaint Animation project* (or simply *project*), is all image and animation layers in a timeline (whether created by drawing, scanning or any other method) with all associated options: global opacity, pre- post- behavior, FX stack (see lesson 7), number of images per second, position in the timeline, resolution, etc.

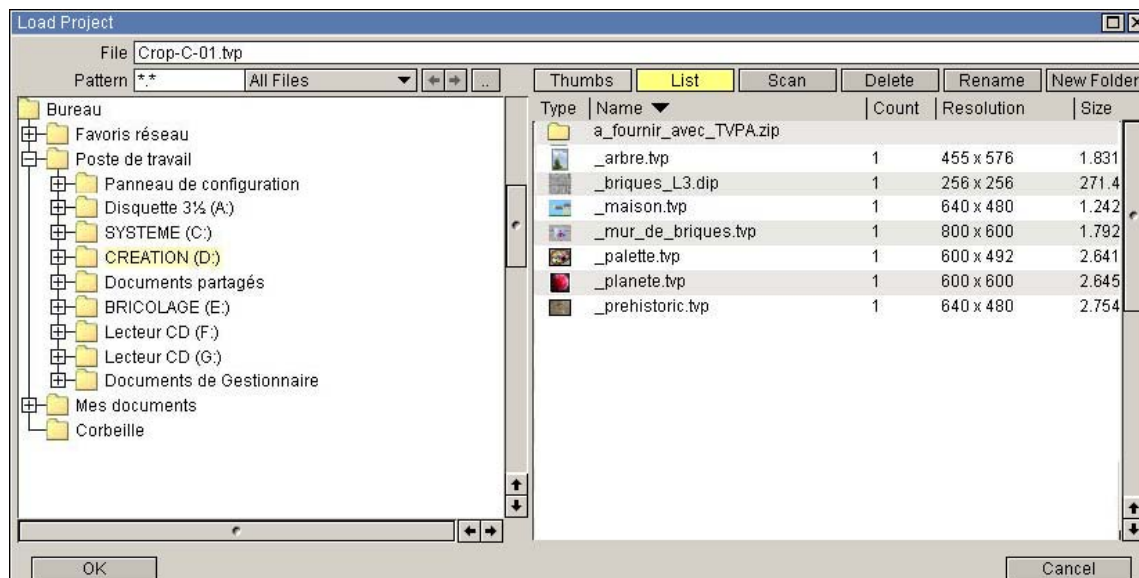
• Save a project

In lesson 1 we saw how to create a project with the parameters of your choice.

After having worked with tools and layers (lessons 2, 3 and 4), you may wish to save your project for later use. To do this, use the *Save project* or *Save project as* functions in the *File* main menu. *Save project* (keyboard shortcut [Shift+S]) allows you to save the project under the current name, whereas *Save project as* asks you to choose a new file name for your project. This function allows you to easily duplicate your project as you progress with its creation.

• Use the requester

A file explorer then asks you to select an access path and file name for your project.



This window is laid out as follows:

- * The text field at the top of the window allows you to enter the name under which the file is to be saved.
- * The second text field just below the first is used to select the type of files to be displayed in the right section of the window.
- * The popup menu to the right of this field is a shortcut used to select the file types of your choice. In the default setting, all file types are displayed (extension .PNG .BMP .JPG ...). TVPaint Animation projects have the extension .TVP.
- * The left section of the window contains the directory path. When necessary, the sliders (and fingerwheel of your mouse) may be used to scroll through the list of folders available for storage. A right-click on an item in this list opens a contextual menu offering access to *Open*, *Delete* and *Rename* functions.
- The and buttons are used to display or hide the content of your storage supports, folders or sub-folders.
- * The is used to return to the parent folder.
- * The arrows are used to scroll through the history of selections in the file explorer. In this way, you may quickly find the folders in which you last saved your work.

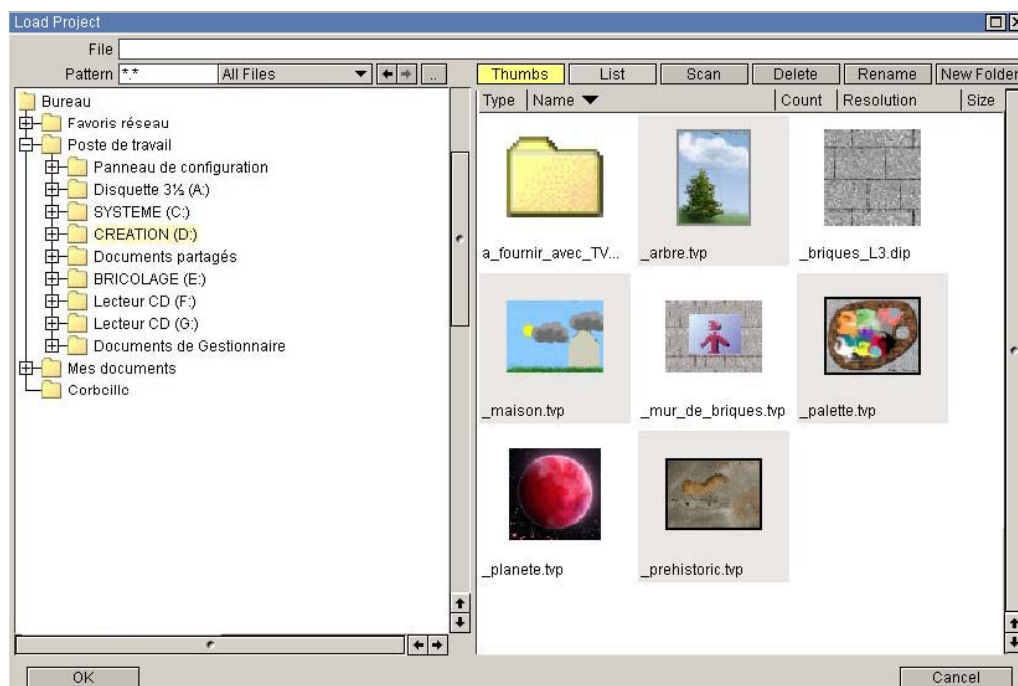
- * The right section of the window displays the files contained in the folder you selected on the left side of the window.
- * You may choose to display thumbnails of your files (button *Thumbs*, the button *Scan*) or display a list containing information relative to your files: type, name, count, resolution, time, size, date of last save (button *List*, then button *Scan*). Note that some data is not taken into account for all file formats.
- * It is also possible to delete the selected file, rename it or create a new folder using the buttons *Delete*, *Rename* and *New folder*.
- * Once you have selected the file or folder you require, click on *OK*.
- * To quit the file requester and ignore all operations, click on *Cancel*.



When using the second text field, the question mark is considered a random number or letter, whereas the asterisk is considered a complete random word.

For example :

- * Enter « *.jpg » to display all image files of the type jpg in the right section of the window.
 - * Enter « dessin003?.jpg » to display all files named dessin003 followed by another character and the extension « .jpg ».
- Therefore files between dessin0030.jpg and dessin0039.jpg will appear whereas dessin0020.jpg or dessin0040.jpg will not.

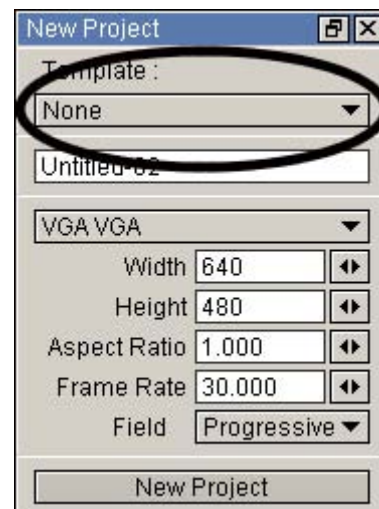
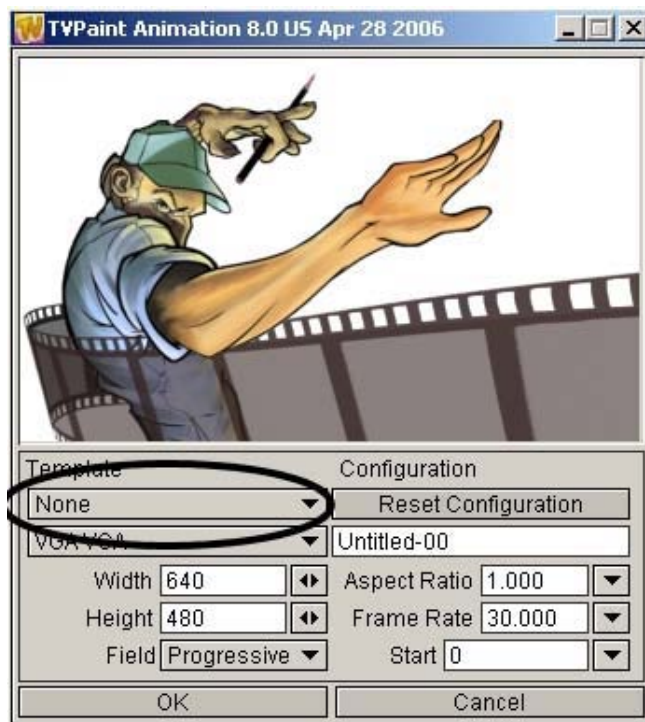


Above an example of a file requester with projects displayed in the form of thumbnails.

• Save a *template*



A *template* is a blank project using a predefined resolution, speed, aspect ratio and number of layers and images.
It is possible to save a *Template* using the dedicated option indicated in the main menu opposite (the template will have to be given a name).



In this way you may select the *template* you just created when a new project is started (when starting up or using the program).

You may also use one of the many predefined models.

• Load an existing project

To load an existing project from the data storage support, simply press the keyboard shortcut [Shift+L] or the *Load* option in the *File* main menu. The file requester will then ask you to select an access path and file name.

Now that you know how to use the requester, load the file « running kid_2.tvp »

Folder **C:/program files/TVPaint Developpement/TVPaint Animation/** for Windows users.

Folder **Applications/TVPaint Animation** for OS-X users.

If the project loaded is too big, too small, possesses too many images or has an incorrect pixel ratio, you may modify it.



A list of files previously loaded with TVPaint Animation is available in the *File* main menu. Simply click on the name of one of these projects to load it again.

• Modify a project

The option *Modify project* is accessible in the *Project* main menu.
The latter opens the panel illustrated below:

* The project properties are indicated on the top left-hand side of the window and include: *Project name*, *Width*, *Height*, number of frames per second (frequency), *Pixel aspect* and *Field* options. Bottom left you will see the future size of your project, after modification.

* Just below, a popup menu is available in which you may select the predefined format you require, corresponding to the format you will obtain after modification. It is possible to modify a project originally in VGA format, to obtain a project in NTSC format.



* The numeric fields located under the popup menu change according to your choice in the predefined formats menu.

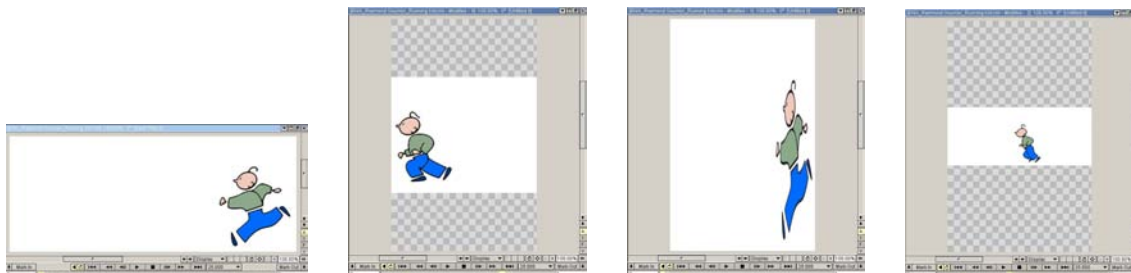
Of course, you may modify your project for your own format (for example to create an animated gif on a website). All you have to do is modify each option manually: *Width*, *Height*, *Frame rate*, *Aspect ratio*, *Field* (a mini popup menu is available for the parameters *Frame rate* and *Aspect ratio*).

The *Lock aspect* button allows you to keep the width and height ratio of the original project. The *Rotation* parameter is used to rotate the project 90, 180 or 270 degrees.

* Here you will discover the functions of the next five buttons:

By default, when the *Modify project* function is used, TVPaint Animation keeps your original project and creates a new project which is modified according to the parameters you have selected.

- The *Resize to new size* button enables, when checked, the resizing of your original project to a new size.
- The *Correct aspect ratio* button forces the program to respect the original image aspect ratio (this avoids the creation of disproportionate images).



- The *Stretch to new frame rate* button, when checked, increases or decreases the number of images so that your new project has the same duration as the original project.

If, for example, your original project displayed 24 images/second and your frame rate is set to 12 images/second, your project will last twice as long (the number of images is, by default,

retained). If the button *Stretch to new frame rate* is checked, some images will be deleted so that the original project and modified project have the same duration.

In the opposite case: original project with 12 images/second, modified to a project with 24 images/second, the modified project will be shorter than the original project. If the button *Stretch to new frame rate* is checked, intermediate images will be added to the modified project to make it coincide with the duration of the original project.

- The two aforementioned examples are similar to the layer's contract and stretch section discussed in lesson 4. The *Time interpolation* button also refers to this function as it imposes layer stretching or contracting with interpolation when the button *Stretch to new frame rate* is checked.
- The *Remove project* button is used when the original project is not to be kept on the screen.



Use of the *Remove project* option is at your own risk as in this case the *Undo* function cannot be used to help you out...

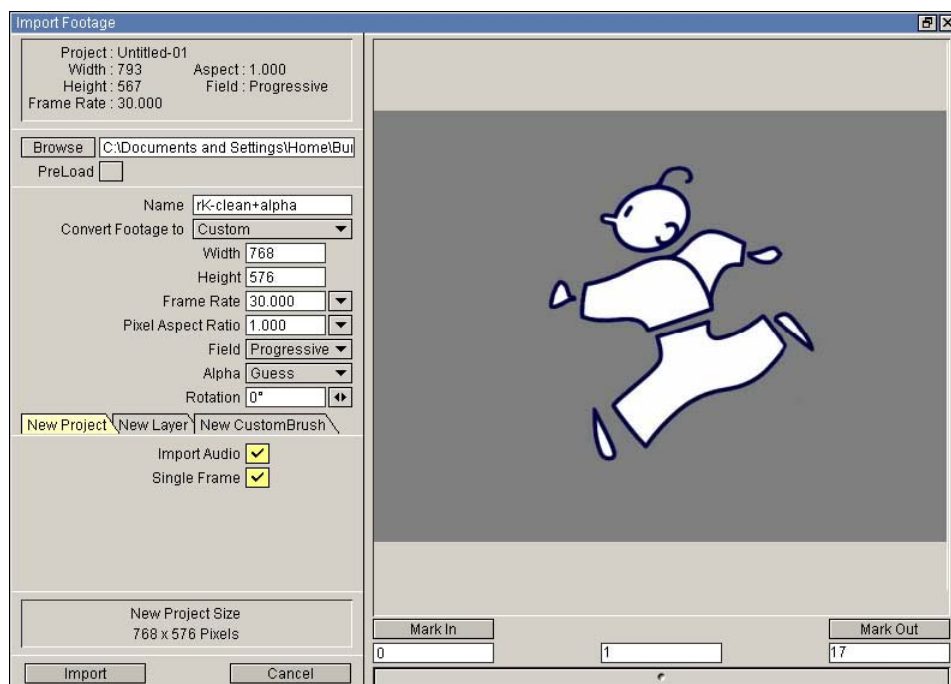
* The right section of the project modification panel enables selection of the portion of the project which is to be modified. The *mark in* and *mark out* buttons as well as the associated numeric fields will help you select the first and last images of the project to be modified.

* The central numeric field and slider are used for navigation over the entire duration of the project.

• Load an existing image or animation

It is sometimes useful, when working, to load an image, video or animation which has not been saved in a format which manages layers as well as their layout and opacity, etc... (in other words, an animation which has not been saved in one of the formats TVP, MIR or AUR)

In this case, a new panel, referred to as *import footage* panel, appears directly after selection of a file in the requester. This panel is as follows:



This panel is similar to the project modification panel.

Let's assume you have loaded a video file (AVI or MOV)

- On the top left-hand side of the import panel you will find all information relative to the file selected in the requester window (size, frame rate, aspect ratio, etc.).
- These are followed by a text field which indicates the path and name of the file you have chosen.

- The *Browse* button allows you, in case of error, to choose another file in the requester window.
- The *Preload* button will be discussed in the *Dependencies* section of this lesson.

Your video file may be modified when imported to suit your needs: *project name*, *width*, *height*, *frame rate*, *aspect ratio*, *field*, *rotation* may all be modified as we discovered in the previous section.

The *Alpha* popup menu, however, possesses specific options including: *Guess*, *Premultiply*, *No Premultiply*, *Without alpha* and *Alpha only*.

* The option *Guess* will consider that the *Alpha* value is equal to the maximum RGBA values present in the sequence.

* The option *Premultiply* refers to the method of calculating each pixel. In this case, each pixel is multiplied by its alpha value which results in the fact that these pixels are calculated quicker than with the *No Premultiply* option.

* The option *Without alpha* will load your sequence without transparency if it had any beforehand.

* Finally, the option *Alpha only* will only load a mask of the sequence. This mask will be extracted from the alpha layer of the sequence.

Further down, three tabs allow you to choose the form to be given to your imported video: the imported video may be created either as a new project, a new layer in the current project or as a custom brush (these three options are mutually exclusive).

* When a video is loaded as a new project, two options are available:

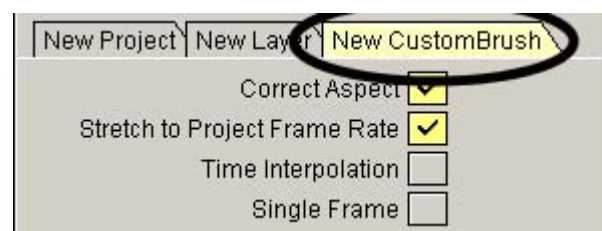
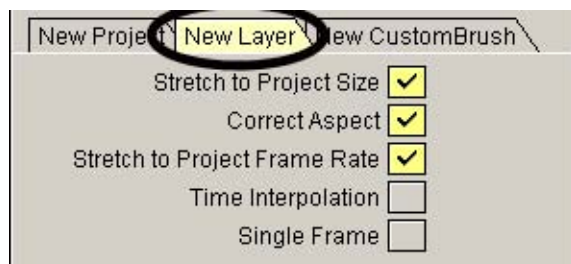


- The video sample loaded will be that located between the two time markers on the right side of the panel. You may also choose to include sound with your video by checking the *Import audio* box in the import footage panel.

- The *single frame* check box, if checked, will create a project with a layer and a single frame: the frame selected in the right side of the panel.

* When a video is loaded as a new layer, a new set of options similar to those encountered in the *Modify Project* section becomes available. You may:

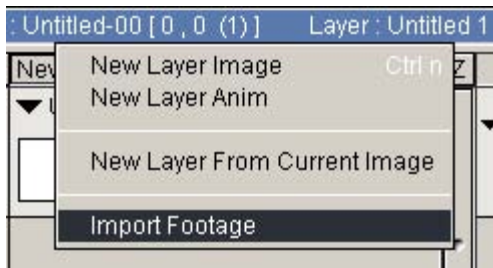
- Stretch your video file to fit the dimensions of your current project,
- Adapt the aspect of your video to that of the current project,
- Compensate for any possible frequency differences between your current project and your video by stretching or contracting your video,
- Choose to stretch or contract with or without interpolation,
- Create a layer with a single frame (here again, a single frame or large sample may be imported between the mark in and mark out points).



* When a video is loaded as a custom brush, the same options are available with the exception of the *Stretch to project size* option.

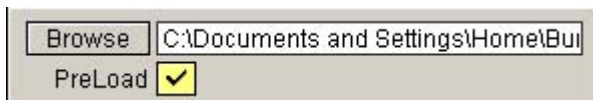


When you load a file in PSD format, a new project is automatically created (no import footage panel is opened) and the image layers are all present in the timeline.



The *Import footage* option in the timeline shown opposite returns the user directly to the import footage panel, *New layer* tab.

• Dependencies



The *Preload* button present in the import footage panel is used to choose whether the video footage on which you wish to work is to be read directly from the computer storage support or if it is to be included in your current project.

This option is important for the following reasons:

* Let's assume your projects possess layers composed of non-preloaded video footage.

When loading the same project again, TVPaint Animation will look for the data necessary to display the images, layers and timelines in the external video files. This function is interesting as it saves space when saving as your project does not contain all the images it comprises.



Attention however: if the video file to which your project refers is deleted, modified or renamed, this will have an incidence the next time your project is loaded (the layers and images concerned will not be found...).

* To avoid having a project which is dependent on external videos, you may, when video footage is imported for the first time, preload it immediately. Your project will then be more voluminous when saved, but at least there will be no risk of losing the data when the imported files are modified.

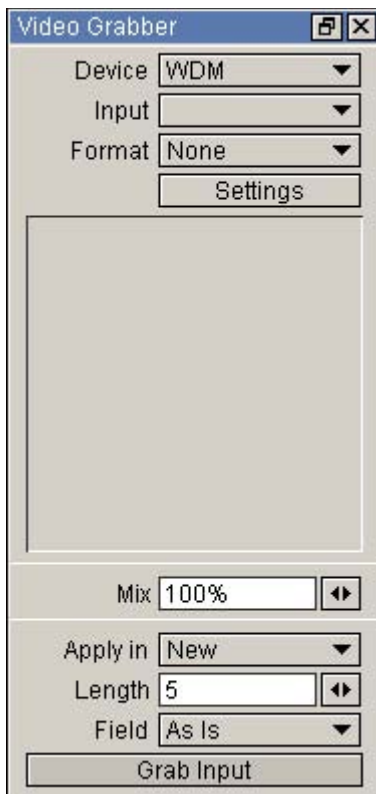


If you forget to do this, it is possible to preload the files later via the main menu *Project > Dependencies > Load all*. This menu also displays the path and name of files on which your project depends.

• Video grabber

It is sometimes useful to refer to video footage to create the drawings necessary for an animation. For this reason, it is possible to enter a video directly into TVPaint Animation. TVPaint Animation is compatible with WDM standard equipment without having to install specific drivers or plugins. For information, WDM devices are Windows Device Manager devices (used by most WebCam and DV format camcorders). On Mac OS X, TVPaint Animation is compatible with QuickTime devices.

To grab video footage, you must first ensure your peripheral device is correctly installed. Then, you must right-click on the V button located on the bottom right-hand side of your project window. This action opens the *Video grabber* window:



* The first *Device* menu allows you to select the type of peripheral device you intend using to grab the video footage.

* The *Input* menu displays a list of the peripheral devices available and allows you to select the device to be used.

* The *Format* menu allows you to select the resolution with which your peripheral device will grab the footage which in turn depends on the capabilities of your equipment.

* The *Settings* button allows you to automatically open the options panel of your equipment and define in most cases certain parameters such as luminosity, frame rate, contrast, etc.

If your device is correctly connected to your computer, opening this window will show what is presently «seen» by the device in the preview window. If you wish to view this video in the project window, left-click on the same *V* button you used to open the *Video grabber* panel.

The value of the *Mix* parameter defines the video footage opacity percentage. This will allow you to continue viewing your project whatever happens.

Finally, the *Apply in* menu allows you to define whether the video grabbed by your peripheral device should be automatically inserted into a new layer or simply added to the current layer.

The *Length* option defines the number of frames to be grabbed. If this value is set to 5 and you grab a video, the resulting video will be duplicated on 5 frames of the destination layer. This is very useful as it allows you to monitor the rhythm of your animations.

The last menu is the *Field* menu which is used to define management of your video fields. Four options are available: *As is* keeps both fields, *+Upper first* and *+Lower first* will only use one of the fields, interpolated to correspond to your project window. The *Mix* option is useful for non-interlaced frames and enables reduction of frame flicking.

Finally, this panel is completed by the *Grab input* button which grabs the video each time it is pressed.

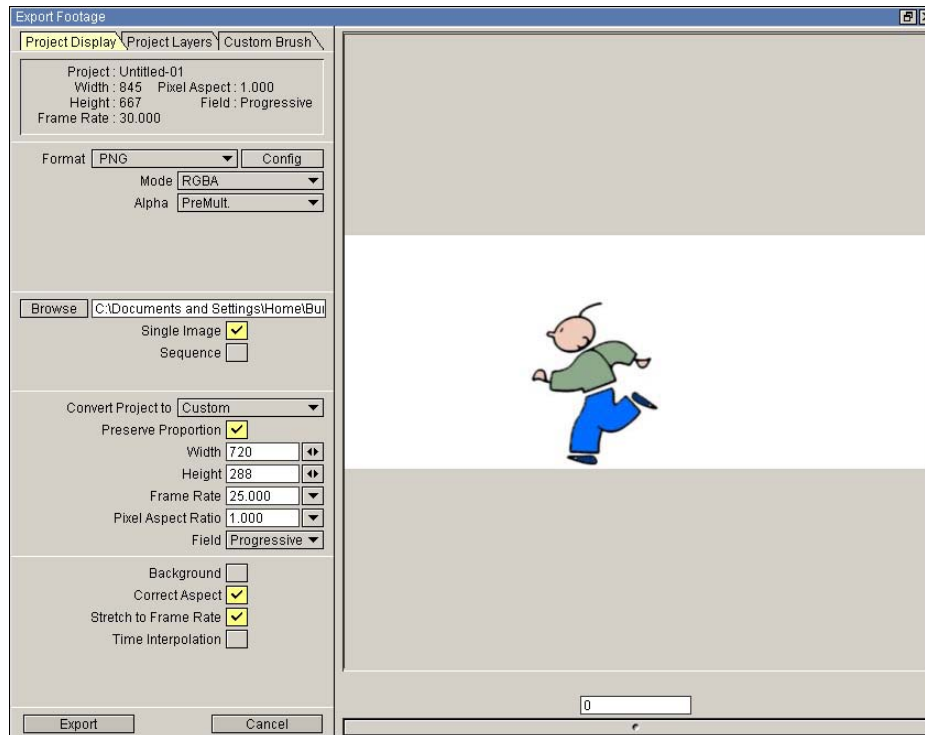
• Export files

Saving a project in TVPaint Animation format with all associated layers may require a considerable amount of storage capacity.

Even if it contains specific data relative to your project (opacity, layers, etc...), the TVP format is not a practical solution if you want to share it with your friends at parties or on a website. Use of the dependencies function will render your project smaller, but it is not more practical in the aforementioned cases.

The option *File > Export project to...* is used to convert your project into a format of your choice: animated GIF, AVI or QuickTime file, numbered frames sequence, etc. You will find this very practical as you are able to save your work in smaller files.

This option is present in the *File* main menu. Once selected, the following panel appears:



Its layout should be familiar to you.

You may choose to export an image (or image sequence) from your project while retaining the layers or current brush (possibly animated).

These three possibilities are mutually exclusive.

To export the project image:

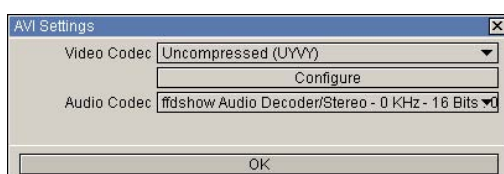
* A box on the top left-hand side is the first section of this tab and provides information relative to the current project.

* The second section deals with the export file format:

TVPaint Animation allows you to export your projects in a wide variety of formats: dip, avi, gif, quicktime, fli, pcx, sunraster, psd, tga, jpg, ilbm, tiff...

Each format has its own specific features which are explained in appendix.

Some are configurable (for example AVI format), others are not.



When the export file format imposes the choice and setting of a video and audio codec, click on the *Config* button to display the corresponding settings panel.

The codecs present in the popup menus and their configuration options are those installed in your operating system.



In order to save a TVPaint Animation project in DVD format, you must have a MPEG-2 encoder codec installed in your operating system.

When required, and depending on the various formats of export files, you may need to set the following option parameters:

- Mode

You may choose to export your work in the form of images or a video with a limited palette (8 bits=256 colors), a large palette (24 bits=16.777.216 colors), a palette which takes into account the pixel transparency: 32 bits, a palette with no color data, but only pixel transparency (a mask).

- The palette

In the case of a limited color palette, you may choose to use:

A gray scale palette.

The program palette located in the *Bin* tab of the palette panel

A global quantized palette to be used for all frames of your footage or animation.

A local quantized palette which is modified for each frame of an animation.

- The number of colors

You may also choose a precise number of colors between 2 and 256 (to do this you must first choose one of the two quantized palettes).

- Dither

The *Dither* button is used to disperse the pixels of your animation in order to simulate use of a palette with a lot more colors (technically referred to as «Floyd-Steinberg dithering»).

- Alpha

Options relative to the Alpha function were discussed on page 7.

* The third section of the panel contains several options:

- The *Browse* button and an associated text field are used to enter the name and location of the file to be exported.

- The *Single image* button is used to save the image visible in the right section of the panel only.

- The *Sequence* button is used to save, one at a time, the images located between the *Mark in* and *Mark out* points. The images created in this way are numbered.

By default, the images are numbered as follows:

file_name_1.ext, file_name_2.ext, file_name_123.ext, ...



Including a « 0 » in your file name may help with numbering your images. For example if the first file name is « dessin_000 », the images will have the names dessin_001.jpg, dessin_002.jpg,dessin_354.jpg...

- The *Animation* button is used to save all the frames between the *Mark in* and *Mark out* points in a single file and is available for some file formats (deep, gif, quicktime, fli, avi).

* The fourth section of this panel manages the restrictions and attributes imposed on a file to be exported: width, height, frame rate, pixel aspect ratio, field.

* Several buttons are present in the fifth and last section:

- The *Background* button, when checked, renders all the pixels of your images opaque using the background selected (color, check or none) which is placed behind the transparent pixels of your images.

- The *Correct aspect* button is used to correct the pixel aspect ratio of the images to be exported in accordance with the setting made in the fourth section.

The *Stretch to frame rate* button, when checked, imposes a previously selected frame rate on the file to be exported while retaining the original duration.

- If the aforementioned button is checked, the *Time interpolation* button allows you to decide whether the frame rate (or fields) correction should be carried out by interpolation (smoothing) or duplication (or deleting as the case may be).

To export an animated brush:

The options are the same as those available to export a project display.

To export project layers:

The options proposed are:

- Choose the path and file name
- Choose the file format: TVPaint or PSD (both file formats retain the layers you have created).

Exporting in PSD format :

Earlier we saw that the Export panel contains three tabs: *Project display*, *Project layers* and *Custom brush*. The *Custom brush* tab does not concern us at this point in time as we are only interested in the differences resulting from the choices made in the *Project display* and *Project layers* tabs :

If you decide to export a project in PSD format in the *Project display* tab, you will export an image (or an image sequence) with all the layers of your project in a single image without transparency. The transparent areas will be replaced by the color black.

If you decide to export a project in the form of layers in the same way as your project .tvp, you will have to choose the *Project layers* tab for this export.

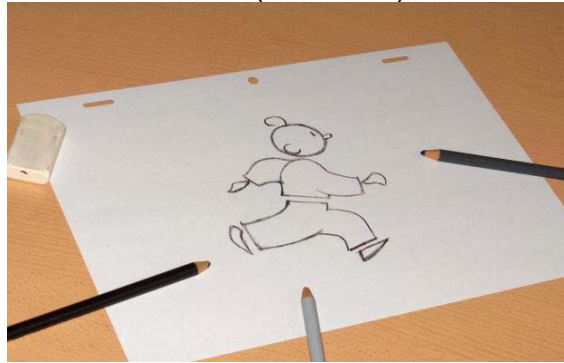
If you decide to export a project in PSD format in the *Project layers* tab, you will export an image (or an image sequence) with all the layers of your project in the spatial order, with transparency.

Create an animated sequence step by step

The aim of this section is to sum up the various steps involved in creating a cartoon using TVPaint Animation and to deal with frequently asked questions. Some steps will be explained in more detail when studying the corresponding effects.

• Scan and print your images

You may choose to create the images for your future cartoon either directly in TVPaint Animation or more traditionally, on paper with PEG holes (see below).



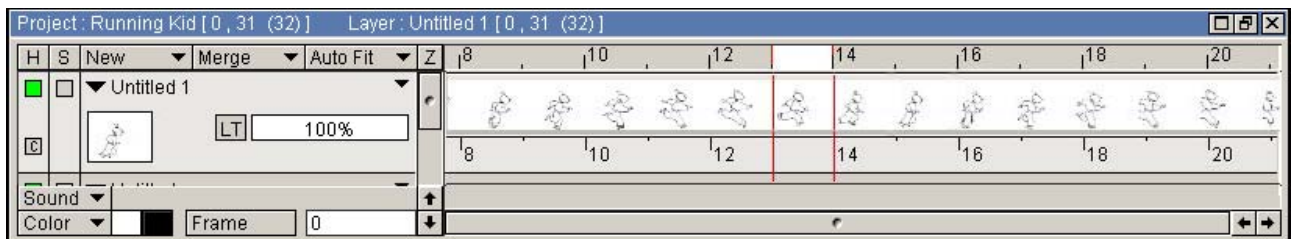
TVPaint Animation works with Twain standard scanners in Windows.

* The *File > Twain > Select* option is used to choose the scanner you intend using.

* The *File > Twain > Acquire* option displays the Twain interface of your scanner in order to begin working with the latter.

On Mac OS X, TVPaint Animation works with ICA standard scanners. Use the *File > ICA > Acquire* option to display the acquisition interface.

In this way, when you scan a set of images, you may either import these images directly after the current animation layer, or in a new animation layer, or simply in a new project.

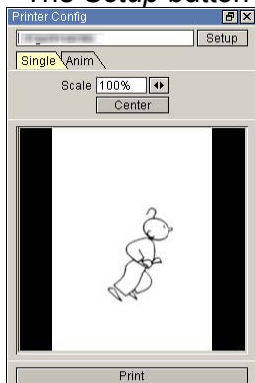


Inversely, it is also possible to print the content of an animation layer.

The *File > Configure printer* option displays the options available on your printer,

The *File > Print* option opens a new window:

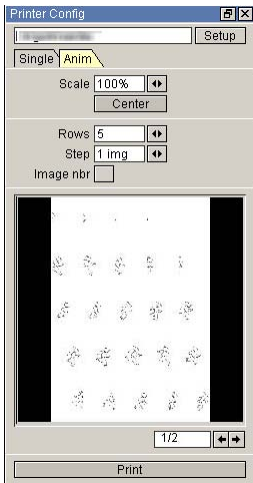
- At the top of this window you will find the name of your printer.
- The **Setup** button displays the options available on your printer.



- The **Single** tab opposite is used to print the current image.

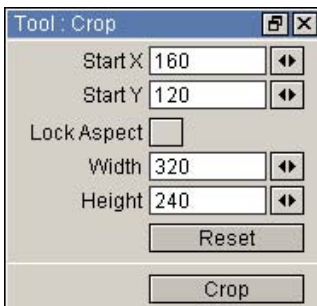
You may adjust the size and position of your image on the future sheet of paper using the click and slide function as well as the *Scale* field.

The *Center* button places your drawing in the center of your future sheet of paper.

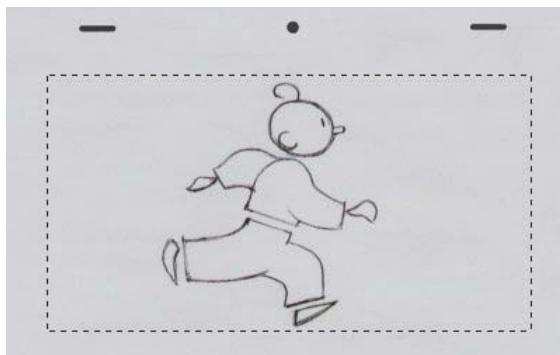


- The *Anim* tab offers the possibility to print several images of your animation (merged layers) on the same sheet of paper. In addition to the image size and position setting options, you may: Choose the number of columns for your images. Display the position of each image on the timeline. Choose every second, third, fourth, etc. image in the *Steps* field. The two buttons in the bottom right-hand corner of the panel are used to scroll through the various pages to be printed.

• Cropping a project



The *Crop* tool is used to define a rectangular area in the current project and to transform the content of this area (including all layers) into a new project. This is very practical when cropping your animations due to badly defined edges (see example opposite). The variables *Start X* and *Start Y* are used to define the top left-hand corner of the rectangular area, whereas the next two variables adjust the *Width* and *Height*. *Lock aspect* retains the same width/height ratio as that of your current project.



before cropping



after cropping



You may modify the rectangular area in the current project window with a left click and/or right click + slide.

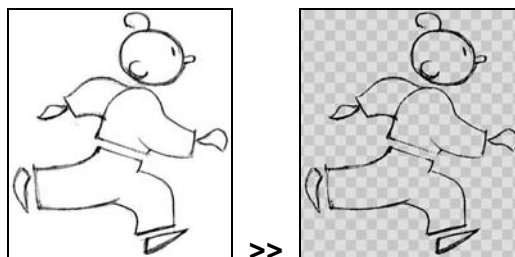
• Clean-up the sequence

Once the drawing has been scanned, it is possible to:

* Clean up your drawings in order to correct rough pencil lines.



* Delete white pixels to imitate the use of a true animation overlay (this operation is necessary for later coloring as well as for use with a background).



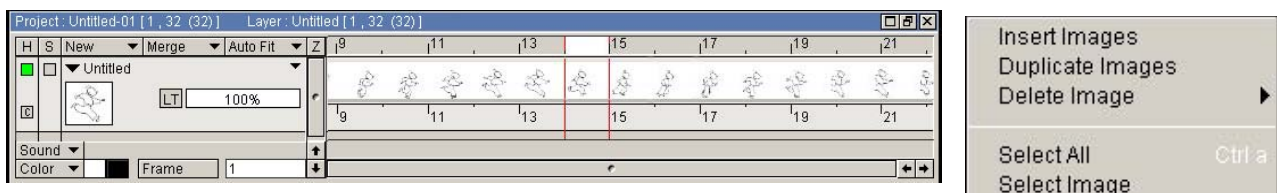
Those who have worked with earlier TVPaint Développement software packages use the *Lumakey* effect followed by one of the color effects to remove the (light) gray aspect of the semi-transparent pixels.

New users will no doubt prefer the new *Scan cleaner* effect specially designed to accomplish the two aforementioned operations in a few clicks (even the veterans should give it a go). To use this function, simply open the FX stack (discussed in lesson 7) and add the *Scan cleaner* effect.

Once all drawings have been scanned, many users wish to delete, add or duplicate images. Sometimes, they also have to transfer complete images or layers from one project to another. It is this traditional, and yet vital, aspect that we will now examine in more detail.

• Insert, duplicate or delete one or several images

To duplicate or delete an image, simply go to the image of your choice in the timeline:



A right click on the timeline opens a contextual menu which allows you to duplicate or delete your image (above).

When duplicating, you will be asked to indicate the number of copies of the current image you wish to create. When deleting, you will be asked to confirm the operation.

* To insert one or several empty images in your animation, simply call up the same contextual menu. It should, however, be noted that the new empty images inserted will be placed just behind the current image. The other images of your layer will be shifted accordingly.

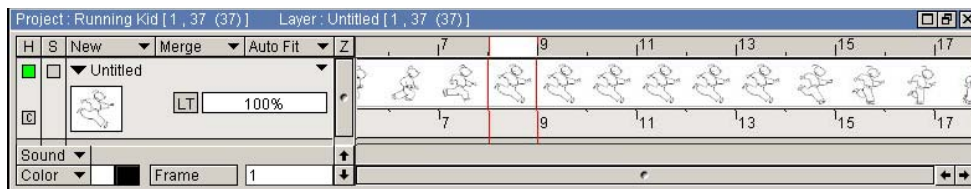
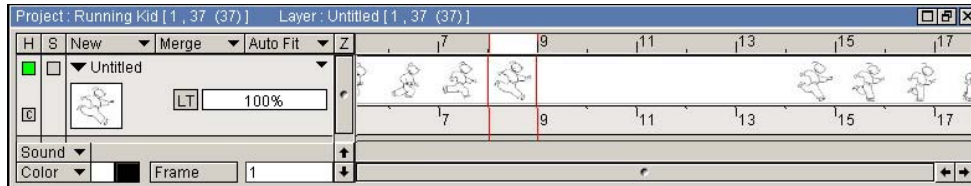


image 8 duplicated



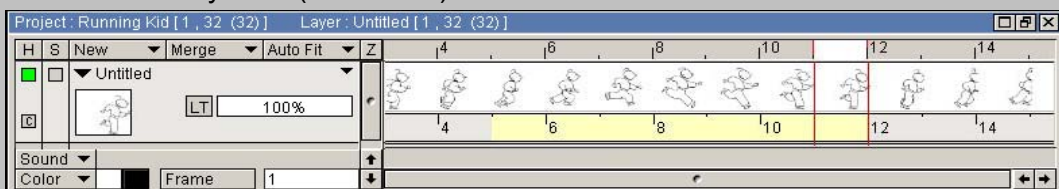
images inserted from image 8



The options *Insert*, *Duplicate*, *Delete images* are also available in the *Image* main menu.



It is possible to select several consecutive images of a layer with a simple click and slide on the left mouse button under the timeline icons. The images selected are then marked in yellow (see below).



It is therefore possible to duplicate or delete all images selected in the same way as described above.

• **Cut, Copy, Paste images**

When using the method described above, it is also possible to cut, copy and paste your images anywhere you wish.

This may be in the same layer, from one layer to another, or even from one project to another if you are working on several projects.

Once you have created a selection within the layer of your choice, the contextual menu displayed with a right click on the timeline allows you to cut or copy the images selected.

Finally, to paste your images, you must:

- select a current image which will be directly in front of the images you wish to paste in.
- select *Paste images* in the contextual menu of the timeline.



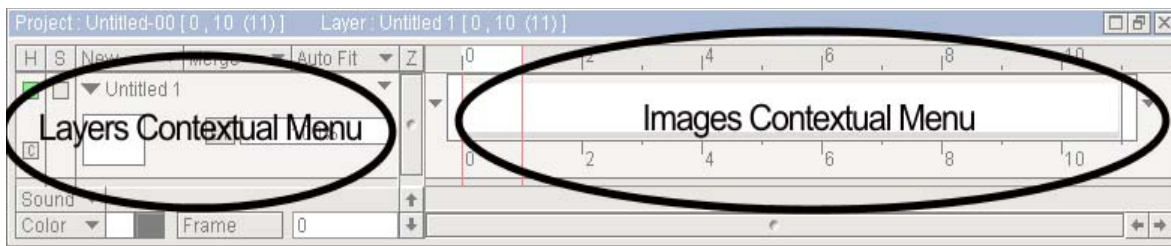
The options *Cut*, *Copy*, *Paste images* are also available in the *Image* main menu.

• **Cut, Copy, Paste layers**

The method employed to cut, copy and paste an image or animation layer from one project to another is the same as that used for images.

To select several layers, simply left click on these layers while pressing the [Ctrl] or [Shift] keys as explained in lesson 3. The layers selected then appear in yellow.

The layers contextual menu is located in the left section of the timeline, the images contextual menu is on the right side of the timeline (see below).

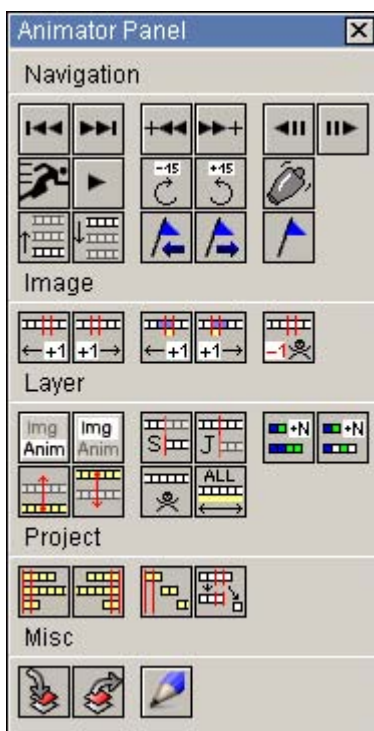


The *Cut*, *Copy*, *Paste layers* options are also available in the *Layers* main menu.



Before transferring the layers from one project to another, always ensure the resolution is correct, otherwise your images may be distorted.

• The custom panel icon



We have not yet discussed these windows which appear when the program is started. They comprise a wide variety of functions which will help you save a great deal of time when you start to get the hang of using the program. You would have noticed that many of the functions already discussed are present in the *Animator Panel*. It was, however, important for us to start by explaining the fundamentals of the program before introducing you to some shortcuts!

Amongst these, you will find the possibility to add images before or after the current image, split a layer (after the current image), delete an image or layer, convert an image layer into an animation layer and vice versa, define bookmarks (add/delete), etc.

Now we are going to take a closer look at these functions...

The first thing you will notice is that the panel is sub-divided into several sections: *Navigation*, *Image*, *Layer*, *Project* and *Misc*.



Everything in relation with the creation or modification of custom panels will be discussed in lesson 6 page 18.

Let's start at the beginning, i.e. with the *Navigation* icons:



: These 2 buttons offer direct access to the first and last frames of the current layer.



: These 2 buttons allow you to move from key to key (if your project has keys) by passing respectively to the previous or next keys.



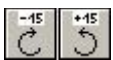
: These buttons are used to move to the last or next frame.



: Run a fast preview of the current animation.



: Play the animation.



: These buttons are workspace rotation shortcuts with respective angles of -15° and $+15^\circ$.



: Layer Shaker.



: Shortcut to select either the layer above the current layer or the one below it.



: Bookmark shortcut buttons used to go to the previous bookmark, next bookmark, or to *Activate/Deactivate a bookmark* in the current image.

In the *Image* section:



: These buttons are used to create an empty image in the current layer in front of the current image (first button) or after the current image (second button).



: These shortcuts are used to duplicate the current image by placing a new image before or after the current image.



: Delete the current frame.

In the *Layer* section :



: Buttons used to either convert an image layer to an animation layer, or to convert the current animation layer image into a single image in an image layer (If you select an image sequence, this button will create as many Image layers as the number of selected images).



: The first button is used to split the current layer into 2 separate layers after the current image. Working similarly to the previous button, if you select a sequence, the Split action will create 3 layers : one with the images before the selection, one with the selection and a last one with the images after the selection. The second button, as you may have already guessed, is used to join 2 layers to form a single layer. Ensure you select the layers to be joined correctly.



: These 2 buttons both open the same window in which you will be asked to enter a number of empty images to be inserted. The difference being that the first button will duplicate each image of the current layer the number of times specified in this window, whereas the second

button will insert empty images between each image of the layer. The number of images inserted depends on the number you enter in this window.

In the *Project* section :



: These buttons are used to move the current layer up or down a notch in the layers window.



: The first button simply deletes the current layer whereas the second automatically selects all frames in the current layer.



: These shortcuts are used to justify all layers selected either right or left.



: The first button is used to link the previously selected layers. The second button is useful when you wish to split your current project into 2 distinct projects after the current image.

Finally, in the *Misc* section:

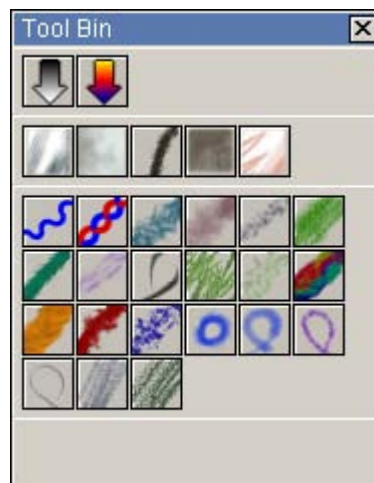


: These 2 buttons enable the use of a virtual stack in which you will store the current image with the first button. This image may then be used by simply pressing the second button. Note, on the one hand, that the last image added to the stack is always the first to be removed and, on the other hand, that the number of images stored in this virtual stack depends on the hard drive space available.




: This button opens the *Tool Bin* panel seen below.

The *Tool Bin* panel is the second custom panel present when you start the program for the first time. Located under the *Animator Panel*, it has the following form:




Although relatively basic at first sight, this panel is also very useful to store your brushes thanks to the first 2 buttons it contains.



The  is used to grab the current tool and place it in the bin under the two buttons. An icon is automatically created according to the tool to be used.

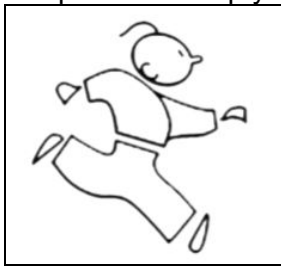


The second button  fulfils the same function as the first except that it grabs the tool together with the *A* and *B* colors active when the tool was grabbed.

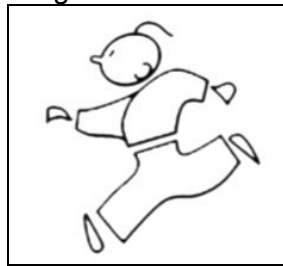
Now all you have to do is click on the icon of the tool grabbed in order to use it again. This proves extremely practical when you have specific drawing habits!
Furthermore, you are also free to create new panels for each type of tool and to save your favorite brushes which are easily identifiable!

• Flip an image

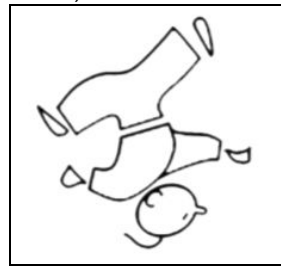
It is possible to flip your images around the horizontal, vertical or both axes.



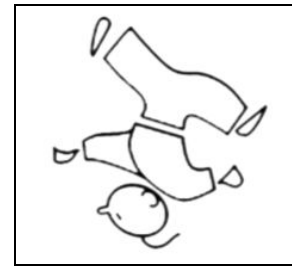
Original image



Horizontal flip



Vertical flip



Horizontal and Vertical flip

To do this, simply use the main menu options *Image > Modify > Flip (Horizontally, Vertically or Both)* an image or the selected images.

• Rotate workspace

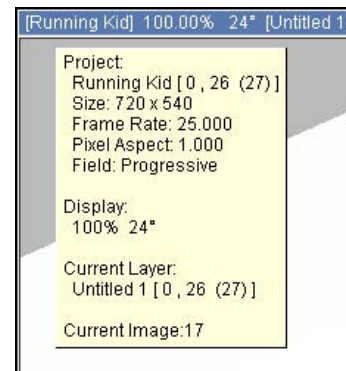
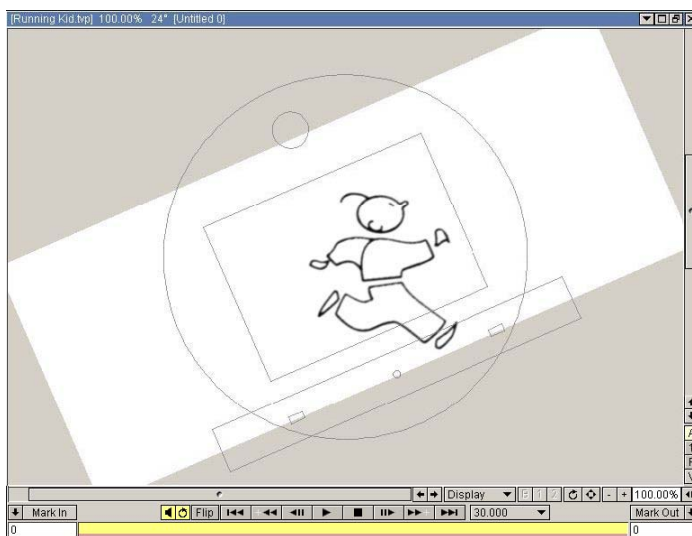
When working with pencil and paper, you often have to turn the page in order to touch-up the lines drawn.

This is also possible with TVPaint Animation thanks to the workspace rotation function.



This is done by left clicking on the button illustrated opposite in the current project window and then moving the mouse.

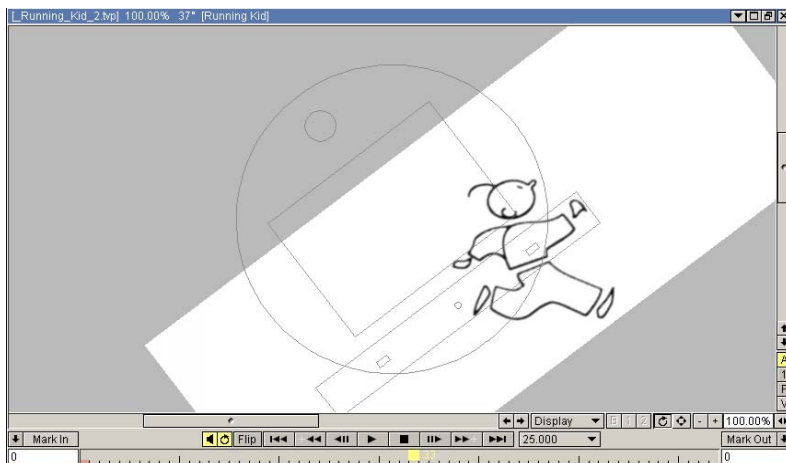
A right click on this button offers access to predefined worktop rotation values. You may also use the keyboard shortcuts [Ctrl+Shift+PageUp/PageDown].



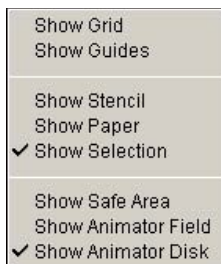
Above to the right you will find all information relative to your project (including the workspace rotation angle) which is accessible by placing the cursor on the project title bar.



It is possible to play your animation with a tilted workspace!

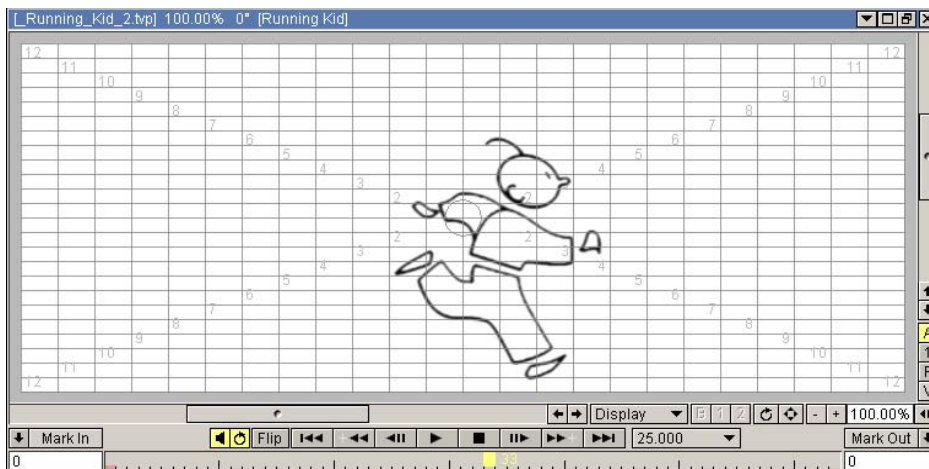


Note that workspace rotation always takes place from the center of your project window. If necessary, you may use the bottom and right-hand sliders of your project window to position the latter (see opposite).



When the workspace is rotated, it becomes visible in the form of an animation disk. If you do not need this function, it may be disabled in the *Display* popup menu of the current project.

Animation artists who prefer to use the *Animator fields* may use the same menu to select this option.



• Using the light table

The light table is a familiar tool to cartoon and animation artists. It simplifies drawing of the current image by offering a tone-down view of the images before and after the current image.



It is accessible with a left click on the light bulb icon in the tool bar or via the *Windows* main menu.

This is the way it looks :



- * Load the animation « Running Kid 2 » and only display the current layer.
- * Start by choosing the *color* option in the popup menu on the left-hand side of the *Light table* panel to display all frames in behind the current frame in the color indicated (default color red).
- * Then disable all the frames in front of the current frame that you do not want to see by clicking on the corresponding frame number.
- * Go to the frame in the center of the animation.
- * To enable the light table in your layer, click on the *LT* icon in this layer.

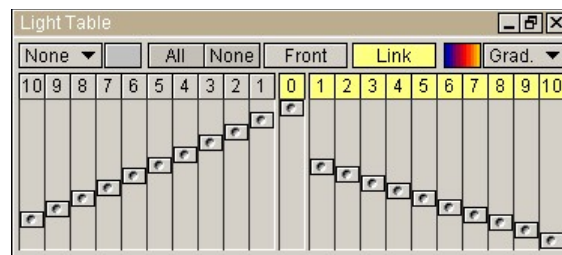
The following image will appear in the current project window:



The frames in our animation layer which precede the current frame are displayed on the screen. The frames closest to the current frame « in time » are the most visible and those furthest away « in time » are the most transparent.

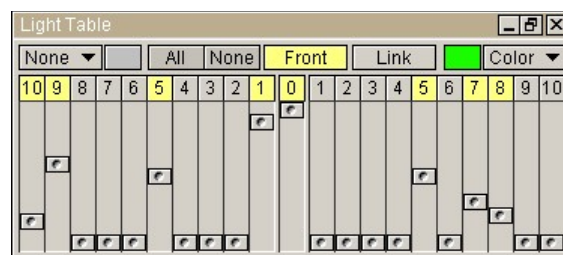
The light table is an extremely practical tool as it is also possible to display all frames after the current frame in time and for a given layer.

If you configure your light table as indicated below (choose the *gradient* option in the popup menu on the right-hand side of the *Light Table* panel), the frames after the current frame «in time» are displayed in a colored gradient, with more or less opacity depending on their position in relation to the current frame.



Now that you understand how this tool works, let's go back and take a closer look at its control panel:

- * The two popup menu allows you to display the images after and before the current image with : their original colors, a color or a gradient of your choice.
- * The two colored boxes near those popup menus allow you to select the colors on the screen or a gradient in a preset list to view the frames before and after the current frame.
- * The use of colors in this viewing mode is not obligatory. If you wish to keep the original image colors, select the option *none* (See below).
- * The sliders are used to manage the opacity level of frames displayed (the *Link* button avoids having to move each slider individually by linking them to one another).



- * The numbers are used to select the frames to be displayed.

- Using the light table

For example: in the panels shown as an example above, the number 5 to the right of the zero is selected and its slider is set in the center of the scale.

This means that the fifth frame after the current frame will be visible with medium opacity.

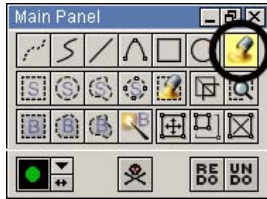
* The *Front* button allows to display the light table images in front of the current image.

* The buttons *All* and *None* allow to display all the images of the light table or no images.



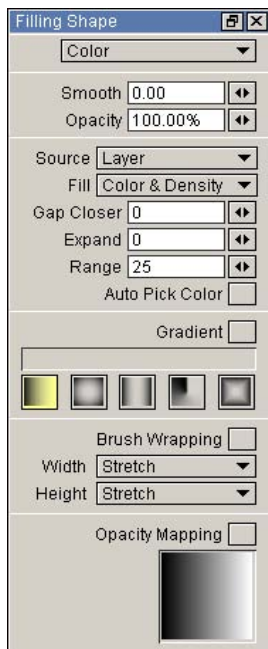
The number zero enables or disables the light table, its slider manages the global opacity of the table.

- Inking the footage



Our running kid is drawn on an animation layer.

We will now fill in the background with the *Floodfill* tool.



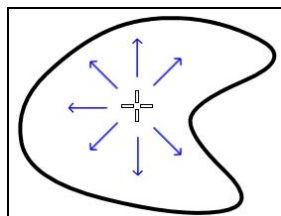
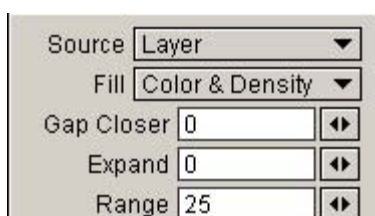
Once the *Floodfill* tool has been selected, various options are proposed in the *Filling shape* panel shown opposite:

- The color modes were discussed in lesson 2,
- The *Smooth*, *Opacity*, *Gradient* and *Opacity mapping* options were discussed in lesson 3.
- The *Wrapping brush* option was studied in lesson 4.

We will therefore only take a closer look at the second section of the *Filling shape* panel.

When using the traditional *Fill* option you choose a pixel in the current project window and then click on it. We refer to this pixel as the *origin pixel*.

The *Fill* option changes the color of neighboring pixels until it is prevented from progressing by the «border» pixels.



Opposite, the «border» pixels in black and the color dispersion from the origin pixel in blue.

The options indicated above allow you to choose the type of pixels to be used as a «barrier» for the *Floodfill* function (i.e. pixels which will not be modified after choosing this option).

Depending on your choice made in the *Fill* popup menu, the pixels considered to be «barrier» pixels will be those with:

- * a different color to the original pixel color
- * a different density

- * a different color and density
- * a different luminosity
- * a color identical to the *B* color.

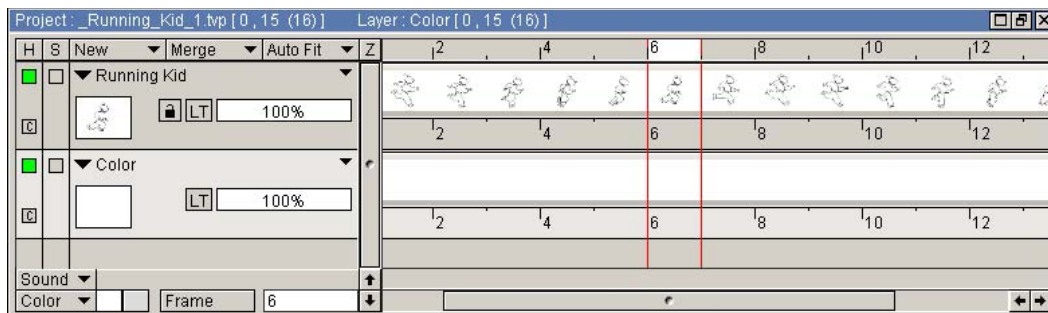
Depending on your choice in the *Source* popup menu, the pixels considered to be barrier pixels are located:

- * on the current layer (by default)
- * on all layers behind the current layer
- * on all layers in front of the current layer
- * on all layers displayed on the screen

It is therefore possible to color our running kid on a layer independent of its contours.

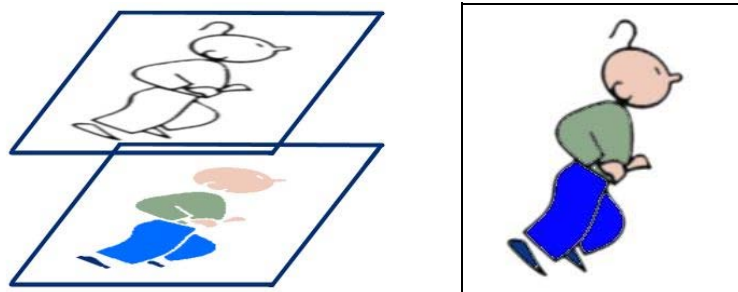
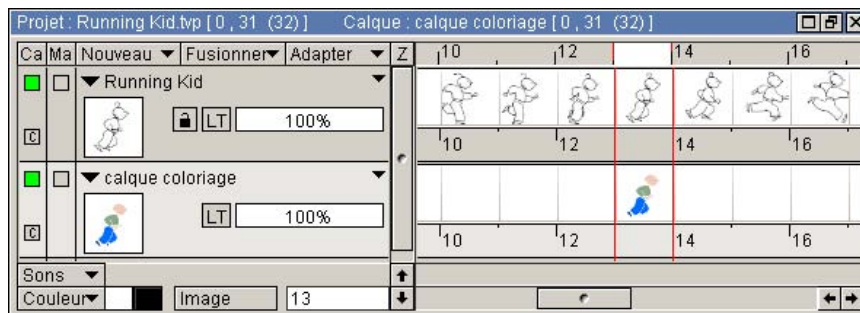
Let's take a look at the timeline below:

(in this case, the white pixels are transparent following a clean up of the animated footage)

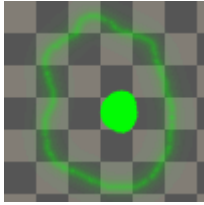


Go to the «coloring layer» located behind the «Running Kid» layer and choose the layer placed in front of the current layer to color the running kid in the «coloring layer» using the outline of the «Running Kid» layer.

It is then possible to obtain the following result:

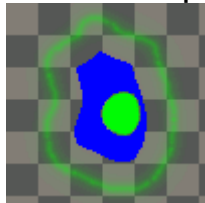


* The *Range* option enables you to numerically adjust the tolerance threshold for the aforementioned criteria (*Fill shape* menu).



For example, opposite, a green shape is drawn with an airbrush on a transparent surface with a checker background. The floodfill option applied in the center of the circle with the color blue provides the image results shown below.

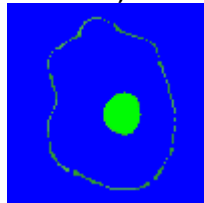
fill = color and opacity, expand = 0 (in all cases below)



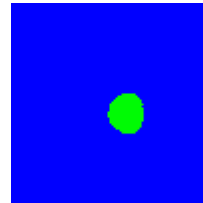
range = 0



range = 50



range = 100



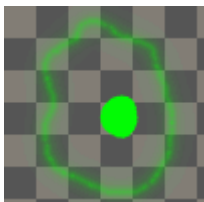
range = 200



range = 255

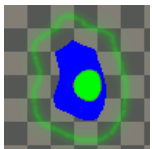
Progressively, it is noted that the tolerance to «border» pixels becomes less and less.

* The *Expand* option increases the size of the floodfill zone to the number of pixels of your choice. This enables you to limit the number of border pixels.

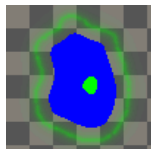


For example: you draw a green line with the airbrush. A left click with the *Floodfill* tool and the color blue and you will obtain the following results:

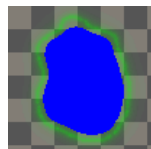
Floodfill = color and opacity, range = 0 (in all cases below)



expand = 0



expand = 5



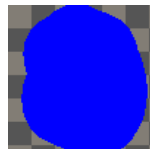
expand = 10



expand = 15



expand = 20



expand = 25

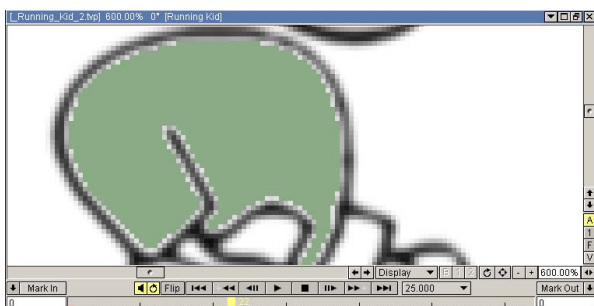


expand = 30

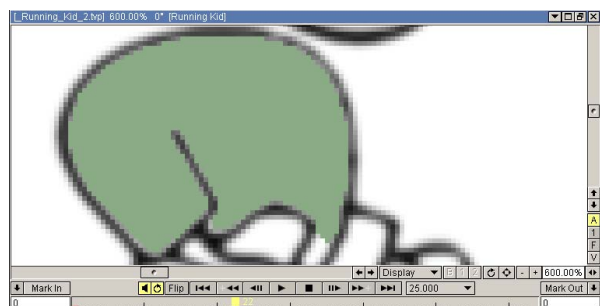


expand = 40

Combine the two options *Expand* and *Range* to avoid the result indicated below left and to obtain the result below right.



>>



* The *Gap* option allows you to avoid «overspills» when you try to fill a surface which is not completely closed. Low values are used in the case of «small gaps», whereas high values are used for larger gaps (it is worth noting that higher values sometimes result in a lower floodfill quality).

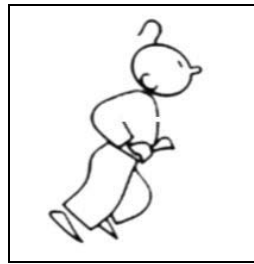
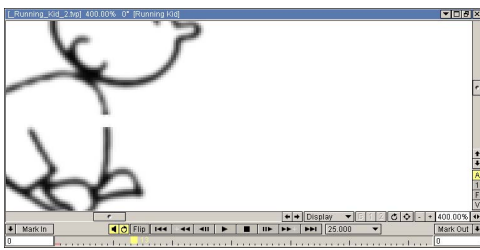
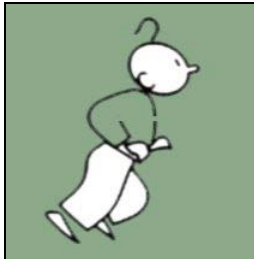
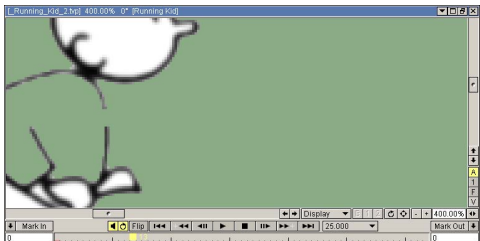
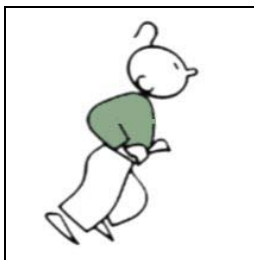
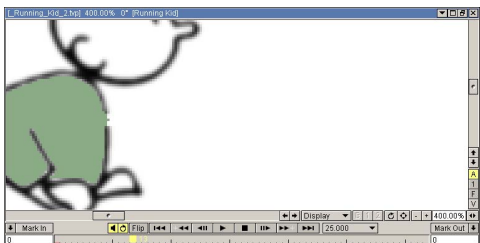


Image with «a gap»



Floodfill the character without *Gap closer*



Floodfill the character with *Gap closer*

Finally, you have noticed that there is also a box called *Auto pick color*:



This option will save a great deal of time as it allows you, when checked, to pick a color when you click and to place it when you release the button. Combined with a *Light table* which only displays the previous frame, you may pick the color from the previous frame and place it in your current frame.

• Create shading

Once you have finished coloring your running kid, you may add shades to the latter using the toonshading effects discussed in lesson 8.



toonshading



toonshading



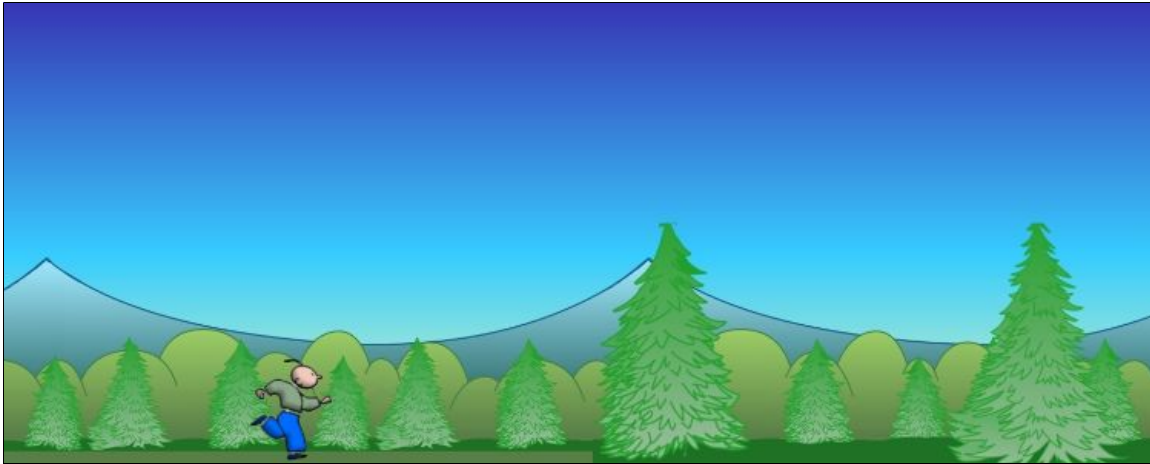
Drop Shadow

- Using the light table

• Camera movements

Now that your running kid is animated, it is possible to add a scenery behind him and to add camera movement (see below).

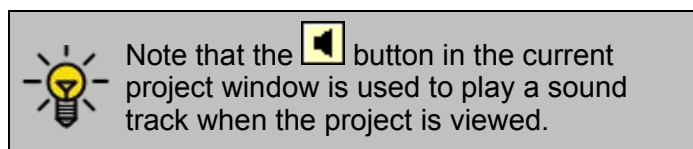
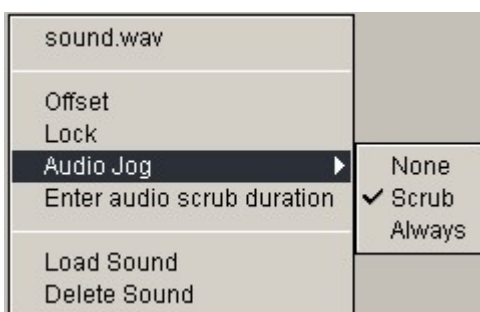
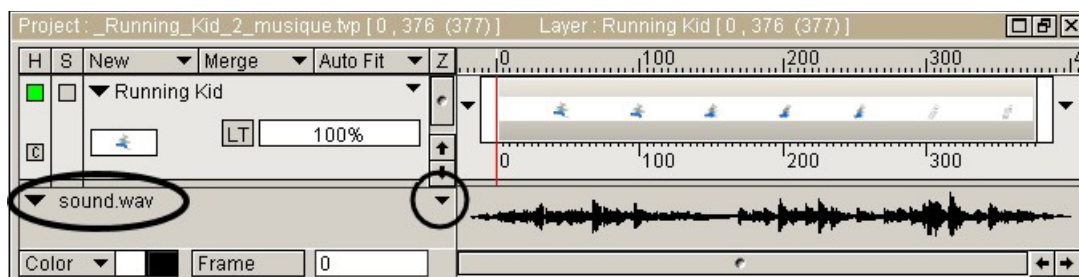
Two effects will help you with this: *Keyframer* and *Multiplane camera* (go to lessons 10 and 11 for details of these effects).



• Add music

The graphic design side of your project is now complete. If you wish, you may now add a sound track in order to give it that final touch.

The audio options are available in the *Project* main menu or in the *Sounds* menu of the timeline (encircled cursor ▽ below on the right).



Here are the various functions proposed by TVPaint Animation:

* *Load* a sound track to be included in your project.

On the left of the timeline, the name of the loaded sound file will appear and an other cursor ▽ will allow you to change the size of the track display :



Optimised display



Reduced display

- * *Delete* a sound track from your current project
- * It is possible to move the audio track along the timeline with a click and slide on the latter. This function allows you to adjust synchronization of your animation and sound track.
- * The *Offset* option enables synchronization using a numeric value
- * The *Lock* option prevents all movement of your sound track with a click and slide. Once you have completed your settings, this option will allow you to avoid any risk of handling mistakes.
- * If the jog audio is in *None* position, no sounds will be emitted when you move along the timeline.
- * If the jog audio is in *Scrub* position, the sounds will only be emitted if your movements along the timeline is carried out with a mouse or stylus.
- * If the jog audio is in *Always* position, the sounds will always be emitted when you move along the timeline, regardless of whether you use the mouse, stylus or keyboard arrow keys.
- * If a sound is emitted each time you change the current image in the timeline, the option *Enter the scrub audio duration* allows you to define the duration of this sound.
- * L'option *Saisir la durée du scrub audio* permet de définir la durée du son qui sera joué pour chaque image lorsque vous naviguerez dans la ligne de temps.

Lesson 6

Other TVP Animation features

In this lesson, you will:

- Use the clipboard.
- Use the spare image.
- Finish studying the drawing tools.
- Use cutouts and selections.
- Modify the workspace.
- Handle customized windows.

Clipboard and spare

• The clipboard



The clipboard menu is located in the *Edit* main menu and comprises four useful options which, in a way, serve as an interface between TVPaint Animation and your other software packages.

* The *Copy brush to clipboard* option makes the current brush available for other software packages installed on your computer.

* The *Copy image to clipboard* option makes the current image displayed in your project (including the background) available for other software packages installed on your computer.



Wordprocessors, spreadsheets and digital creation software packages generally use a function referred to as *Paste buffer content* or *Paste* which you simply have to call up in order to use your brush or image.

When you use the [print screen] key on your keyboard or when you use the *Copy* option (to be understood «copy to buffer») in the program, it is possible to recover the image stored in TVP Animation :

* The *Get brush from clipboard* option renders the current image stored in the buffer memory of your computer available as current brush.

* The *New layer from clipboard* option creates a new image layer from the clipboard.



For the latter option, ensure the size of your current project is adapted to that of the image stored in the buffer memory, otherwise the image may be cropped.

• The Spare image

It is possible to virtually store an image of the current layer displayed on the screen in order to use it at a later time (mixing options) or to use specific drawing modes (*Merge* or *Impressionist* modes). This image is referred to as *spare image*.

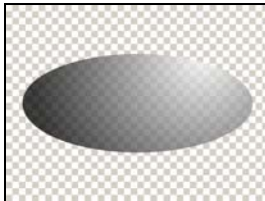


The following examples will provide a better understanding of this notion.

Above you will find the options available in the *Edit* main menu > *Spare*.




Spare



Current image

Save the TVPaint logo opposite as a spare image (main menu *Edit > Spare > Copy to spare* or shortcut [Shift+J])

Delete it from the current layer (standard delete tool: ) , then draw an ellipse with an opacity of 75% in its place.

* The option *Swap spare* (shortcut [J]) returns the TVPaint logo to the screen and replaces the spare image with the ellipse.

Using this function again will redefine the TVPaint logo as spare and will display the ellipse in the center of the window.

* Depending on your selections in the popup menu, the *Spare mixer* option offers the following results:



* Finally, the option *Delete spare* is used to delete the spare image.



If you are working with several projects at the same time, note that each project has its own spare image.

• The *Merge* drawing mode



The *Merge* drawing mode is only available once a spare image has been defined.

It may only be used with the tools airbrush, penbrush, mechanical pencil, pencil and wetbrush.

It is used to draw the portion of the spare image corresponding to the zone traveled by your stylus on the screen.

• The *Impressionist* drawing mode

This drawing mode will be discussed in the *Special brushes* section of this lesson. It also requires the use of a spare image.

To perfectly master the drawing tools.

The two tools indicated below are very useful to warp the images and give the appearance that they were hand-drawn.

• The warpbrush

The warpbrush may be used to give the impression that a drop of water has fallen on the image. Combined with certain types of paper, it gives the impression that you are looking at the image through a window. There are two types of warps: warp out and warp in (see below).



Warp in at top
Warp out at bottom



Original image



Use of this tool on an image

• The *Special brush*

The special brush functions differently according to the drawing mode selected.

It shifts the image pixels:

- * uniformly in *Shift* mode,
- * degressively in *Smear* mode,
- * by adding color in *Mix* mode ,
- * by taking into account the spare image pixels in *Impressionist* mode.

Below you will see the results of the first three modes from top to bottom.



In each case, a line was drawn from left to right.

* *Mix* mode (the A color is red)

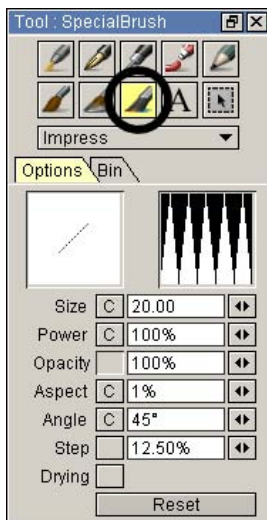
* *Shift* mode

* *Smear* mode

As indicated above, the *Impressionist* mode requires a spare image in order to work. When tracing a line in this drawing mode, the current image is deleted in order to make place for a spare image and the latter is smeared in the direction of the line traced.

This creates quite an eye-catching effect when working with a small tool and with « dotted » *Profiles* and a *Ratio* close to 0% (see *Special brush* panel below).

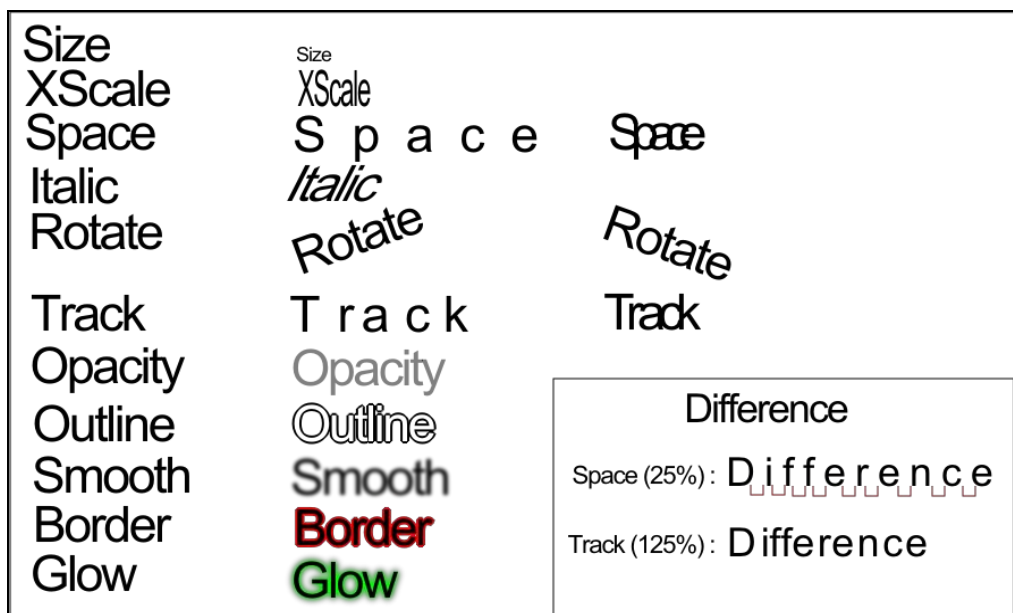
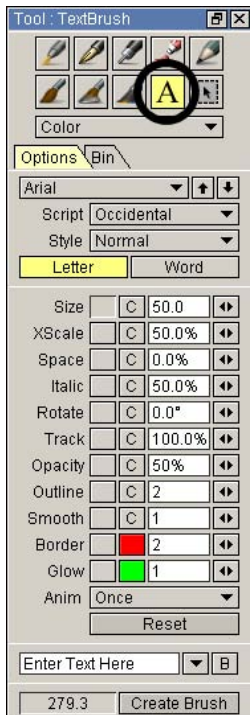
When required, the current image used as spare image may also provide a very original artistic effect.



Opposite an illustration in impressionist mode with the parameters panel together with the current image = Spare image.

• The *Text* tool

The *Text* tool is used, as its name implies, to generate text brushes.





Here you will find a general introduction into how to add a text to your images:

- * Enter the text of your choice in the text field at the bottom of the panel.
- * Select the font of your choice.

- * Select *Letter* mode or *Word* mode depending upon whether you wish to display the entire content of the text field or simply one letter at a time.
 - * Modify the parameters as you require.
- All changes to the numeric fields or using the mini-sliders will be taken into account and displayed interactively on the screen for several seconds in order to allow you to view the result of changes and settings made.
- * Now all that is left is to apply the text to the layer in the location of your choice.

Below you will find a detailed description of the parameters at your disposal for this tool:

- * The first popup menu is used to select the font best suited to your project amongst those installed on your operating system. The two arrows   are used to quickly scroll through the list of fonts available.
- * The popup menus *Script* and *Style* are used to select the character type to be used (occidental, oriental, Greek, etc.) and their style (bold, italic, underlined ...).



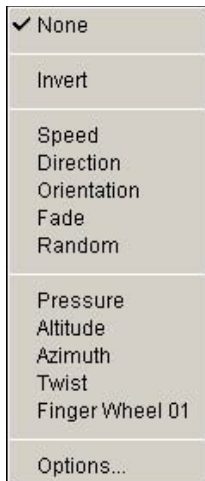
The fonts used by TVPaint Animation are of the format
« .ttf » (True Type Font) for PC.

- * The *Size* variable defines the font size in pixels.
 - * The *XScale* variable manages the font width.
 - * The *Space* variable defines the space between characters (a negative value overlaps the characters).
 - * The *Italic* variable modifies the inclination applied to characters.
 - * The *Rotate* variable is used to increase or decrease the angle formed between the text and the horizontal axis.
 - * The *Track* variable adapts the space between characters, but this time, in proportion to the size of each letter in the text field.
 - * The *Opacity* variable defines the text transparency.
 - * The *Outline* variable creates an outline of varying thickness around the letters, but renders the interior of the letters transparent.
 - * The *Smooth* variable applies a blur to the letters.
 - * The *Border* variable creates an outline of varying thickness around the letters.
 - * The *Glow* variable creates luminous halo around the letters.
- The border and glow may be of any color of your choice.
- * If the *Letter* button is selected, an *Anim.* (Animation) popup menu is present: you may then choose to apply the letters in the text field one only, in a loop, randomly or in ping-pong.
 - * If the *Word* button is selected, a *Step* variable is present: this variable functions in the same way as for standard drawing tools (see lesson 2).
-
- * The *Reset* button resets all settings.
 - * The « ▼ » button provides access to the last phrases or words entered in the text field.
 - * The *B* button opens a larger text field in order to work with longer texts.
 - * The number in the bottom left hand corner of the panel represents the text width in number of pixels (a width which is dependent on your settings).
 - * The *Create brush* button allows you to transform your text into a brush and switch to the brush settings in the tool panel.



In addition to the settings via the mini-sliders, do not forget to tick the boxes to take these variables into account.

• Connections



Throughout this lesson, we have modified the size, power, opacity, etc. of our tools and you have certainly noticed the letters located in a box left of the corresponding numeric value.

These are the *Connection parameters*. The corresponding contextual menu is accessible by clicking on the box.

Most graphic tablets available on the market are sensitive to pressure, stylus travel speed and inclination, etc ...

TVPaint Animation takes all these advantages into account and it is therefore possible to imitate the specific aspects of drawing by hand.

Here are some examples:

- * If you connect the *Size* of the pen tool with the stylus *Travel speed*, the thickness of the line drawn will be thicker the faster you move your stylus (to do this, select *Speed* in the *Size* connection menu).
- * If you connect the stylus *Pressure* to the airbrush tool *Power*, the more you push down on the tablet with the stylus, the brighter the color will be on the screen.
- * If you connect the *Opacity* of the wetbrush tool to the *Altitude* of the *stylus*, inclining the stylus will render the aquarelle almost transparent.

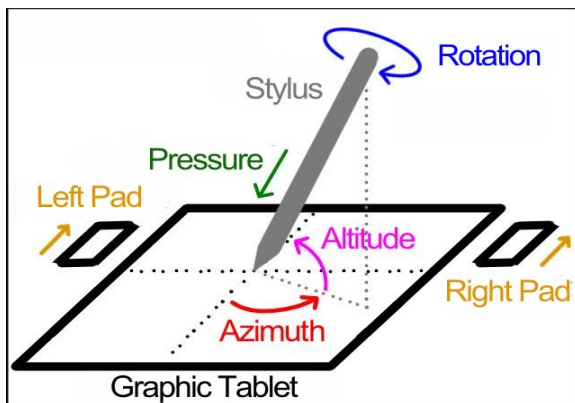
A wide variety of setting combinations are available. Below we will describe each of them. It is then up to you to make the connections according to your needs and creative spirit, don't hesitate to experiment!

The first set of parameters applies to pointing peripherals (mouse, trackball, stylus) :

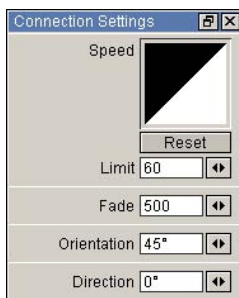
- * *None*: no connections.
- * *Invert*: invert the effect of the connection chosen.
- * *Speed*: the tool connected will travel at a speed proportional to the stylus travel speed.
- * *Direction*: the tool connected will travel in the same direction as the stylus.
- * *Orientation*: the tool connected will have an opacity which changes according to the stylus inclination.
- * *Fade*: the tool connected will fade as the line drawn progresses.
- * *Random*: when using the *Random* option, the tool connected will vary randomly.

The second set of parameters applies only to stylets and graphic tablets:

- * *Pressure*: the pressure of the tool connected will vary proportionally to the pressure applied to the stylet on the tablet.
- * *Altitude*: the altitude of the tool connected will vary proportionally to the angle formed by the stylus inclination on the tablet.
- * *Azimuth*: the azimuth of the tool connected will vary proportionally to the angle formed between the stylus projection on the tablet and the vertical plane.
- * *Fingerwheel left/right*: the tool connected will vary according to these options when using the right or left fingerwheels on your tablet.
- * *Rotation*: rotation of the tool connected will vary when you roll the stylus between your fingers.



Opposite you will find a summary diagram of the connections indicated above. Note that some tablets do not offer all these options. For optimum results, TVPaint recommends the use of Wacom Intuos 3 tablets!



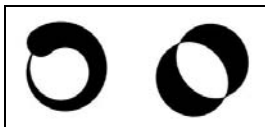
The speed, fade, orientation and direction parameters are adjustable.

Orientation angle, direction angle, speed curve and fade speed may be modified in the *Connection options* window (select *Option* in the connections contextual menu shown on the previous page).

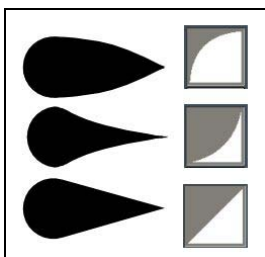
Below you will find some examples to illustrate the effects:



Size connected to *Fade* for various fade values.



Size connected to *Orientation* (right drawing).
Size connected to *Direction* (left drawing).

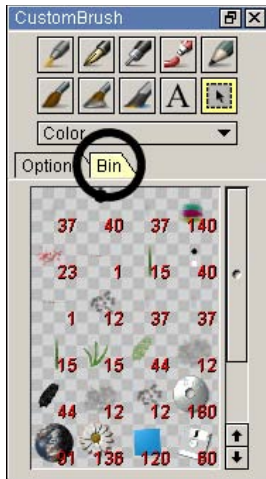


Size connected to *Speed* using various curves.
All three lines were obtained by increasing the stylus travel speed (i.e. with progressive acceleration).



The *Text* tool with *Rotation* connected to the stylus *Direction*.

• The drawing tool panel *Bin tab*



Two tabs are available for each drawing tool:
The *Options* tab you have already seen and the *Bin* tab.

Regardless of the tool you are using, you may save the settings applied (*Size, Power, Opacity, Angle, Profile, Connections, Gradient, Mode, etc.*) in order to use them again later.

Right click on the *Bin* tab window to check whether any predefined settings exist and to use them or create new settings if you feel they are required.

At this point we will study the *Bin* tab of the *custom brush* (the same applies for all other tools).

Right click on the empty zone of the *Bin* tab to:

- * either *Add* the current brush to save it.
- * or *Get* a brush of your choice to be saved.

In both cases, a miniature of your brush appears under the tab.



The numbers next to the brushes indicate the number of animated brush images or size of the brush.

Right click on the brush in the tab to:

- * *Add* the current brush to the bin
- * *Get* the brush you just clicked on as current brush
- * *Swap* the current brush with the one you just clicked on
- * *Export* the brush
- * *Delete* the brush from the bin



Your settings will be saved if you click on *Save this configuration* when you leave the program. If you reset TVP Animation's configuration, your settings will be lost.

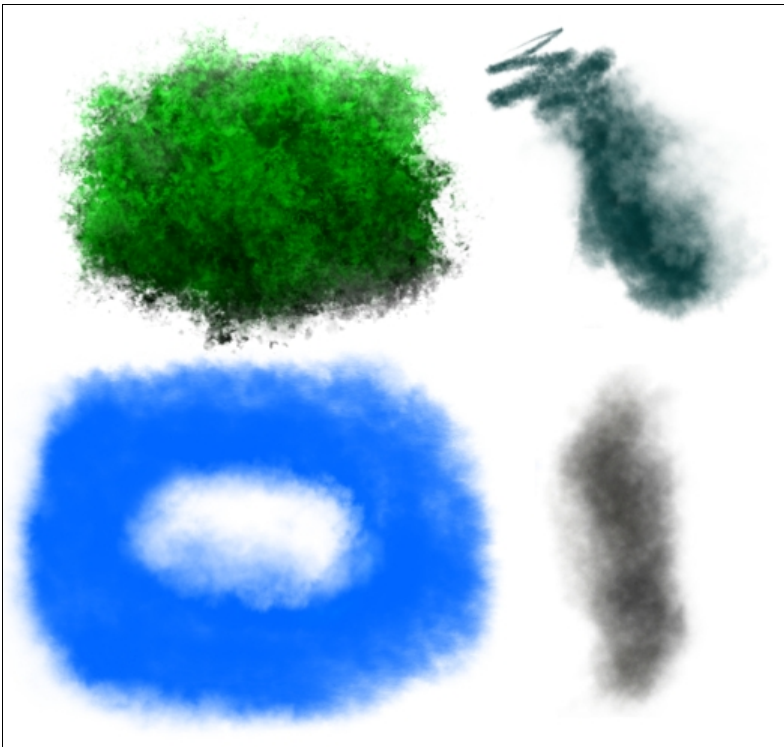


Opposite you will find an example of the predefined animated brushes available in TVPaint Animation.

• Use of the brush as a drawing tool

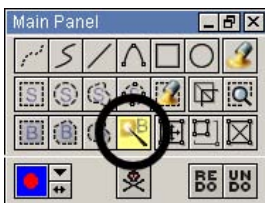
The use of predefined brushes and the connection parameters described above may produce spectacular results:

- * Tree leaves (*Luma stamp* mode with green *A* color and black *B* color and a randomly selected brush angle).
- * Clouds (*Alpha stamp* mode with blue *A* color, *Angle* randomly selected and *Opacity* of the animated brush connected to the stylus pressure).
- * Smoke (*Size* of the brush chosen in *Random* mode, *Opacity* connected to a *Fade ...*).
- * Ink (*Luma stamp* mode with *A* and *B* colors to choice, *Size* connected to stylus *Azimuth*, *Angle* chosen in *Random* mode).
- * etc ...



Selections and cutbrushes

• Use the magic wand cutbrush



In lesson 4 we saw that it is possible to cut a rectangular, polygonal or freehand brush. It is also possible to use the *Magic wand* cutbrush.

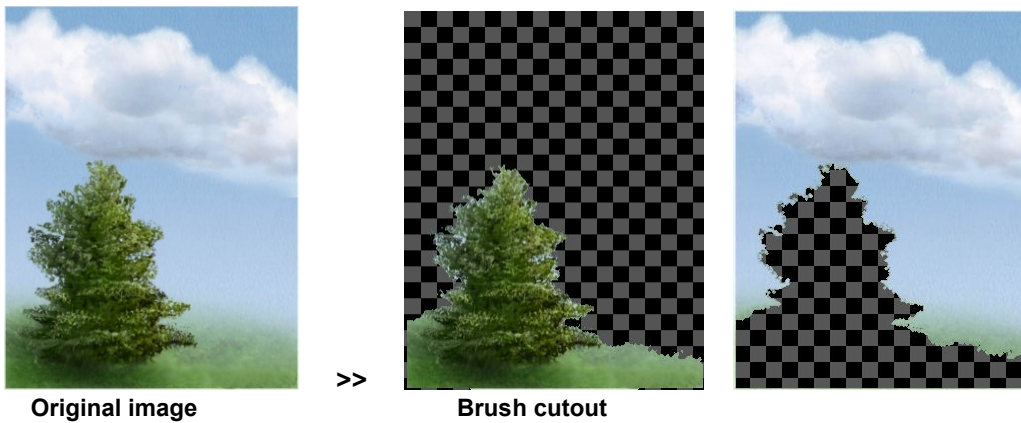
Let's take a closer look at this function: don't worry, it's not sorcery!

When using the *Floodfill* tool, the boundary points (not filled in) are defined and the other points are colored (see lesson 5: adjustment of shape settings).

The same applies to our magic wand except that the «floodfill» area of the image becomes the current brush.

The current brush may therefore take all kinds of shapes.

For example, by adding the *Expand* and *Range* parameters, it is easy to obtain the following two brushes.



• Working on a specific area on the screen

Selecting a section of the screen will allow you to work without changing anything in the area of the screen not selected.

For example, in the image below we have selected the cloud. Any drawing with your stylus will affect only the cloud.



You may also select a section of a layer and then make the modifications in another layer, for added safety.



If you have selected an area, using the *Delete image* icon in the main panel will only delete the selection.
The choice of a color channel for working also only affects your selection.

• The various types of selections



Five icons in the main panel are used to enable these selections.

From left to right:

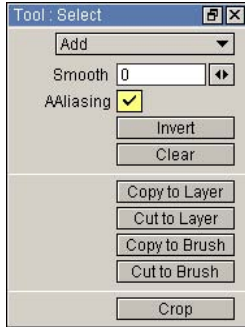
- * Rectangle select
- * Circle select
- * Freehand select
- * Spline select (refer to lesson 2 for further details about this type of spline)
- * Select with *Magic wand*



Regarding the function of the magic wand, refer to the section *Shape setting* in lesson 5.
In the present case, we create selections instead of filling surfaces, otherwise the mode remains identical...

• Complex selections and brush creation

That's not all, the window of the *Selection* tool opposite extends the range of possible actions.



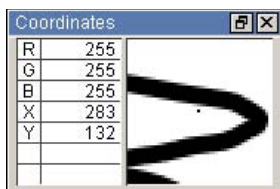
From the popup menu:

- * The *Add* and *Sub* options may be used to create complex selections: the *Add* option allows you to add a new selection to the previous selection while the *Sub* option, as the name implies, will remove the new selection from the previous selection. You may obviously combine various *Selection* tools with each other in order to obtain the required selection.
- * The effect of the *Replace* option is that drawing a new selection will automatically replace the previous selection.

- * The *Smooth* option works in the same way as that presented in lesson 3 to draw a filled rectangle.
- * When checked, the *Anti-Aliasing* box smoothes the contours of the future selection.
- * The *Invert* button inverts the current selection.
- * The *Clear* button deletes it.
- * The four buttons which follow are used to copy or cut the pixels contained in the selection and incorporate them in a new layer or new brush (animated brush or animation layer, if several images were selected previously).
- * The *Crop* button is used to create a new project containing only the contents of the selection. Your new project will contain an image or animation layer depending on whether you have selected one or several images in the current layer. If your current project contains several layers you will find the same number of layers in the new project.

Precision drawing

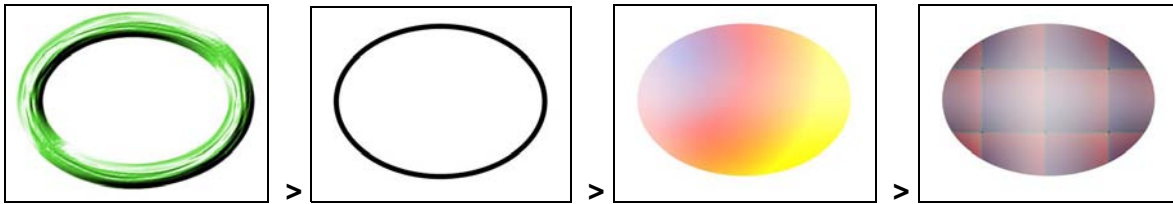
• The coordinates



The *Coordinates* window is accessible via the *Windows* main menu or via the icon of the tool bar shown opposite.

- * left you find the coordinates in pixels of the pixel pointed with the mouse as well as its RGB values.
 - * right you find a small zoom box with a central point.
 - * if you trace a rectangle, the two empty lines will indicate the height and width of the latter in pixels.
- There you will also find the length of the two half-axes if you draw an ellipse.

• The *Re-apply* option



This is a situation that is often encountered:
you have drawn an ellipse on your screen...

But, you have used the wrong tool: you used the *Oilbrush* instead of the *Penbrush*. The *Undo* option allows you to go back (the ellipse drawn with the *oilbrush* will disappear), but you may have trouble drawing the ellipse again with the same precision...

Even when having noted the exact coordinates of the ellipse (center coordinates and length of the two half axes), it may be tiresome to reproduce exactly the same drawing on the screen.

The *Re-apply* option (keyboard shortcut [Enter]) was developed to counter this type of problem and facilitate your task...

When your ellipse is deleted, change the tool and adjust the parameters and colors. Then select the *Re-apply* option in the *Edit* main menu.

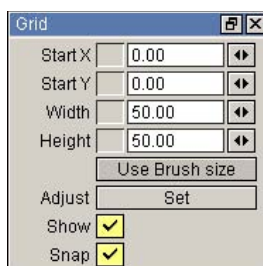
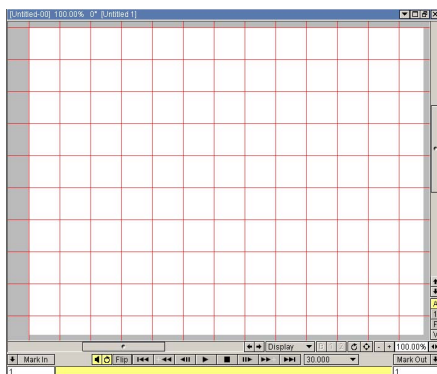
A new ellipse is drawn.

You may even do more than that as, before using the *Re-apply* option, you have the following choices : change the layer, select several layers, change the type of line to work with filled shapes... (see the examples above...)

It is even possible to define selections or cut animated brushes from the original drawing !

• Use the *Grid*

The grid is, in fact, used a kind of plotting paper the parameters of which may be set and the basic unit of which is the pixel.



Using a grid is very useful when :

- * tracing parallel lines,
- * placing a brush at regular intervals on the screen,
- * aligning a text along a vertical line,
- * etc.

As you have probably guessed, this option is also accessible in the *Tool bar* and the *Windows* main menu. Once enabled, it does not affect your project itself, but the way you will draw (just disable the option to make the red grid disappear...).

* The *Grid* panel which is accessible with a right click on the *Grid* icon in the *Tool bar* or via the *Windows* main menu is used to set the width and height of the boxes (use the numeric fields of the same name or the mini-sliders).

* The *Start-X* and *Start-Y* numbers will help you shift the grid in the surface defined by the work area.

* If required, you may adapt these four values in such way as to recover the image using the current brush and the *Brush size* button.

* The *Set* button is used to interactively define the grid parameters by drawing a dummy rectangle in the current project window.

* The *Show* box displays the grid when it is checked.

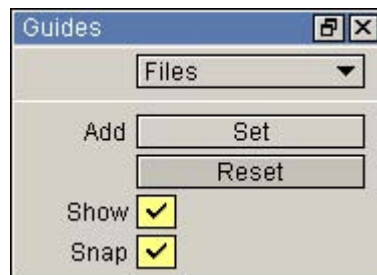
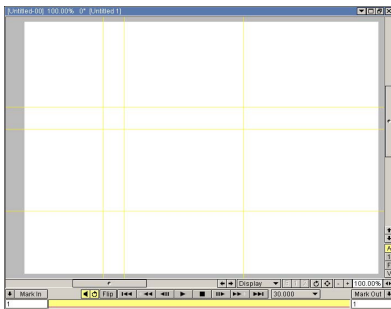
* The *Snap* box renders the grid magnetic. This option imposes that the user may only use the red pixels at the intersections of the horizontal and vertical lines. This works as if the cursor on the screen were magnetically attracted to the grid intersections.

• Use the guides

The purpose of the *Guides* of TVPaint Animation is to create customized and magnetic marker points in the current project window.

When using the guides it is very easy to trace concentric circles or parallel lines.

To display the latter, left click on the *Tool bar* button shown below (a right click will open the window for guide parameter setting).



The following options are available in the guide parameter setting window:

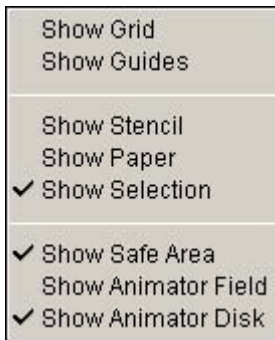
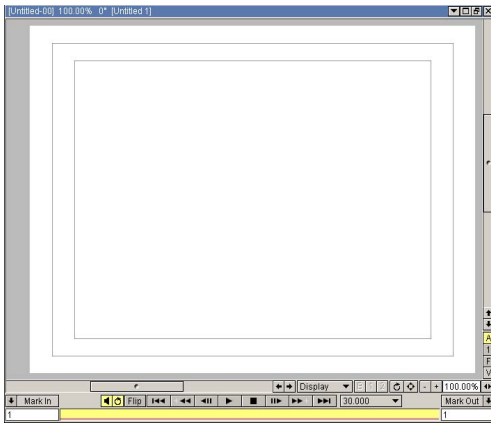
- * Once the *Set* button is selected, any click with the mouse in the current project window will generate a horizontal and a vertical line. It is therefore possible to create « a grid with irregular graduations » and to impose the line intersection points as the only points to be used.
- * The *Reset* button is pressed to go back to a project window without guides.
- * The *Show* box, when checked, displays the guides.
- * The *Snap* box imposes the yellow pixels at the intersections of the horizontal and vertical lines as the only pixels to be used. This works as if the cursor on the screen were magnetically attracted to the guide intersections.

The *Files* popup menu enables saving and loading of your guide positions.

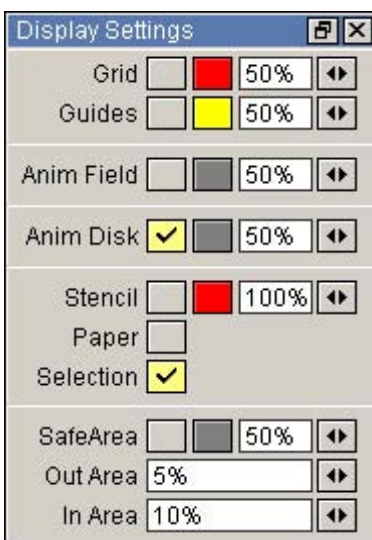
• The Safe Area

The *safe area* may be displayed in the current project window: it may be enabled via its *Show* popup menu (see below).

It is therefore possible to recover the markers normally used in the film industry: the action and text safe areas allow viewing of what will effectively appear on the TV screen (i.e. the Safe Area).



• Display settings

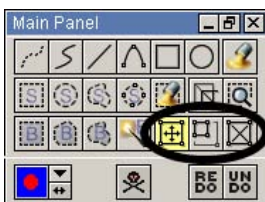


The *Display settings* window is accessible via the *Windows* main menu and is used to choose the color and opacity of the guides, stencils, safe area, animation disk, etc.

You may also enable display of the stencil, paper and selections when using the latter.

The safe area has some additional parameters: position of the action and text safe areas may be set in percentages.

The transformation tools



It is possible to transform all or part of several images using the three tools shown opposite: *Panning*, *Transform* and *Wrap*.

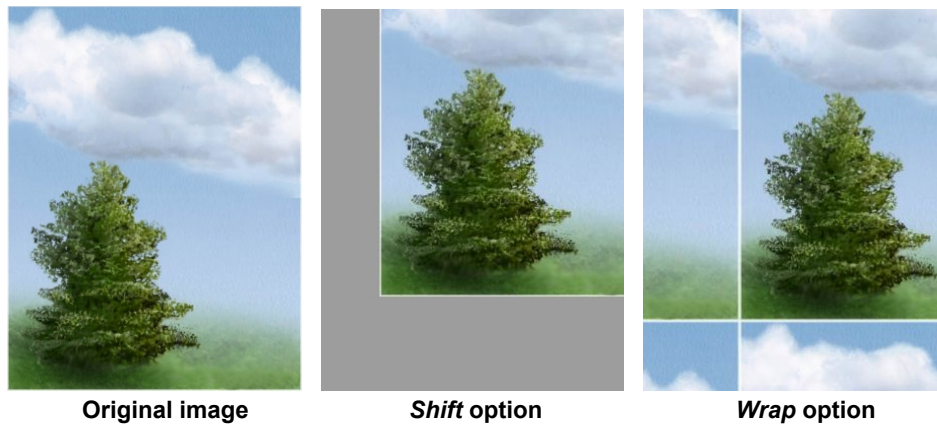
• The *Panning* tool in the main panel



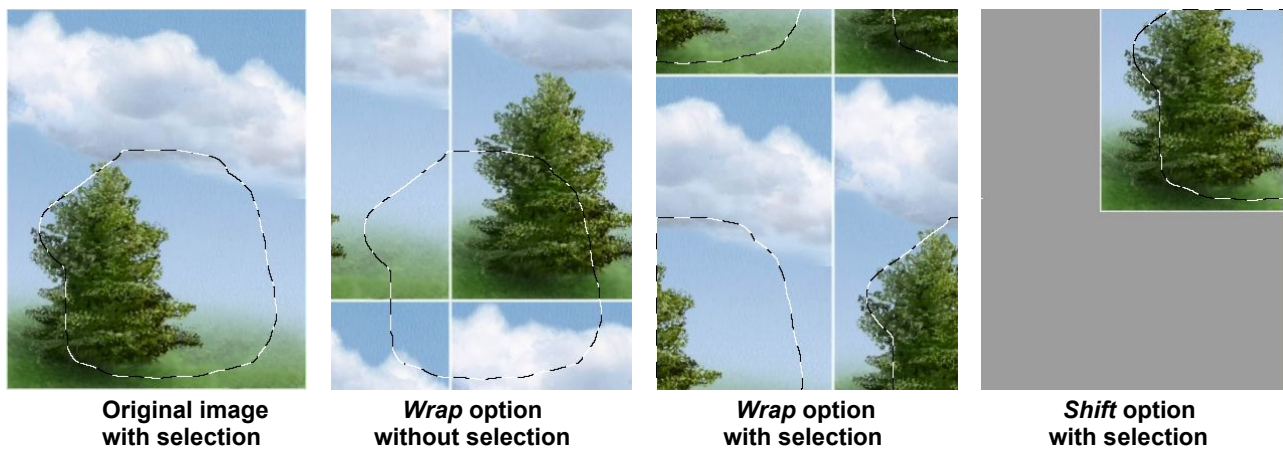
The *Panning* tool is used to shift an image or a selection on the screen with a left click + slide of the mouse.

The *Wrap* option enables you to « wrap » the image (see below).

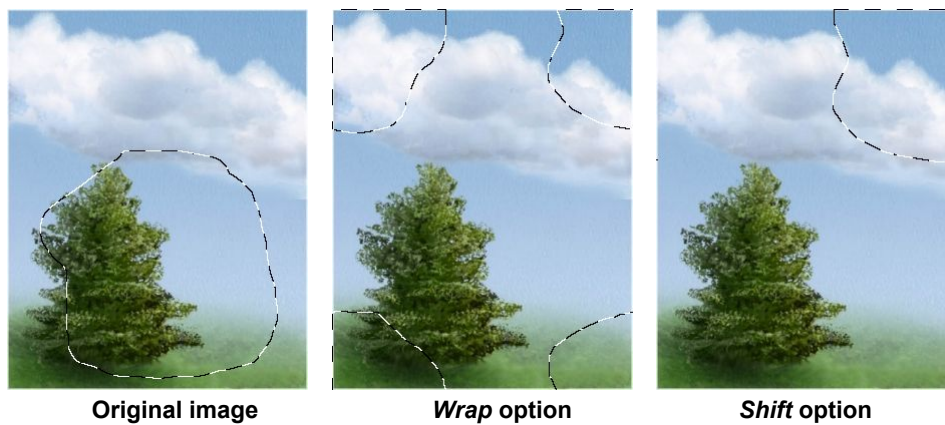
* If you check the *Apply to image* box, the current image will be taken into consideration when shifting (see below).



* If you check the *Apply to selection* box as well as the *Apply to image* box, the current selection will be taken into consideration when shifting (see below),

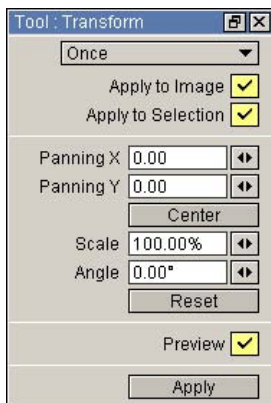


* If only the *Apply to selection* box is checked, the image will not change but only the selection.



* If the *AAliasing* box is checked, the image contours are smoothed.

• The *Transform* tool in the main panel



The *Transform* tool in the main panel is used to shift, increase or reduce the image.

Below you find a detailed description of the options proposed in this panel:

* The popup menu allows you to either *Shift* the image or to *Fill* the screen with the current image.

* As with the *Panning* tool, it is possible to shift the image and/or the selection (see examples below).

* The *Panning X* and *Panning Y* variables are used to translate the image on the screen. The *Center* button is used to re-center it.

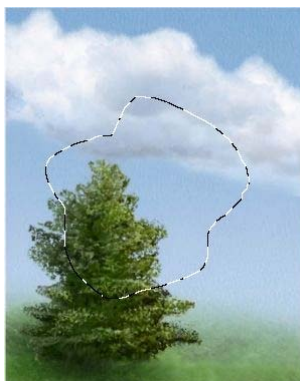
* The *Scale* variable is used to modify the size of the image (increase or decrease).

* The *Angle* variable is used to rotate the image.

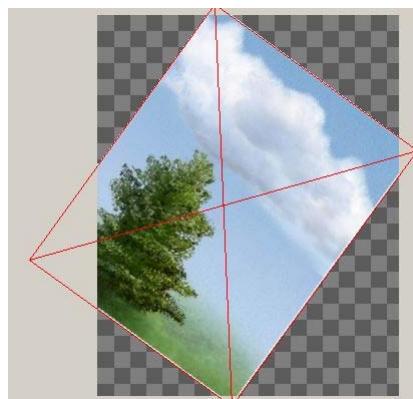
* The *Reset* button resets the settings.

* The *Preview* box enables interactive viewing of the previous parameters on the screen.

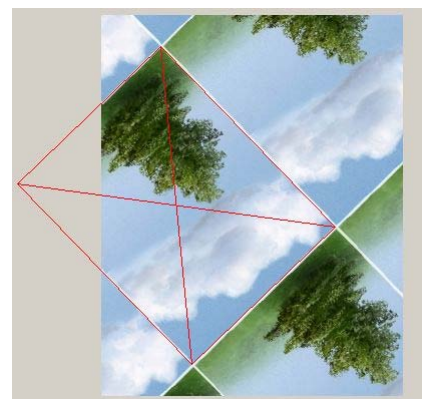
* Once satisfied with the settings, the *Apply* button is pressed to finish the operation.



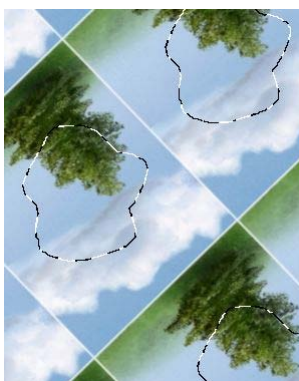
Original image



The *Transform* tool in *Shift* mode



The *Transform* tool in *Fill* mode



Panning tool applied to image and selection.



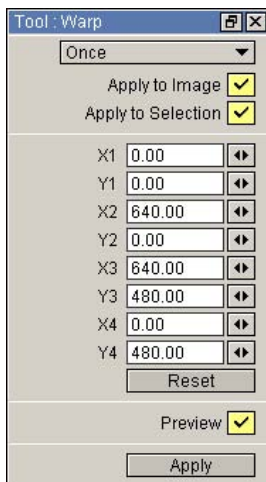
You may also work directly on the screen using the mouse:

- * left click and slide to modify panning.
- * right click and slide to modify size.



To shift all images of a layer, first select them all. Use the keyboard shortcut [Ctrl+S] or the contextual menu in the timeline.

• The *Wrap* tool on the main panel



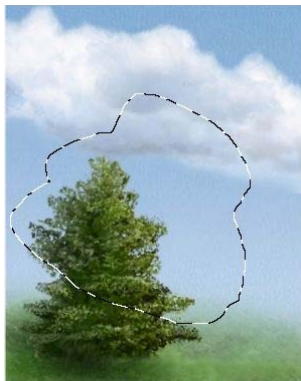
As the name implies, this tool is used to put the image or current selection into perspective.

A modification of the four corner coordinates of the image is sufficient to obtain a convincing effect.

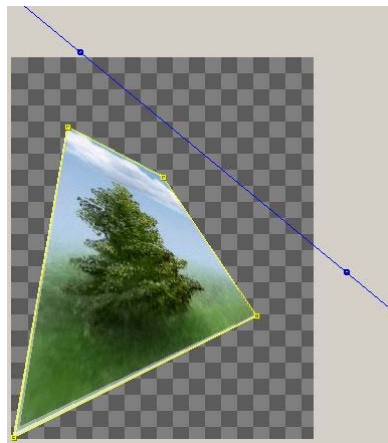
You may or may not fill the screen with the current image (see examples below).

Here again, the same system as above is used (*Preview* then *Apply*).

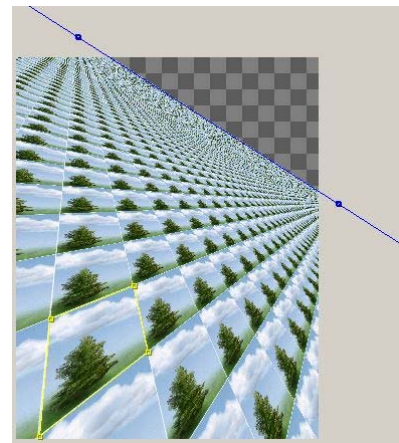
Use the *Reset* button to reset the settings.



Original image
with selection



Wrap tool in *Shift* mode



Wrap tool in *Fill* mode



Wrap tool applied to the
image and the selection

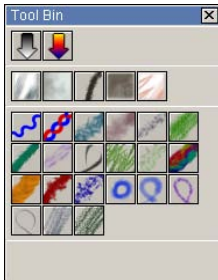


The blue line that appears on the screen during setting is the horizon line. You may move the two guide points as you wish to set the perspective.

Customized windows

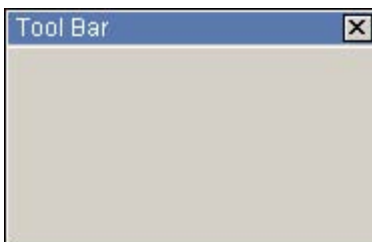
It is possible to create your own customized panels and icons in TVPaint Animation to adapt the interface to your needs.

To access the customized windows of TVPaint Animation, click on the button circled in the *Tool bar* (see below).

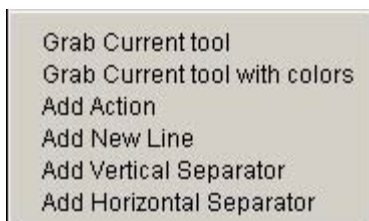


The customized windows are similar to those shown opposite: numerous icons are represented and each of them has a specific function.

By default, when you create a new customized window, the latter is empty but we will explain how to fill it later on.




A newly created panel is as shown in the image opposite and will be referred to as *Tool Bar* by default.




A RMB click in an empty area of a customized window will open the menu shown opposite.

The following options are available:

- * *Grab Current tool* allows you to save your current tool with all its settings and connections: airbrush, penbrush, custombrush, etc ... This action creates a button in the current panel. The icon of this button is the one of the tool grabbed and it provides fast access to the previously grabbed

tool. Note that the option to grab the current tool is also accessible by simply pressing the  button of the *Tool Bin* panel which is present by default.

- * *Grab the current tool with colors* has the same effect as the previous operation except that the tool is saved with the A and B colors defined at the moment of grabbing. This option is also

accessible via the  button of the *Tool Bin* panel.

- * *Add Action* or series of actions.

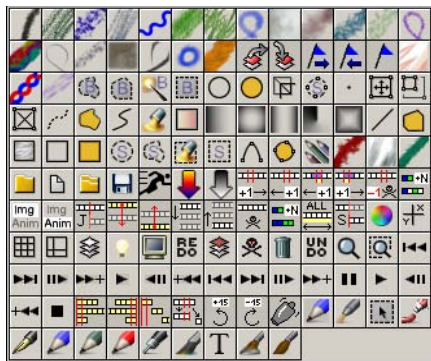
- * *Add new line of icons* to be filled.

- * *Add vertical and/or horizontal separators* between your icons (click with the right button on the latter to remove them ...)

Adding an action is done using the panel at the bottom left on the next page :

- * using the first two text fields you may define a name and in-line help comment for your future customized function .

- * The buttons and menus *List*, *Tool* and *A color* allow you to choose the icon corresponding to the action you will create.

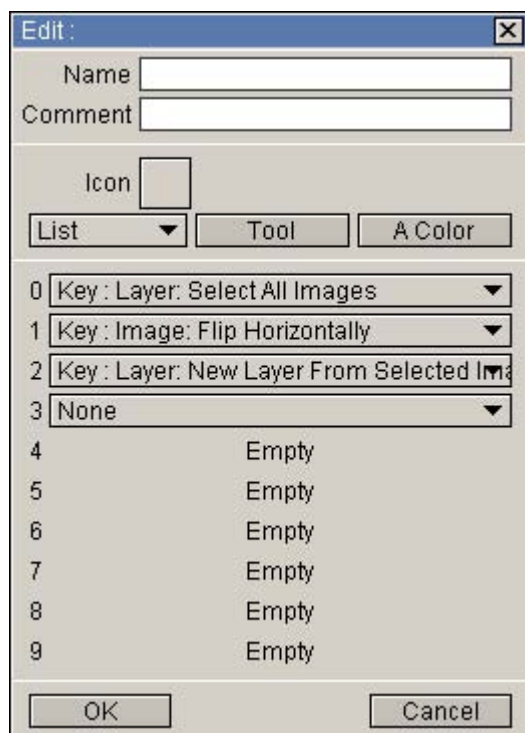


Opposite you find the list of icons supplied with TVP Animation.

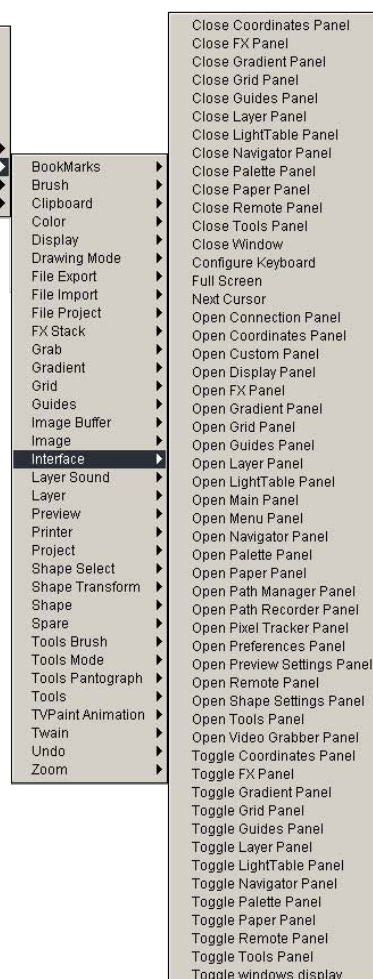
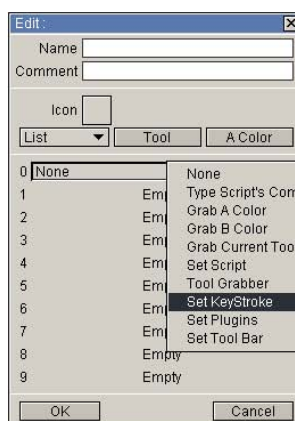
To create a new icon, you simply have to create a brush with its image and select the *Tool* button.

* The numbered lines are the actions to be carried out one after the other when you click on the icon corresponding to your function.

You may enter the current color, the current tool, call up an automation script or a precise program function (for further details regarding the scripts, refer to the TVPaint Développement forum or ask for the SDK).



Above you find the example of an action which selects all images of the current layer, flips them and copies them all to a new layer.



Note the presence of the actions *Open Plug-in* and *Open panel*.

Open Plug-in allows you to place a button to fast-start plugins.

Open panel allows you to create dependencies between your panels, i.e. you may display secondary panels from the main panel, for example. This may be useful for organizing your custom

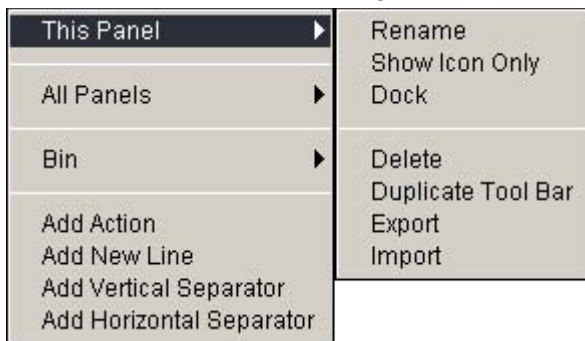
brushes or the contents of your various *Bins*. For example, the button  at the bottom of the

Animator Panel is used to open the *Tool Bin* panel which is a default Bin in which your tools are saved. Nevertheless, it is possible to create a Bin for each type of drawing tool (Airbrush, Penbrush, etc.) which may be opened from the *Animator Panel* using other buttons of this type.

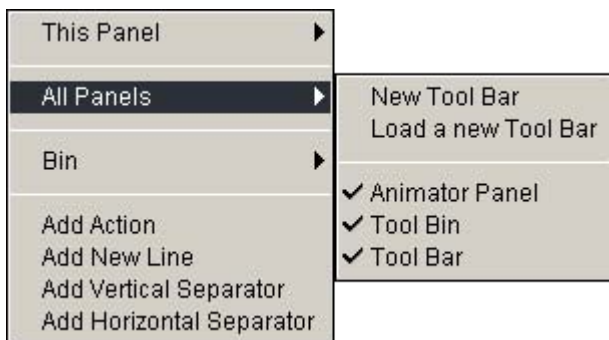
Once your buttons are created in the custom window, other options become available:

- * With a simple selection in your custom window you may cut or copy the icons/actions that you have just created. You simply use the menu described above to « paste » your icons/actions later.
- * With a right click on an icon/action in the custom window, you may edit, duplicate or delete it.

Now we will look at the options proposed in the panels themselves. In the sub-menu shown below, which is accessible with a right click in an empty area in your custom window, you may :

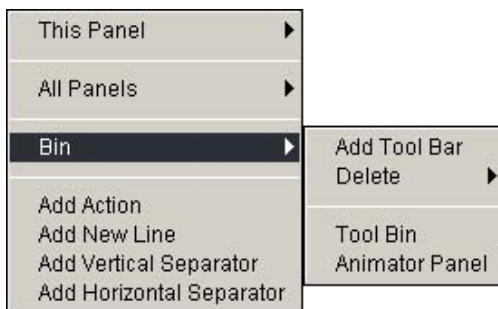


- * *Rename* the current custom window .
- * *Show icon only* (without text).
- * *Dock* your window under the tool bar (*Dock*).
- * *Delete* the current window.
- * *Duplicate* the entire window.
- * *Import / Export* the current window.



In the second sub-menu you may :

- * *New tool bar* (you may create an unlimited number).
- * *Load a new tool bar* from its .bin file.
- * *View* the name of the custom windows visible on the screen.



This last sub-menu is used to:

- * *Save* a customized window in order to re-use it later.
- * *Delete* one of the customized windows that you have just saved.



If you save the configuration, your custom windows saved under the *Bin* menu will still be present when re-starting TVPaint Animation. This being the case, a reset will delete these settings. Remember to export the custom window you need the most.



You may also define a keyboard shortcut for each action created using the keyboard shortcuts panel!

Lesson 7

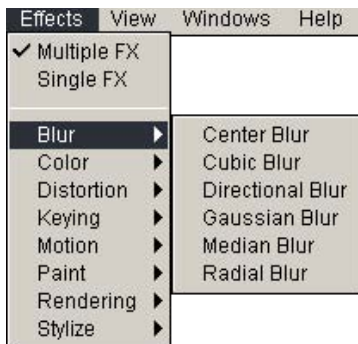
Working with the FX stack

In this lesson you will:

- Use the FX stack.
- Discover the concept of the animation keys.
- Study the blur effects.

In lessons 2 to 6 we have, amongst other things, studied the TVPaint Animation drawing tools and discovered the timeline and its functions. You are now able to produce « frame by frame » drawings.

TVPaint Animation also offers you a wide range of effects. This has been specially designed for working on animated footage.



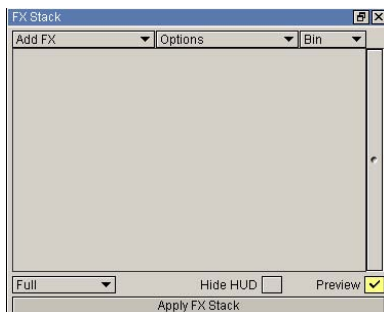
These effects or composition tools are available in the *Effects* main menu (see opposite).

They are arranged according to categories. We will study them progressively in the subsequent lessons.

The effects categories comprise:

- * Blur : to alter the existing pixels of the animation.
- * Colors : to rework the colors of an animated footage.
- * Distortion : to distort the images of a footage.
- * Keying : to cut out a part of the current animation.
- * Motion : to manage camera movement.
- * Paint : to repeat a line on the screen.
- * Rendering : to create lighting and particles effects.
- * Stylize : to rework the pixels of an animated footage.

The effect stack or FX stack



It is possible to set the parameters for your effects in a special window (for example : the power of a blur, the luminosity of the animated footage, the speed of a fade ...), this is the *FX stack*.

You call up the FX stack by clicking on the *FX* icon in the *tool bar* or by selecting *FX stack* in the *Windows* main menu.

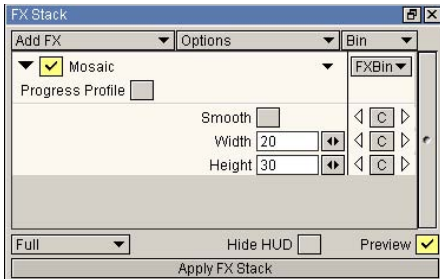
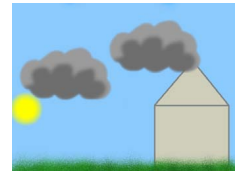
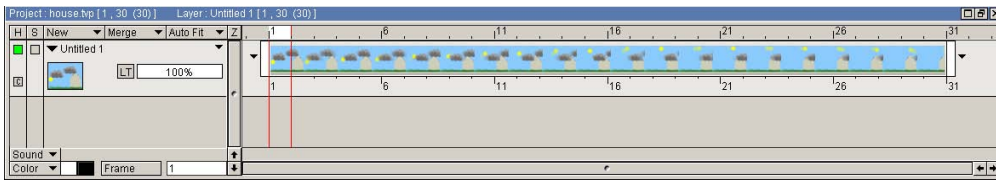


The popup menu *Add FX* contains all the effects indicated above: the menu is identical to the *Effects* main menu.

● Initial study of the *FX stack*

Load the project named « house » which you have created in lesson 4. Merge it and spread the layer over thirty images. The resulting layer will be named « house ».

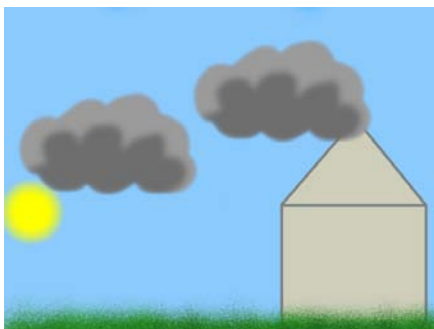
We obtain the following timeline and screen:



Our effect stack is presently empty. Select the effect *Stylize > Mosaic* from the menu. The effect stack must look like the one shown opposite. Now modify the parameters *Width* and *Height* by setting the values to 20 and 30.

The result is immediately visible on the current image: the image is cut in blocks of 20 pixels in width and 30 pixels in height (the color of a block is equal to the average of the pixels making up the block in the original image).

The *Smooth* button enables blending between adjacent blocks, the image obtained is therefore closer to the original image.



Original image



Image with preview of the effect

That said, the right image above is, in fact, for the moment only the preview of our mosaic effect (disabling the *Preview* button allows you to return to the original image).

To validate your settings and apply them into the current layer, all you have to do is apply your effect : click on the button *Apply FX stack* at the bottom of the *FX stack* window. Your current layer will be modified according to your settings (if required, use the *Undo* option to undo the modification...). Don't forget that all images of the layer must be selected if required.

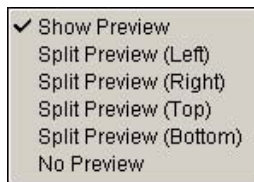
• Working in real time

Almost all software packages on the market impose a preparation stage and then an effect calculation stage. Viewing the final result on the screen is only possible after completing these two stages. In the best case, you have a window for a low-res preview of your effect at your disposal. TVPaint Animation does not adhere to this model and employs a much more interactive method. You have the possibility to view the results of these effects in real time!

Once the *Preview* box is checked, it is possible to play your complete animation using the *Play* button on the control panel. It will then be shown with all the modifications you have chosen in your stack.

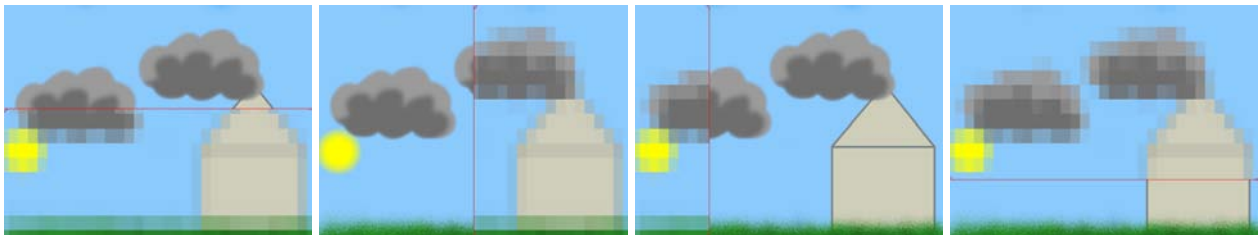
In other words, any modification of the parameters within the effect stack is immediately visible on the screen, in full size and full resolution whether your project is a simple image or an animation. Sliding along the timeline using the keys [←] and [→] also allows you to view progress frame by frame.


• The various viewing modes



For the moment we will stay with our *Mosaic* effect.
There are several types of viewing: they are available in the popup menu at the bottom left of the *FX stack* window (see opposite).

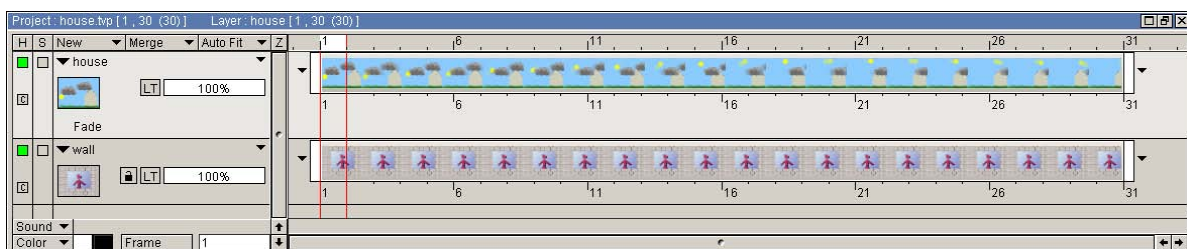
You may view the effect on the entire image, its left half, its right half, the top or bottom... you may even modify the viewing area to your convenience by sliding the border line on the screen (to do this, left click on the line and slide it).



Here again, the *Play*  button is pressed to preview your effect in real time but only on a given section of the screen.

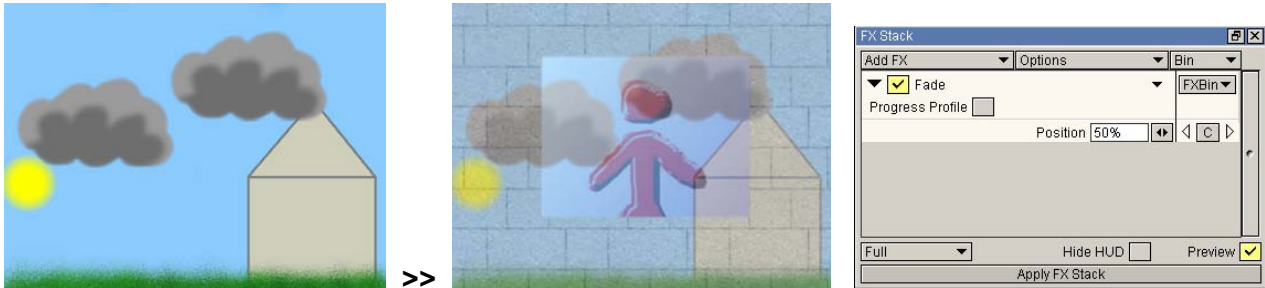
• Some operations

- * If you have applied the effect *Stylize > Mosaic*, click on *Undo* to cancel the effect and return to the unmodified animation.
- * Go into the *Options* popup menu of the *FX stack* and choose *Delete all*.
Your stack is empty again.
- * Select the effect *Colors > Fade* from the available menu.
- * Add a second layer behind the current layer and name it « brick wall ».
- * Import the project « brick wall » which you have studied in lesson 3, merge it and spread it over 30 images.
- * Copy all the images of the layer obtained into the layer named « brick wall » in your project.
- * Finally, go to the first image on the timeline, on the layer named « house » (see timeline below).



- * Modify the value of the position parameter to 50% then apply the *FX stack*.

You obtain the following image:



You have certainly understood that this effect creates a fade between the image of the current layer and the image on the lower layer.

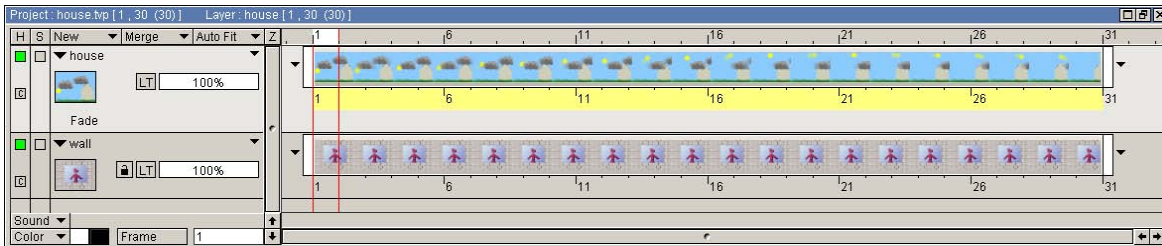
Indeed, but this effect is applied to the current image (the first) and not to all the images of the layer, ... so let's remedy this.

Click on *Undo* to find the layer named « house » intact.

Now select all the images of the layer and apply the *FX stack*.

The effect now applies to the entire layer.

This is not yet perfect: the fade effect is locked at 50% of its progress for all images of the layer... it does not evolve in time.



To obtain a true fade effect on the screen, one has to apply the *FX stack* with a position value : 0% for the first image, 1% for the second, 2% for the third ... and so on all the way to the last image... (assuming that our animated footage has a total length of 100 images... If not, complicated adjustment calculations must be made!).

At first sight this seems like a long and complicated process. Fortunately, TVPaint Animation offers tools which reduce this fastidious process to a few seconds: the *Animation keys*.

Working with animation keys

It is possible to set the parameters for our fade effect to 0% for the first image in our layer, then to 100 % for the last.

In this way TVPaint Animation takes charge of calculating the progress of the effect on the intermediate frames.

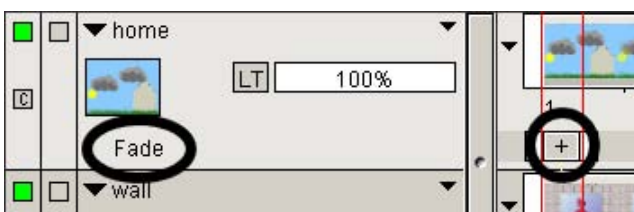
This is what we refer to as working with *Animation keys*.

Once this concept is understood, you will no longer work frame by frame.

Proceed in this way for our current project:



* Go onto the first image of the « house » animation layer. Set the effect to 0% then click on the button shown opposite.






* A symbol appears in the timeline (see opposite) under the first image.

The name of the *Fade* effect is written to the left of the timeline.

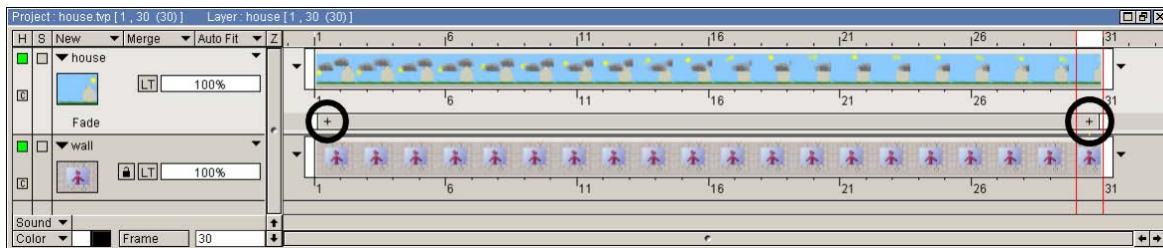
* The *Fade* effect is now set to a value of 0% for the first frame of the timeline. At this stage, application of the *FX stack* has no animation effect. Indeed, the value of this key will be repeated for all frames after this one.


It is necessary to create a second key before applying the *FX stack* in order to obtain an animation effect.

* Go on the last image of the « house » animation layer, create a key using the  button of the *FX stack*.

 You may now immediately set the effect to 100%. In this case it is not necessary to click on the button C as before and the key represented by the symbol  will be created automatically.

The timeline is modified as below:



* Note that by sliding along the timeline using the [←] and [→] keys of the keyboard or pressing the *Play*  button allows you to view the progress of the chosen effect from the first to the last frame.

* Now select all frames of the layer and apply the *FX stack*. This time, application of the effect stack will modify progression of the fade effect in time (see following images).



TVPaint Animation has calculated an effect with a progressing position parameter for the intermediate frames.

To sum up, an animation key is a sort of adjustable time parameter lock which sets the value chosen by the user to a precise point in the timeline.

However, the drawing tool parameters vary dynamically according to the user's direct action on the project and may therefore not be assimilated to animation keys.

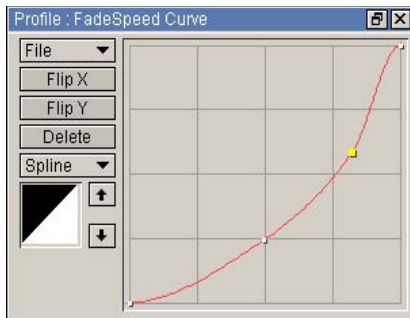
• Manage the effect progress

You have probably noticed the *Progress* button under the name of each effect. This button is used to manage the speed at which the chosen effect will be carried out.



Click on the *Progress* button and then on the small black section appearing on the screen (see opposite)

The Progress profile editor will then appear.



The interface of this window is identical to the one presented for brush profile setting in lesson 2.

The *File* and *Spline* menus, the *Flip X*, *Flip Y* and *Delete* buttons are the same as the ones you have studied before.

This being the case, the progress profile editor has a very specific function within the effect stack:

- * The abscissa in the graph represents time,
- * The ordinate in the graph represents the progress of the chosen effect.

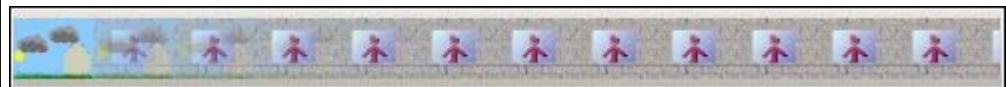
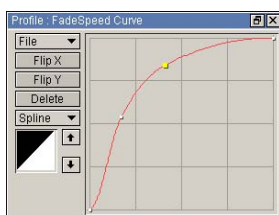
Let's go back to the fade effect in the « house » layer:

- * Use the *Undo* option to recover the layers intact.
- * Choose the same keys as those indicated in the chapter above.
- * Draw the spline above before applying the *FX stack*.

After playing the project you will note that the effect is first carried out slowly and then at top speed (see timeline below). This corresponds to our spline : it rises slowly first and then very fast.

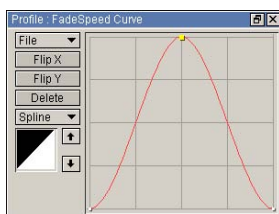


In the same way, if we choose the spline shown below before applying the *FX stack*, the *Fade* effect will be fast at the beginning and slower at the end.



Choosing a horizontal straight in the profile will stop progress in time of the effect.

If the spline rises and then falls off again, progress of the effect will change accordingly:

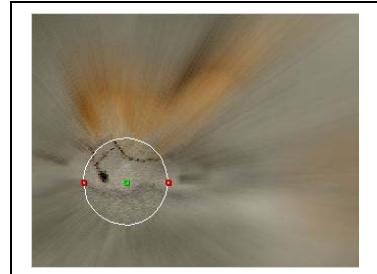
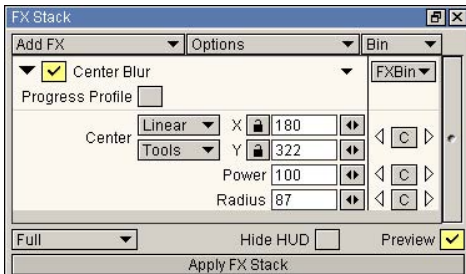
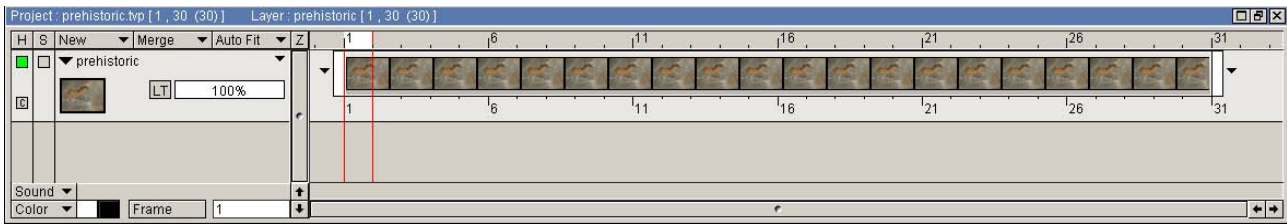


• Managing effects with several parameters

Now close the « house » project and load the « prehistoric » project.

- * Merge the layers of this project.
- * Stretch them over thirty frames.
- * Delete the content of the *FX stack*.
- * Choose the *Blur > Center blur* effect.

The following timeline appears :



To make it easier we have deliberately chosen to work with an animation layer always containing the same image. Everything that follows also applies to an animation layer of the type «house».

You will see that there are three parameters which may be locked with an animation key:

- * the position of the *center*,
- * the *power* of the blur,
- * the *radius* of the circle in which the blur is not applied.

The position of the circle in which the blur is not applied as well as its center are shown in the preview (see image above)



Some parameters may be adjusted directly on the screen by clicking and sliding the mouse on the color *handles* (shown opposite).
When the effect is applied, circle and handles will, of course, have disappeared.

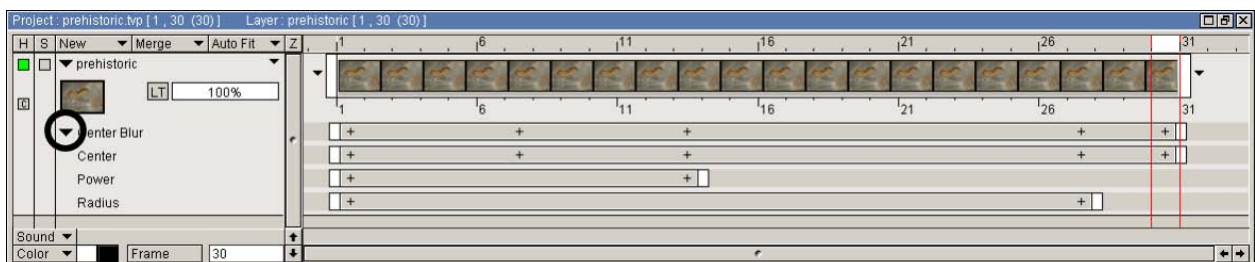
The parameters directly adjustable on the screen (handles, circles, spline) are referred to as *HUD* (*HUD stands for: Head Up Display*).

The *Hide HUD* of the *FX stack* is used to hide the latter.

Now let's take a look at the timeline:

- * As soon as an animation key is created, a left click on the triangle encircled in the diagram below displays the name of three parameters which may be set with the animation key.
- * To the right of the parameter names, corresponding key lines will be displayed as you create your keys.

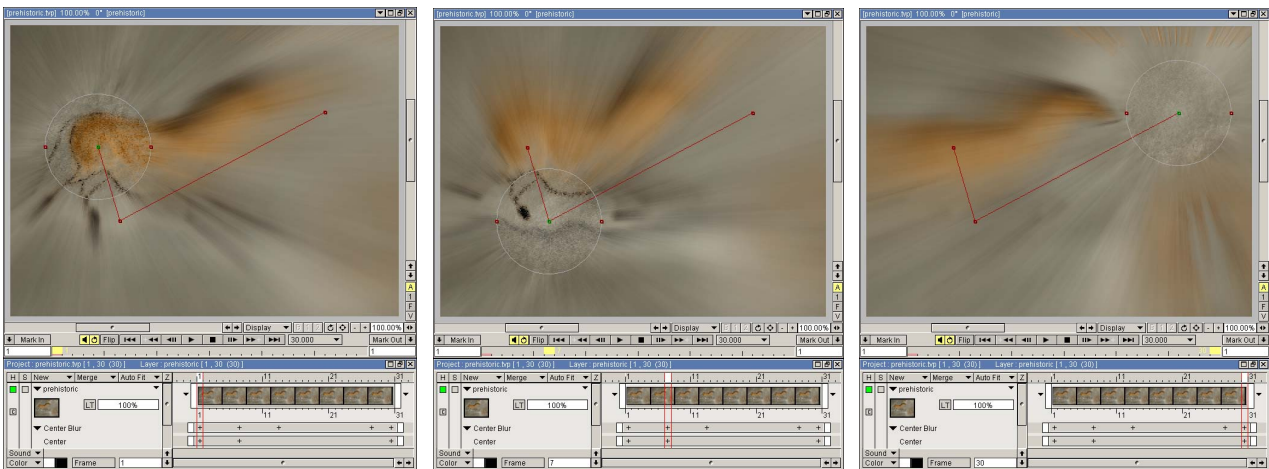
It is possible to create animation keys for each parameter, for the image of your choice along the timeline.



A separate set of keys may be created for each parameter (*Center* of circle, *Power*, *Radius*). This means that the parameters may progress in time independently of each other. For example: the power of the centered blur may decrease slowly while its radius may increase rapidly, all at different times ...

Thanks to several keys, the parameters can be adjusted in time. This is the case for the *Center* parameter in the timeline above : three animation keys are placed on the key line associated with the *Center* parameter.

Below, the effect produced using these three keys.



The first key line in the timeline has the name of the effect in the stack and displays all its keys.

The path

When position parameters progress in time, there must be a path taken by the parameter in question.

For example, three animation keys were created at the images 1, 6 and 30 for the *Center* parameter above.

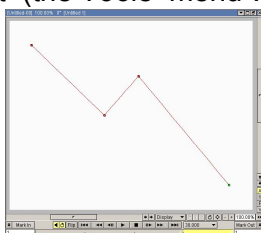
The center of the *Center blur* effect consequently follows a path as time progresses.

In our example, the path is visible via the *HUD* and looks a bit like a red « V ».

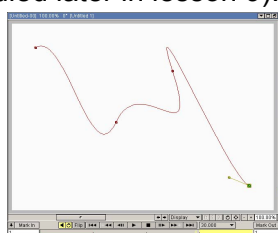


It is possible to choose an interpolation mode between the key points which define your paths.

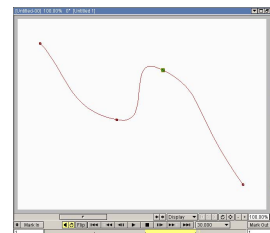
You may choose to connect the points in a linear, spline or smooth manner using the first menu of the effect (the *Tools* menu will be studied later in lesson 9).



linear



spline

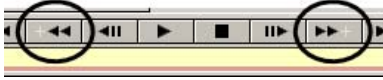
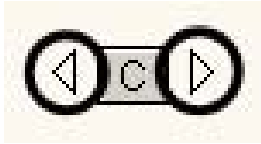


smooth



When using *Spline*, it is possible to use handles. The [Ctrl] key + mouse click on a handle are used to move only this handle.

• Moving from key to key



It is not always easy to place yourself on a key within the timeline, especially when the project contains many images. The « triangle » buttons in the effect stack or in the current project window (see opposite) are used to move rapidly from one key to another without having to use the [←] and [→] keys or the mouse.

• The contextual menu for the keys



A right click in the timeline on a « keyline » (see opposite), calls up a contextual menu.

You may:

- * create or delete keys (which requires confirmation),
- * select one or several keys (they will then be displayed in yellow...),
- * cut, copy, paste keys (a process already used for images and layers: see lesson 5).



When using animation keys:

- * The layer contextual menu offers the possibility to select the frames corresponding to the keyline.
- * The *Auto Fit* menu is used to adjust the zoom of the timeline in order to view the keys.

• Contract, stretch a key line

In the previous lessons we learned how to contract or stretch an animation layer. This is also possible for key lines (see below).



stretch
contract



If required, it is possible to move a key from one place to another in the timeline (click and slide with the left mouse button).

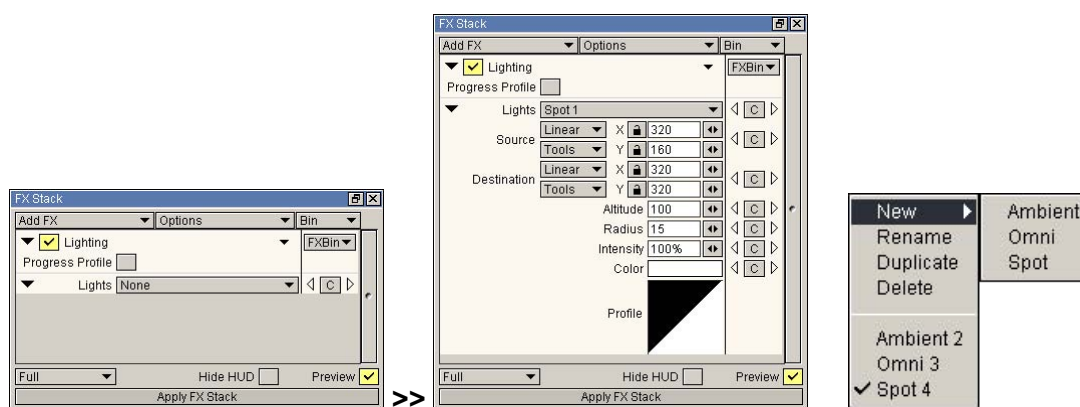
• Use the selections

When you make a selection on the screen and then apply an *FX stack*, the latter is only applied to the zone selected (whether you apply the stack to one or several images makes no difference). This is very useful when you apply your effect to a precise area in your image or animation.



More details about the FX stack

• A more complex effect: the *Rendering > Lighting* effect



This effect is used to light up the image or sequence of your choice as if using an exterior light source (light, projector...).

By default, nothing is present in the list. The *Lights* menu may be used to create one or several lighting effects among the following categories: *Spot*, *Omni* and *Ambient*.

As soon as a lighting effect is created, you may duplicate, delete or rename it.

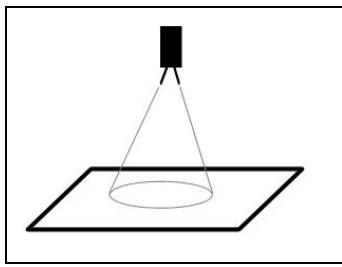
The *Lights* menu displays the name of the light whose parameters are shown in the stack. If you work with several lights you may go from one to the other by selecting their names in the *Lights* menu.

Here an overview of the different lighting types:

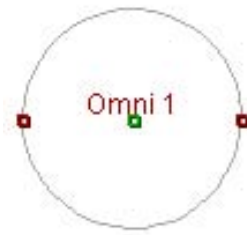
* *Ambient* lighting lights up the scene globally in the color of your choice. Values under 100% will darken the image, values higher than 100% will brighten it.

* *Omni* lighting lights up a circular area of your choice similar to a projector located on an axis perpendicular to the image. The parameters to be set are color, lighting intensity, center and radius of the circular area, as well as altitude of the virtual projector.





Omni projector diagram

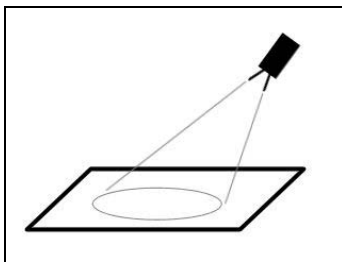


Omni HUD

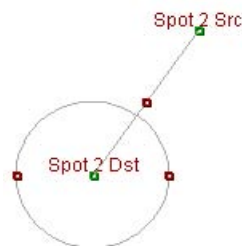


Omni lighting

* *Spot* lighting lights up the image similar to a tilted projector. Two position parameters are available for this mode, which allow you to adjust the position of the light source as well as its direction.



Spot projector diagram



Spot HUD

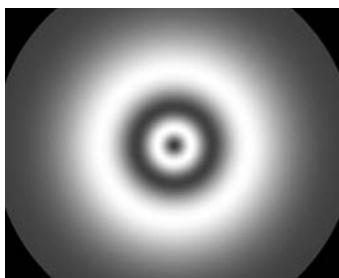


Spot lighting

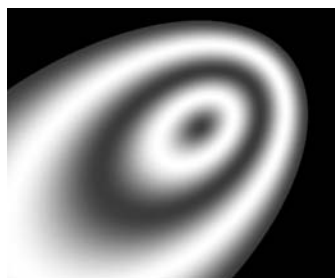


For many of the parameters described above, the settings may be made directly on the screen (don't forget to display the *HUD*).

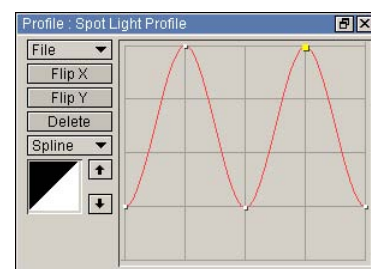
Spot and *Omni* lighting have a profile editor which works similarly to that of the drawing tools (see lesson 2 for more details).



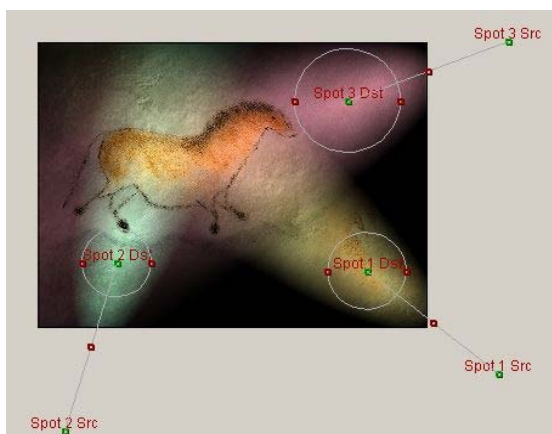
Omni



Spot



profile



With the *Light* popup menu it is possible to use several light sources (regardless of type), as well as to *rename*, *duplicate* or *delete* them.

This is how our cave may be lit up in various ways !



This *Lighting* effect only applies to the opaque pixels of the current layer. To obtain the examples above it is therefore necessary to first merge the layers of our project.

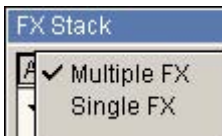
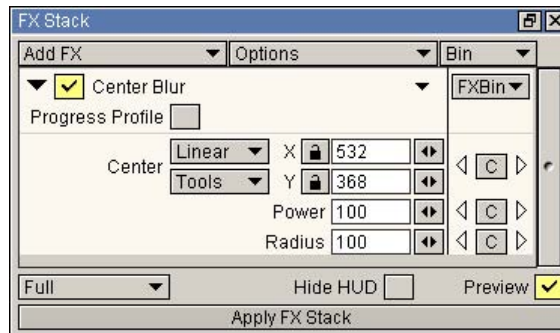
• Single effects, multiple effects



Up to now we have only used a single effect in our stack. TVPaint Animation also offers the possibility to use a succession of effects.

For a better understanding of this notion, we will use the merged « prehistoric » project that we have used before.

Using the parameters below, place a *Center blur* effect in your *FX stack*.
You now have the following preview:

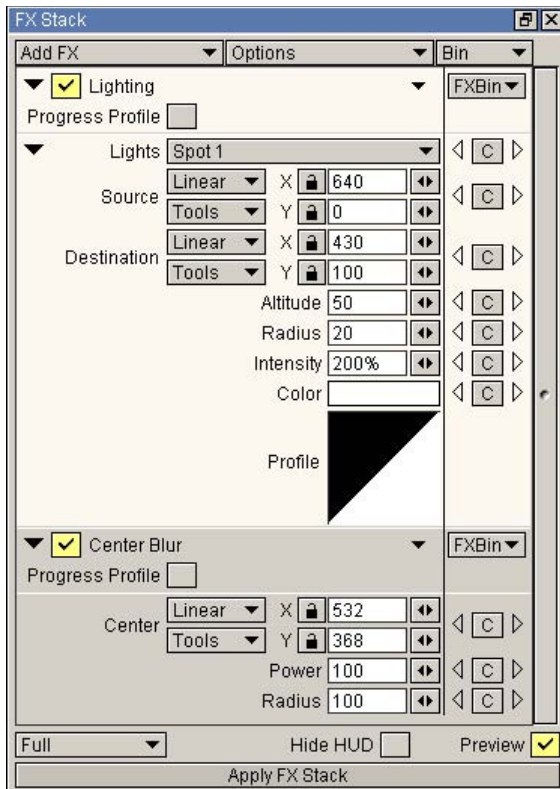


Maybe you noticed the options *Multiple FX* and *Simple FX* in the *Effects* main menu or in the *Add FX* popup menu of your stack.

If you select a new effect in the popup menu:

- * When *Multiple FX* is checked, the chosen effect is added to the present effect.
- * When *Simple FX* is checked, the chosen effect will replace the present effect.

Check *Multiple FX* in the menu and choose the effect *Rendering > Lighting* explained above: this effect will automatically position itself over the current effect.



Set the parameters for the two effects as shown below.

To simplify our example, there is only one type of lighting used and our effect applies only to one frame (so no key is required ...). This said, everything that follows still applies if you use keys and animation layers.

Once the preview is enabled, you see the following result: lighting is applied « above » the center blur of the previous page!

The advantage of our stack with two effects is that is possible to modify any of the two effects at any time during the preview.

Modifications of this kind would indeed be very fastidious if you used a single effect at a time: application of the FX stack twice in a row for two different effects followed by the *Undo* option twice in a row, change the first effect, reapply the two effects one by one, *undo* option again, etc.



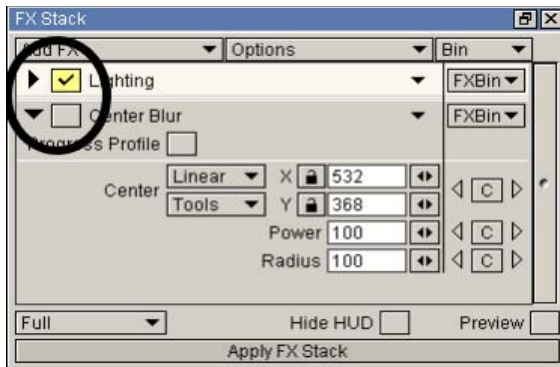
result of the FX stack above



It is also possible to accumulate the number of effects of your choice or even several times the same effect if you need it! Remember the *Play* button to view the effect on the animation layers ...

• Current effect, preview and collapsing of effects

- * One of the effects in your multiple FX stack is always selected. This effect is referred to as « current effect » (the one which seems to appear « brighter » while the other effects are « gray »). The keys visible in the timeline are always those of the current effect.
- * When several effects are used, it is possible to collapse them using the ▼ buttons top left.
- * The boxes close to the arrows indicated above are used to enable or disable the effect they belong to.

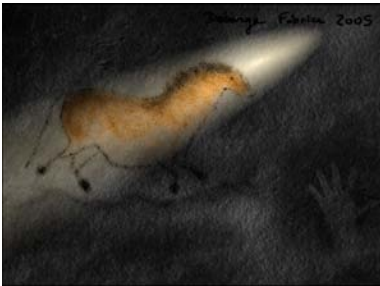


Opposite,

The *Lighting* effect is enabled and reduced.

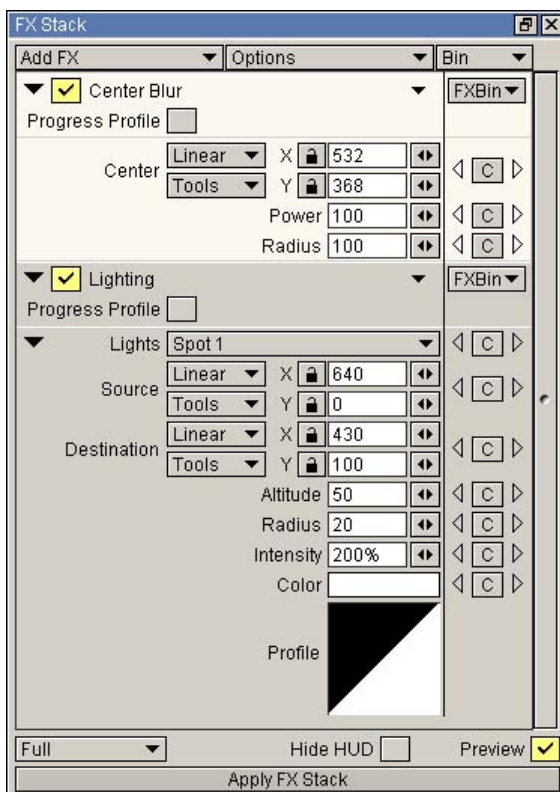
The *Center blur* effect is disabled and visible.

The current effect is the *Lighting* effect.



If the *FX stack* above is applied to our initial frame, we obtain the image shown opposite: only the *Lighting* effect is taken into account. There is no center blur applied before it.

• Invert two effects



The effects contained in the stack are executed from bottom to top during preview or application. There is a kind of chronological order for the effects ...

The results may therefore vary if two effects are inverted:

* In the left image below, the *FX stack* applied is the one illustrated opposite. The center blur is applied after lighting.

* In the right image below, the *FX stack* applied is the one illustrated on the previous page. The center blur is applied before lighting.



Preview of the *FX stack* above

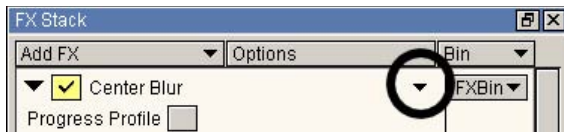


Preview of the *FX stack* of the previous page



It is also possible to invert the effect by clicking on and sliding its name. The process is identical to the one used to invert the layers in lesson 3.

• Reset and rename effects



A left click on the right triangle above calls up a contextual menu which may be used to:

Rename the current effect in the *FX stack*, *Create* or *Delete* an animation key, *Reset* the effect parameters to their initial values, *Duplicate* or *Delete* the effects from your *FX stack*.



The *Options* menu of the effect stack may be used to delete or reset the values of all your effects.

• Saving the settings of the *FX stack*

We have learned how to create and save our own graphic palettes, our settings of custom tools, our pre-defined gradients, etc. It is therefore only natural to proceed in the same way for our effects:

The *Bin FX* menu for each effect offers several options:

- * The *Add* option allows you to store your effect for later use (you will first be asked to name this effect).
- * The *Export* option saves the current effect to a storage support.
- * The *Import* option recovers an effect from a storage support.
- * The *Delete* option deletes a pre-defined effect.



The effects added may only be re-used when re-opening the program if you save the configuration when quitting. Resetting the latter will delete all the effects of the user.

The *Bin FX* menu for the entire stack works in the same way, but may be used to add, import, export or delete an entire stack.



When you add an effect to a pre-defined effect stack, all keys and profiles relative to the progression of each effect you have created are also saved.

• *FX stack* and TVPaint Animation projects

We may be repeating ourselves, but it is important to remember that it is indispensable to *Apply the FX stack* so your effect is taken into consideration and affects the current layer (if not, all you do is preview it...).

Also note that, when you save a project, as well as saving the layers, their position and the associated parameters (*Position*, *Duration*, *Pre-Post- Behavior*, etc.) you also save the current effects stack.

This makes it possible to keep a complete and intact animation and the effect stack necessary for your finishing touches. Useful, isn't it?



When you work with several projects at the same time, note that each project has its own effect stack.

The *Blur* effect

Some details regarding the *Blur* effects of TVPaint Animation :



Cubic blur

Cubic blur

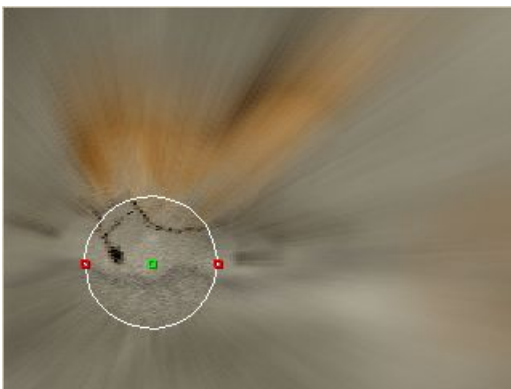
This is the most standard blur: the more you increase its size, the less the sharp and angular zones of the source image will be visible. It may also be applied only to the transparency channel of the image (alpha channel).



Gaussian blur

Gaussian blur

An image with a *Gaussian blur* may be compared to an image seen through a camera that is not set correctly. The *Gaussian blur* is « more precise » than the *Cubic blur*.



Center blur

Center blur

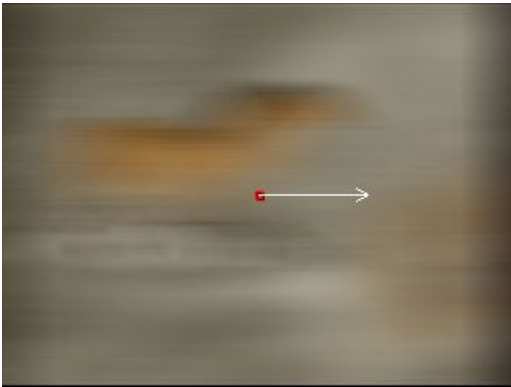
Above, we have studied the *center blur* in detail. The parameters are the position of the center, the power of the blur and the radius of the circle.



Radial blur

Radial blur

This blur is applied in a circular manner around a point the position of which you have chosen on the screen. The second parameter to be set is the power of the blur.



Directional blur

Directional blur

This blur is applied only in the direction (angle) of your choice and the spread of your choice (you may set the vector parameter directly on the screen).

Median blur

When using the *Median blur*, the color of the pixels obtained after application of the blur depends on the colors of the adjacent pixels in the initial image.

The *Median blur* comprises all kinds of modes, the effects of which you may admire below:



Smooth mode



Light halo mode



Dark halo mode



Light mark mode



Dark mark mode



Double edge mode



Impressionist mode

Lesson 8

Effects relative to images and their colors

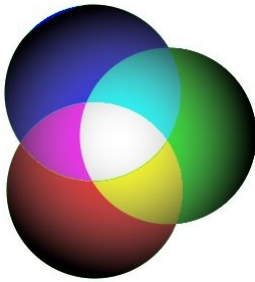
In this lesson you will learn to:

- Touch up the colors of an image or animation.
- Handle the effects of the stylize group.

Unless indicated otherwise, all images in this lesson have only one layer.

Color channels

Based on the additive color principle, all colors are mixture of red, green and blue (more or less dark) in exact proportions.



The color of a pixel therefore has a darker or lighter *Red* component, a darker or lighter *Blue* component, a darker or lighter *Green* component and a last component which indicates the pixel transparency level. This last component is referred to as *Alpha* component.

TVPaint Animation enables modification of each of the components described above, independent of the others, for all pixels on the screen.



Click on the icon shown opposite in the *Tool* bar to only modify the red component of the pixels :

The blue and green pixels are not affected by your work.

The yellow and purple pixels, which are partly composed of red, are partially affected.

This is what we refer to as Enabling the *Red* channel of the image.

You may proceed in the same way to enable the *Green* and *Blue* channels.

The left icon is the toggle to enable the *Alpha* channel. When the channel is enabled, the more the pixel is opaque the more it is sensitive to the color modifications you apply to it.

The effects of the *Color* menu

Let's take a look at the image opposite: the various colors were spread and mixed on a wooden palette.

All colors of the chromatic circle are present on this palette (red, orange, yellow, green, blue, purple).

This image will allow us to study all the color modifications available in TVPaint Animation.

To do this, load the project « palette ».

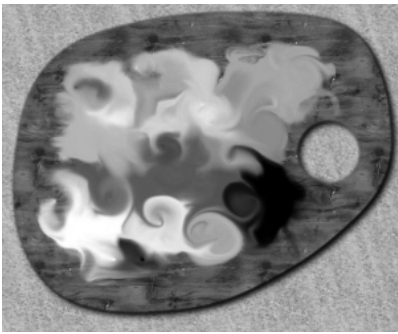


• Convert an image into black and white

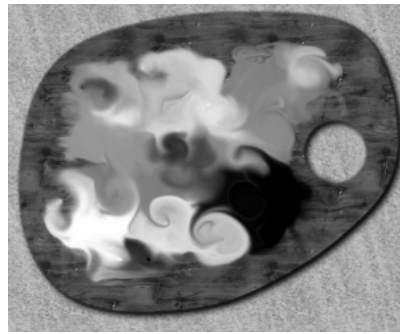
The effect *Black & White Converter* has three parameters that may be locked using an animation key. By default, it transforms the images by deleting the color data. We therefore obtain the same effect as photos taken with a black and white film.

Increasing the value of the *Red* parameter will make the red pixels of the original image lighter when changing over to gray. Reducing the value will make them darker (see next page).

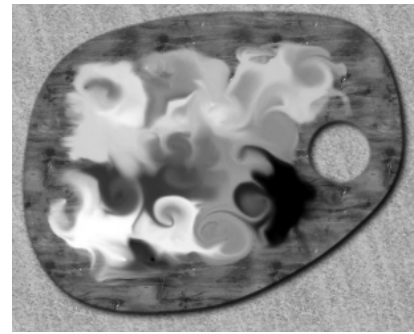
The same principle applies to the parameters *Green* and *Blue*.



Default settings

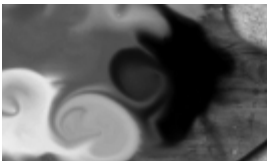


Parameter Red at value 0



Parameter Red at value 255

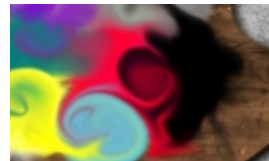
Below, a zoom on the red area of the image :



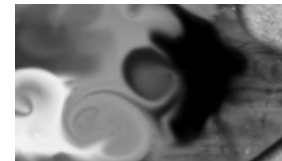
Default settings



Parameter Red (value 0)

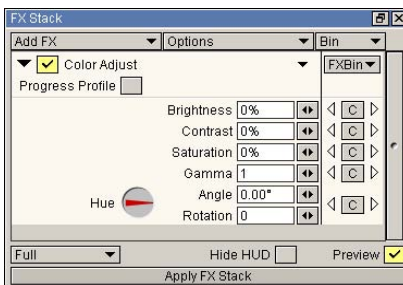


Original image



Parameter Red (value 255)

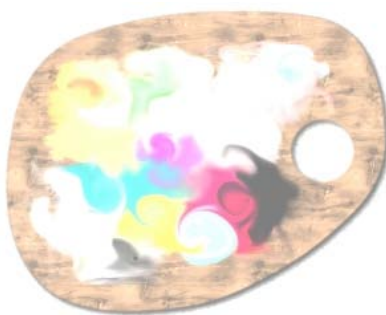
• Adjust the colors of a video



We'll keep the image from the beginning of this chapter and study the effect *Color Adjust* shown opposite in detail.

This effect uses the traditional notions of color modification for drawing and photo touch-up software packages:

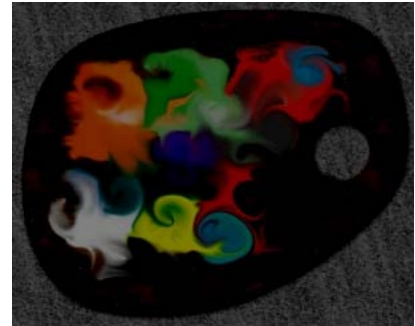
* The *Brightness* parameter is used to increase or decrease the global brightness of the current image or video (use negative values to decrease lighting). In other words, all the pixels present are either changed over to the color black or the color white.



Brightness + 75%



Original image



Brightness - 75%

* The *Contrast* parameter, if increased, will accentuate the luminosity differences between the light and dark zones. When decreased, it will reduce them.

A setting close to 100% will only make the primary colors appear, as well as black and white. A setting close to -100% will make the image or footage almost entirely gray.



Contrast + 75%

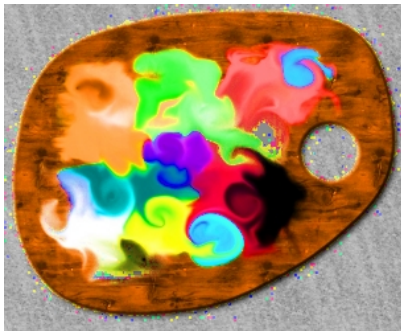


Original image



Contrast - 75%

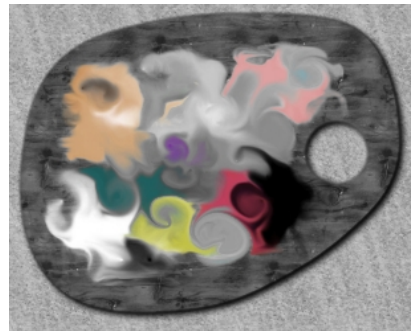
* The *Saturation* parameter accentuates or reduces color vivacity. A setting close to 100% will reduce the number of pixels close to the gray colors while reviving the colors, a setting close to -100% will produce a gray drawing.



Saturation + 75%



Original image



Saturation - 75%

* The *Gamma* setting is often used for photo touch-up but also enables lightening or darkening an image without leaving the impression that a dark or light sheen was placed over it. Its value may vary between 0.01 and 5.



Gamma = 2



Original image (Gamma =1)



Gamma = 0.5



At first sight, the *Gamma* parameter seems to have the same effects as the *Brightness* parameter. This is true, with the difference that the *Brightness* parameter affects all pixels on the screen whereas the *Gamma* parameter affects the light and dark pixels only marginally.

Below you will find an example of the difference between a gamma reduction and a reduction of the brightness :

Reducing the *Gamma* by half only slightly affects the pixels making up the paint and the background: the latter remain bright and clear.

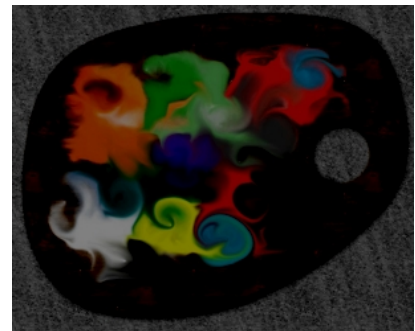
Modifying the *Luminosity* to -50% gives the same pixels a darker hue.



Original image (*Gamma* = 1)



Gamma = 0.5



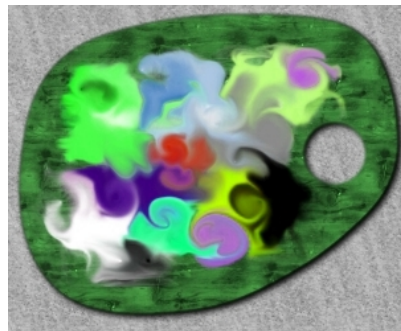
Luminosity - 50%

* The *Angle* parameter enables rotation of colors at the angle of your choice around the color wheel (see below).

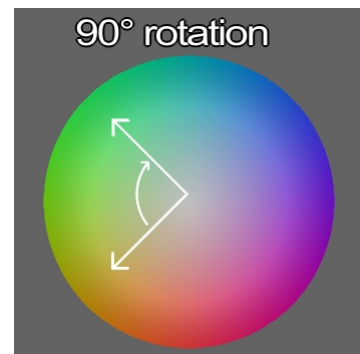
For example: going from angle 0° to the angle 90° will transform the orange colors in our image to green, blue to purple,...etc.



Original image



rotation of colors around 90°



the color wheel

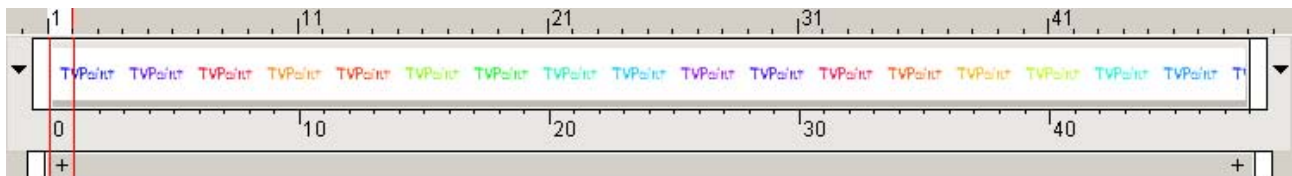
* The *Rotation* parameter reflects the number of turns around the color wheel before arriving at the chosen angle. This allows you to make the colors vary in a time cycle, which is sometimes useful for colored logos.

In the example below, we start with a blue TVPaint logo (R=0, G=0, B=255), placed on each image of an animation layer comprising forty-eight layers.

TVPaint

An animation key is placed at the first image of the layer, locking the value « 0 » for the *Rotation* parameter. A second key is placed at the last image of the layer, locking the value « 2 » for the *Rotation* parameter.

When the FX stack is applied, you see the following result:



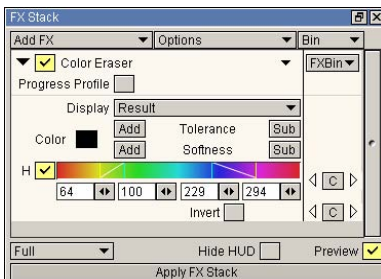
The logo changes color in cycles, going twice in a row through the colors of the color wheel.

• Delete the colors of your choice

Let's assume that we want to delete the green and blue colors in our image. This is easily done using the *Color eraser* effect.



By erasing the color we understand erasing the data relative to the color composing the pixels and not modifying the opacity of the pixels. In other words, we unsaturate the pixels with a precise hue.



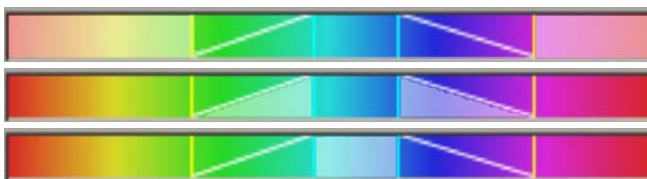
original image



image with green and blue hues erased

Start by selecting a color in the green zone of the image in the *Color* box of the panel above. Part of the green pixels will then be unsaturated and turn to gray. To obtain a better finish, you may increase or decrease the tolerance or softness thresholds.

To select the pixels according to their hues, the color bar of the panel as well as the 4 mini-sliders will help you.



non-unsaturated hues,

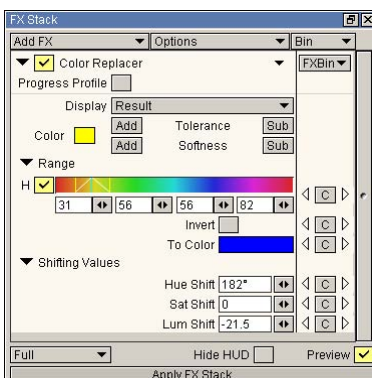
progressively unsaturated hues

completely unsaturated hues



The *Invert* button is used to invert the final result: saturated pixels become unsaturated and vice-versa. If necessary, the popup menu *Display* enables recovery of source image viewing.

• Replace a set of colors with another



The effect *Color Replacer* is based on the same principle as the effect *Color Eraser*, with the difference that you do not unsaturate the colors.

Indeed, using *Shifting values* enables progressive modification of the hue, saturation and luminosity of the chosen color range. You may thus easily toggle one color range to another.

The *Shifting values* are calculated as being « gap » in the H.S.L system between the colors circled in the panel (see next section).



Original image



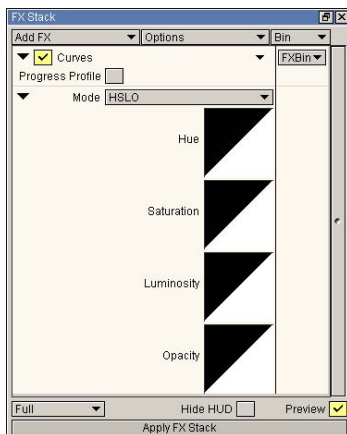
yellow colors changed to blue

• Modify pixel values with precision

Each pixel on the screen is defined by its components:

- * The so-called *R.G.B.A* generates the color of a pixel with four components: red, green, blue and alpha. In this system, the values of the four components vary between 0 and 255.
- * The *H.S.L.O* system generates the color of a pixel using four other components: hue, saturation, luminosity, opacity. In this system, the values of saturation and luminosity may vary between 0 and 255, the hue may have a value between 0 and 359 (thus the previously used concepts of angle and color wheel).

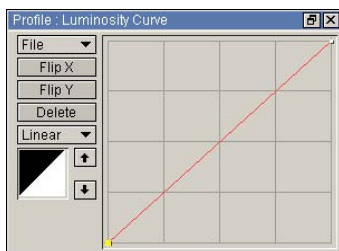
Inversely, any pixel on the screen may be broken down in each of the two coordinate systems. Modifying the color of a pixel therefore means you modify the values of its components.



The *Curves* effect enables precise management of these modifications: the *Mode* popup menu offers a choice between the two systems described above.

Let's go, for example, into the *H.S.L.O* system and take a look at our image. Next to the name of each component we find a miniature profile, comparable to those we encountered when studying the drawing tools and acceleration of an effect.

Click on the luminosity miniature profile to call up the edit profile window.



The options proposed are traditional: flip the curve along the « X » or « Y » axes, use pre-defined curves, save the settings, modify interpolation of the points...

Now we just have to study the meaning of the curve:

- * The horizontal axis represents all luminosity values that may be contained in a pixel on the screen (values between 0 and 255)
- * The vertical axis (also known as *LUT*: Look Up Table) represents all luminosity values of the pixels once the *Curve* effect has been applied.

Let's take the curves below as examples:



* In this example: the luminosity of every pixel is divided by two after application of the effect (for example, a luminosity value of 50 changes to 25 after application of the effect).



* In this example, the luminosity of every pixel remains unchanged.



* In this last example, any pixel with a luminosity value between approximately 64 and 192 will turn black, the others remain unchanged.

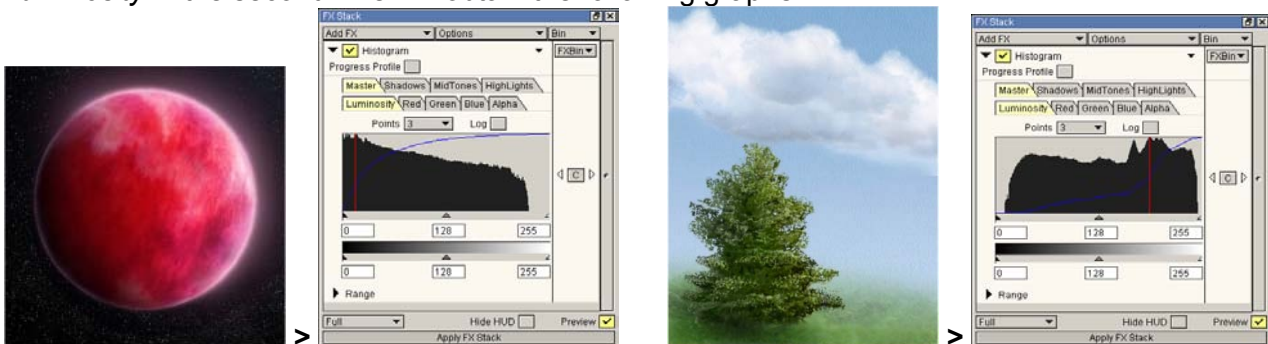
We have just studied the luminosity curve in detail. Now it's up to you to work with the other curves and use them to the advantage of your projects.

• Analyze colors on the screen

We have just seen that it is possible to work on pixels using markers and curves. TVPaint Animation also offers the possibility to work on the colors on a more « statistic level» thanks to the *Histogram* effect. You can open this effect in the FX stack.

The first function of the histogram is to provide information about the distribution of colors on the screen.

Let's take for example the images below and select the tabs *Master* in the first row of tabs and *Luminosity* in the second. We will obtain the following graphs :



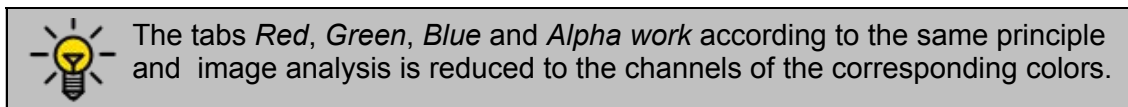
The *Log* box enables use of a logarithmic scale instead of a proportional scale. For the moment, pay attention that this box is not checked ...

* The more dark pixels the image on the screen contains, the more dense the graph is to the left (this is the case for our red planet).

* The more light pixels the image on the screen contains, the more the graph is concentrated on the right (this is the case for the image of the tree).

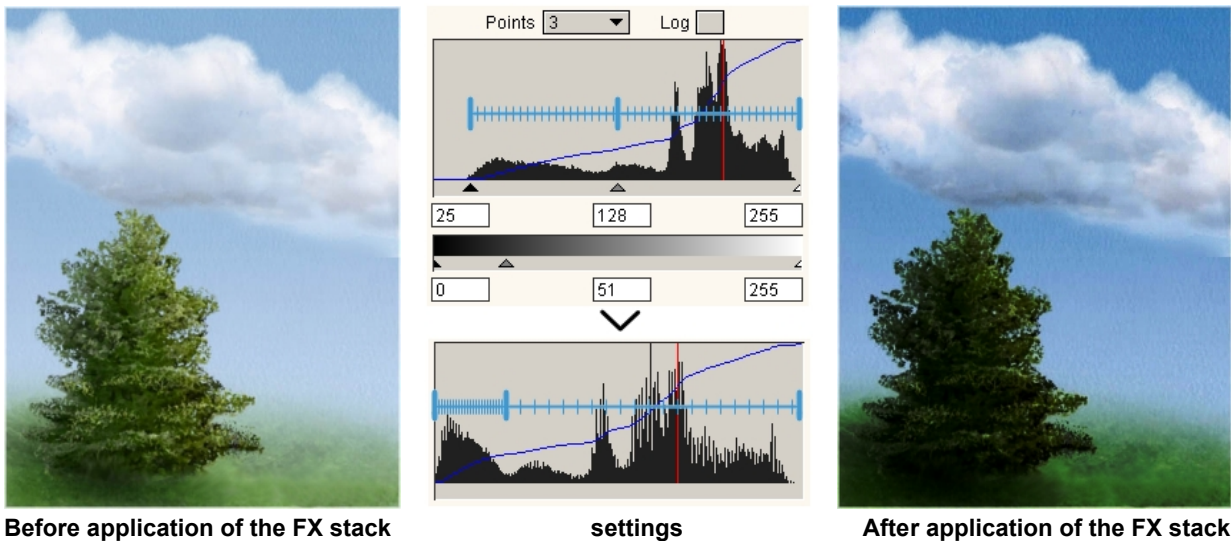
For a luminosity value given in the abscissa, the graph proportionally represents the quantity of pixels of the image having this luminosity value on the ordinates axis.

The blue curve represents the percentage of pixels having at least attained the luminosity value in the abscissa, the vertical red line represents the pixels the luminosity of which is the most represented on the screen.



The second function of the histogram, as you may have guessed already, is to modify the color properties of the image or video of the current layer (here again, the animation keys lock the parameters for a given position in the timeline).

To do this, we have to use the slider system of the histogram. You may use two, three or four of them. The latter enable re-calibration of the histogram by stretching or contracting it. Let's again take a look at the pixel luminosity component. Below, you see the example of luminosity modification using the three sliders:



The section of the histogram between the abscissas 25 and 128 will be contracted to fit between the abscissas 0 and 51. The section of the histogram between 129 and 255 will be stretched to fit between abscissas 52 and 255.

This means that the dark components of the pixels in the image will be reinforced and contracted whereas the light components of the pixels in the image will be redistributed, spread and therefore reduced.



The tabs *Red*, *Green*, *Blue* and *Alpha* make the other graphs relative to the current image appear. Each of them may be modified independently of the others.

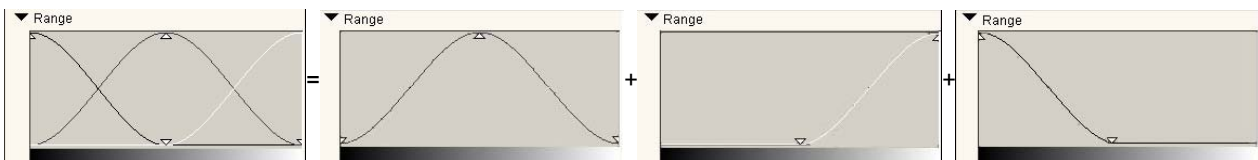


The principle of contracting and stretching is the same, regardless of how many sliders are used. Only the number of contracted or stretched intervals changes..

The first row of tabs contains four tabs: *Master*, *Shadows*, *MidTones* and *HighLights*.

- * Clicking the *Shadows* tab limits the impact of the slider modifications to the dark colors, gradually.
- * Clicking the *MidTones* tab limits the impact of the modifications to the medium tones and will reduce them progressively and finally cancel them out for the dark and light colors.
- * Clicking the *HighLights* tab limits the effects of the histogram modifications to light tones, the latter waning progressively then cancelling them out for the medium and dark tones.
- * The *Master* tab affects all color ranges in the same way.

Look at the following graphs for a better understanding:

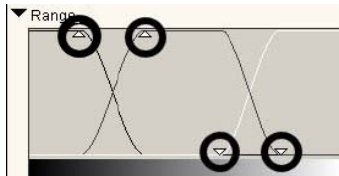


Three curves are represented:

- * The black curve represents the impact of the modifications in the histogram on the dark tones (*Shadows* tab)
- * The gray curve represents the impact of the modifications on the medium tones (*MidTones* tab)
- * The white curve represents the impact of the modifications on the light tones (*HighLights* tab)

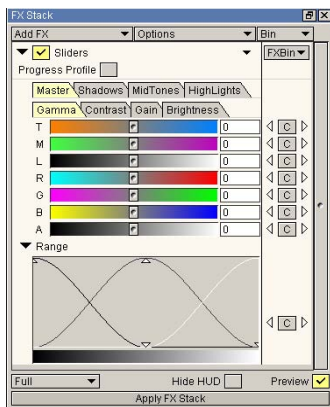
The tones concerned are located on the abscissa.

The impact power is represented on the ordinates axis (the higher the curve for a given range, the higher the influence of the histogram modification on this range).



The circled sliders in the graph opposite are used to move, contract or stretch the three curves and, consequently, modify the effect of the tabs.

• Adjust the colors using the *Sliders* effect



In addition to the effects affecting the color on a « geometric » and « statistic » level, there is a last color correction effect which is more complete and is applied using sliders (as the name implies ...).

- * It also has four tabs: *Master*, *Shadows*, *MidTones* and *HighLights* which have the same task as those in the Histogram tool: used to choose whether you wish to work on lighter or darker color ranges.

* The following four tabs: *Gamma*, *Contrast*, *Gain*, *Brightness* control how the LUT curves will be modified when a slider is moved.

* The seven lines correspond to seven *LUT* curves (see above) which may be modified: *Temperature*, *Magenta*, *Luminosity*, *Red*, *Green*, *Blue* and *Alpha*.

When the *Gamma* tab is selected, moving the slider to the right increases the height of the L.U.T curve (and therefore increases the values of *Temperature*, *Magenta*, *Red*, *Green*, ...) for the range selected (*Shadows*, *MidTones*, *HighLights*). The ends of the curve are less affected by the slider modifications (the modifications take place progressively).

When the *Contrast* tab is selected, moving the slider to the right increases the height of the L.U.T curve in its high sections and decreases the curve in its low sections for the chosen range. This means that the strong values of (*Temperature*, *Magenta*, *Red*, ...) will be reinforced and the weak values reduced for the range of your choice (moving the slider to the left produces the opposite effect).

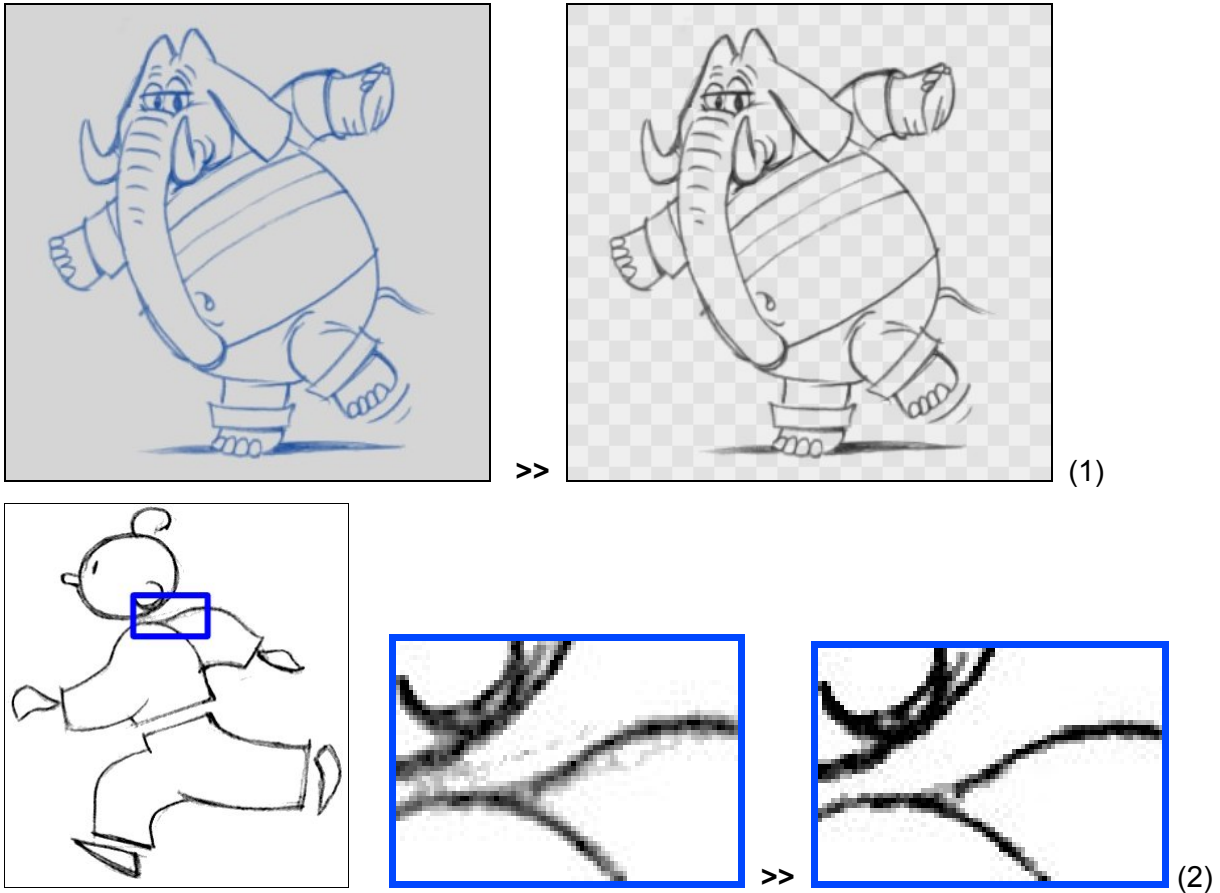
The *Gain* tab functions in roughly the same way as the *Contrast* tab, but the ends of the curve are gradually less affected by the slider modifications (the modifications of the values of *Temperature*, *Magenta*, *Red*, ... are the same as with the tab *Contrast* but work in a more subtle and progressive manner).

The effects of the *Brightness* tab are similar to the *Gamma* tab but the modifications are not applied in a progressive fashion due to the identical attribution from one end of the curve to the other.

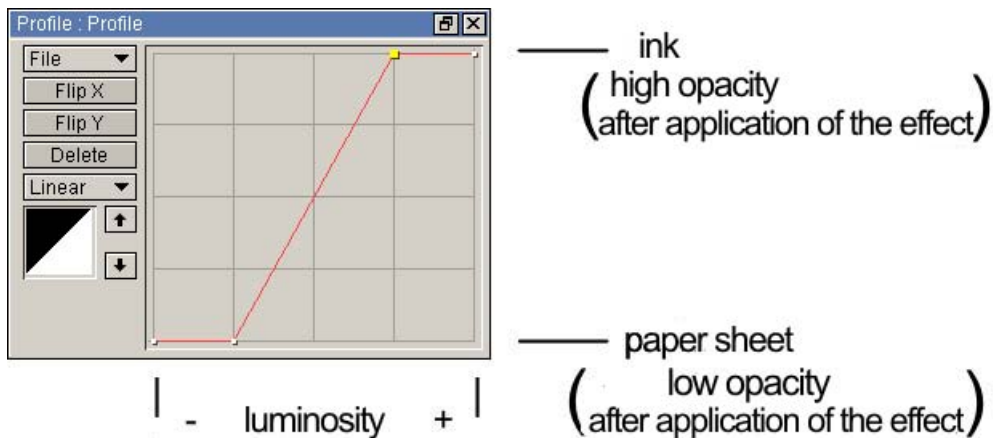
• The effect **Color > Scan cleaner**

This effect is used to clean up a scanned image drawn by hand.

Let's take a look at the sketch below to the left. This effect will not only make the light pixels of the image transparent and color the remaining pixels black (1) but will also remove unwanted pencil marks (2)



The diagram below illustrates the role of the profile curve present in this effect :



• The effect **Colors > Source Image**



It is necessary to know a few effects of the *Stylise* group (like *Drop Shadow*, *Add Border* or *Lumix*, ...) in order to master the *Source Image* effect perfectly. So it will be studied at the end of this lesson.

The effects of the Stylize menu

The effects of the *Stylize* menu are often used to work on logos, drawings or video footages.

We will take the images below as reference images for our examples:

(the running kid and the TVPaint logo are located over different background layers)



TVPaint

• The effect *Stylize > Glow*

It is possible to create an aura around a text or any other image containing transparent pixels ... The *Width*, *Height*, *Color* and *Opacity* of this aura may change in time thanks to the key system.



• The effect *Stylize > Grain*

This effect adds a noise (polychromatic or monochromatic) to the image or video footage of your choice. The *Size* parameter is used to set the size of the grains, the *Range* parameter controls their distance.

It is also possible to adjust their color using the parameters *Red Variation*, *Green Variation* and *Blue Variation* as well as modify their transparency.

If a logo is placed in front of a filmed sequence, application of a light noise on the logo helps integrate it into the sequence and minimize the « computer » look of the latter. The noise effect may also be used to smudge an image or drawing in a different way than a blur effect.



Original image



Monochromatic noise



Polychromatic noise

TVPaint TVPaint TVPaint

Original image

Blue polychromatic noise

Noise with larger grain size

• The effect *Stylize > Bevel*

This effect is used to give volume to your logos or drawings.

The *Mode* popup menu is used to choose between creation of an inner or outer relief. You may also use both effects at the same time, which gives a relief effect to the contours of your image.

To give an image relief you must set the *Size* of the bevel as well as its *Lighting* using the following parameters: *Force*, *Altitude*, *Direction*, *Color* and *Power*.

The *Smooth* parameter enables attenuation of rough contours by applying a slight blur.

TVPaint TVPaint TVPaint

inner bevel

outer bevel

inner and outer bevel



inner bevel



outer bevel



inner and outer bevel

• The effect *Stylize > Drop shadow*

This effect is useful to add a shadow to a logo or any other image that is not entirely opaque.

Color, *Direction*, *Distance* and *Opacity* are parameters that may be set using keys at your disposal.

In this way you can make the shadow of your logo move as if a light source were moving above it.

TVPaint TVPaint TVPaint

various shadow distances and directions



traditional shadow and blurred shadow (the background and the running kid are located on different layers)



The option *Shadow only* of the *Toonshadow* and *Drop Shadow* effects will be studied later in the chapter called « the *Color > Image Source* effect »

• The effect **Stylize > Toon Shading**

This effect differs from the drop shadow as it enables creation of a shadow inside an image. The transparent pixels are not affected by the creation of your shadow (see below).

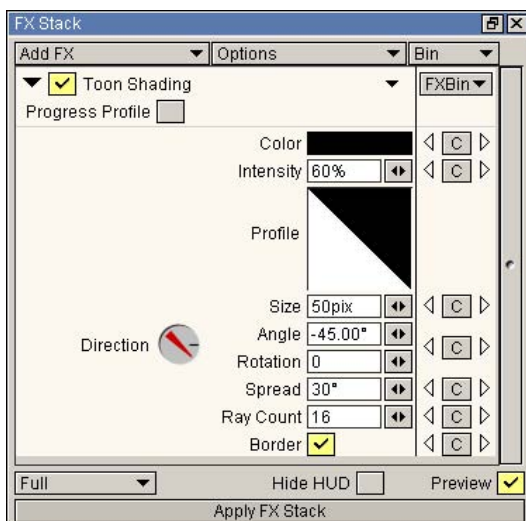


Toon Shading

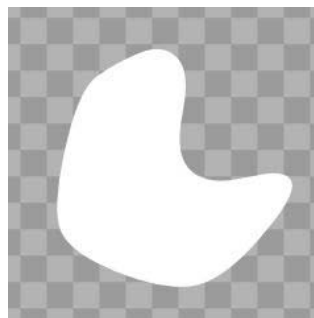


Drop shadow

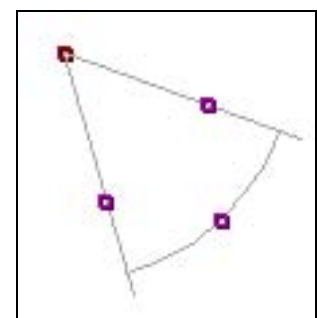
Let's take the shape filled with white below as an example to study this effect:



The panel of the toon-shading effect

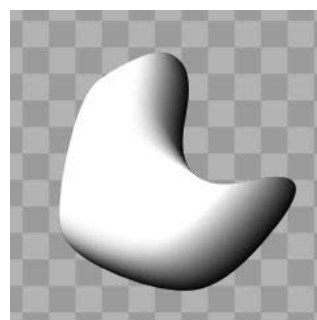
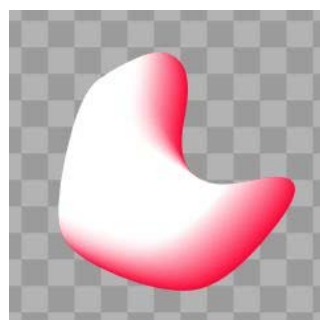


our reference image

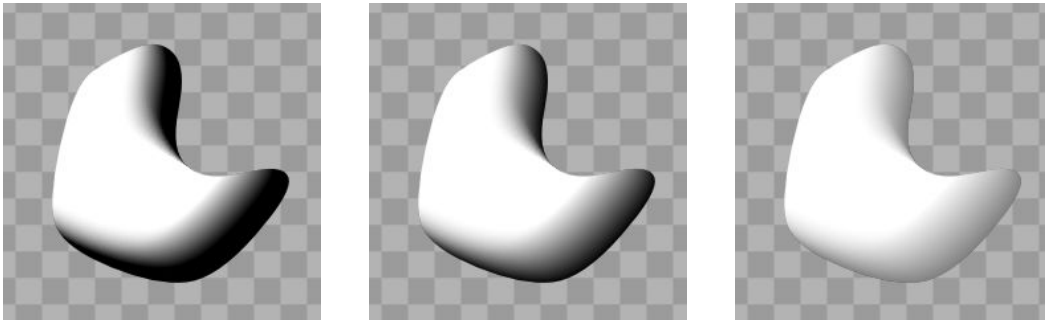


the HUD of the effect

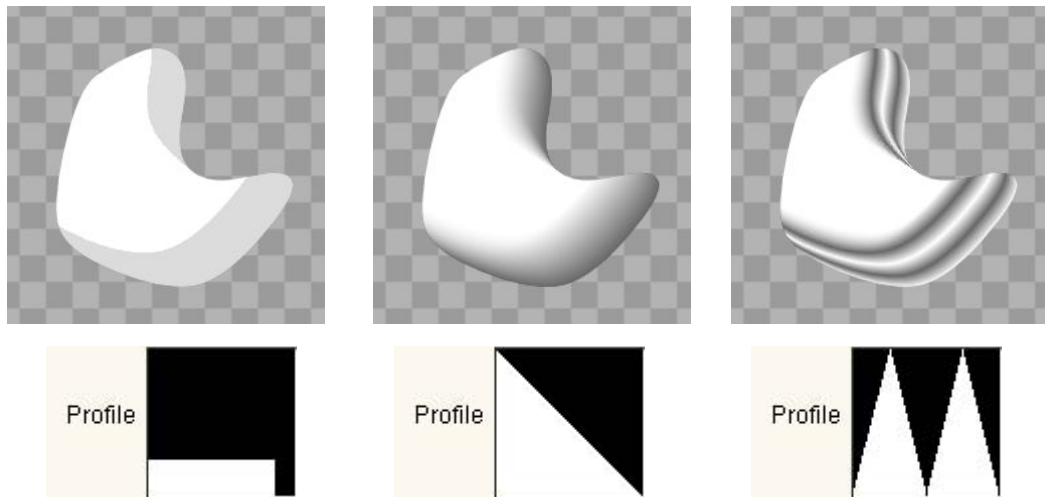
- The *Color* box is used to choose the color of the shadow you will create.



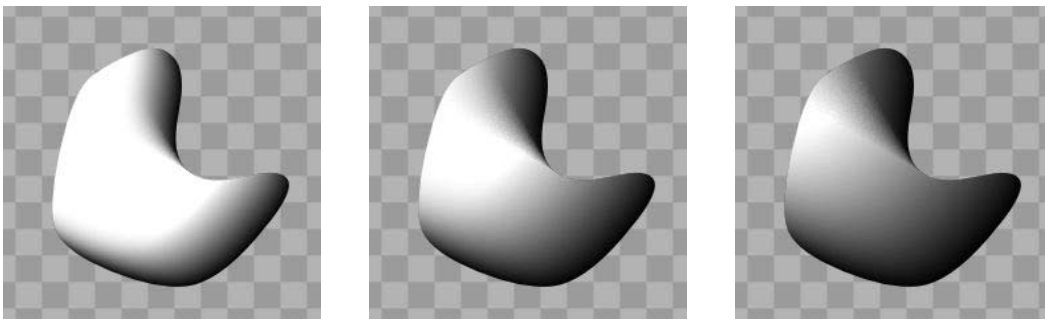
- The *Intensity* option is used to vary the power of the shadow in time:



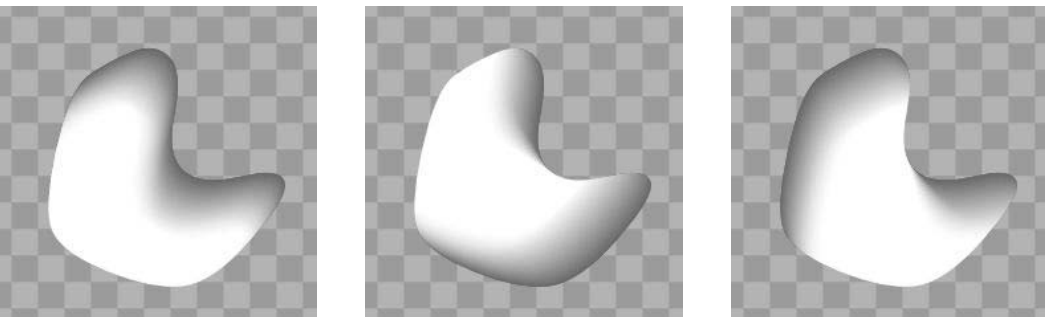
- The *Profile* option is used to vary the nature of the shadow:



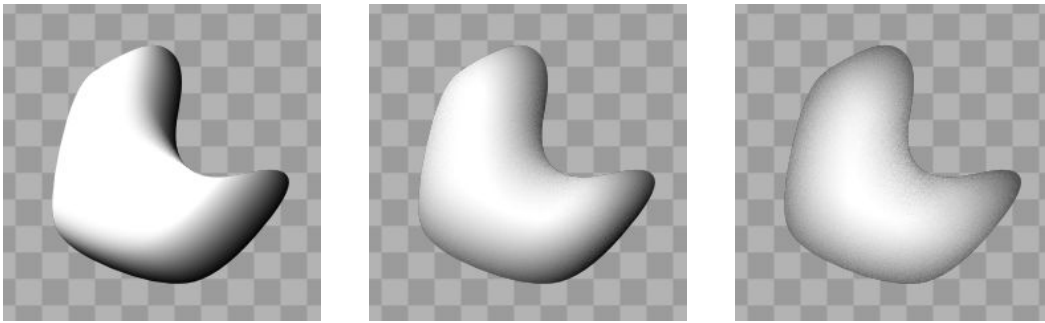
- The *Size* in pixels sets the range of the shadow:



- The *Angle* parameter is used to choose the direction of your lighting/shadow. When using animation keys, the *Rotation* parameter reflects the number of complete rotations to be carried out before arriving at the chosen angle.

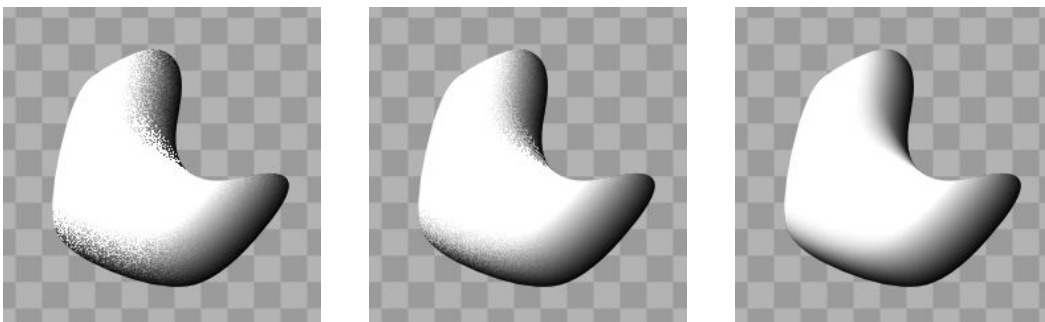


- The *Spread* parameter (in degrees) defines the angle over which the shadow will be spread (see next page).

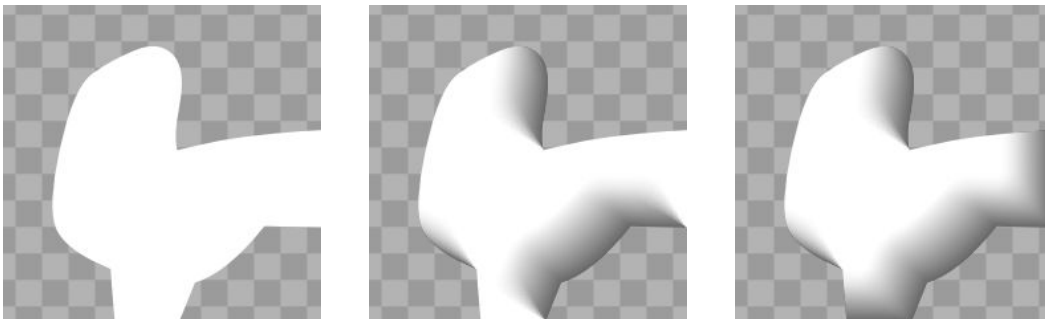


Using the *HUD* is very practical to adjust the angle, size and spread of your shadow.

- The *Ray Count* parameter refines the result when applying the effect. The higher this value, the higher the quality of your image, the lower the value, the more noise your shadow will contain.



- The *Border* box, if checked, is used to create a shadow from the borders of your project (see below).



Original image

border option not enabled

border option enabled

Once you know how to use the Toon-shading effect, it is possible to create all kinds of shadows for your characters:



The option *Shadow only* of the *Toonshadow* and *Drop Shadow* effects will be studied later in the chapter called « the *Color > Image Source* effect »

• The effect *Stylize > Erode*

This effect enables eroding the contours of an image or video footage.

This may create an interesting effect for the appearance or disappearance of images as well as for the attenuation of contours (see below...). There are two parameters that may be adjusted using keys : *width* and *height*.

TVPaint TVPaint TVPaint TVPaint



• The effect *Stylize > Add Border*

This effect is in a way the opposite of the *Erode* effect. It enables creation of a border of the thickness of your choice around an image. As TVPaint Animation works with sub-pixel precision, it is possible to increment this thickness in steps of 0.5 pixel using the associated mini-slider. It is also possible to choose the color of the border.

TVPaint TVPaint TVPaint

• The effect *Stylize > Bloom*



This effect produces a light blurry aura on the current image and may give an unreal aspect to an animated footage. Contrary to the *Glow* effect this bloom is applied to the opaque areas of the image. The parameters *Width* and *Height* are the same as those for the *Glow* effect.

If you wish, you may apply the bloom effect to the channel of your choice (*Red*, *Green* or *Blue*) and control *Blur*, *Saturation* and *Luminosity* of this aura.

• The effect *Stylize > Blender*



This effect blends the original image in a certain way and then transforms it into a large puzzle, the pieces of which have distorted contours. The adjustable parameter enables random modification of the result.

- The effect **Stylize > Mosaic**



This effect was already studied in lesson 5. It enlarges the pixels on the screen to the *width* and *height* of your choice.

- The effect **Stylize > Posterize**



This effect is used to reduce the number of colors on the screen and simplifies the original image or video footage. The *Number of colors* parameter may be set using the mini-slider and locked with a key.



This *Number of colors* parameter does not represent the exact number of colors on the screen but the number of colors blended to obtain the effect required.

- The effect **Stylize > Noise**



This effect moves the pixels of the original image at a distance corresponding to your parameter setting. You may also choose the percentage of pixels of the original image to be moved.

Well applied, this effect gives the impression that one sees the image or video footage through frosted glass.

- The effect **Stylize> Print**



Have you ever looked at a comic or cartoon strip through a magnifying glass? The color areas are made up of superposed round points of different sizes and colors.

The *Print* effect reproduces exactly this aspect.

You may choose to work in *Color*, in *Black & White* or work only on the non-opaque zones of the image...



The *Size* parameter is used to set the size (and therefore the number) of dots on the screen.

Opposite and on the page above you see the *print* effect applied with the *Color* channel and with the *Black & White* channel.

• The effect *Stylize > Negative*



This effect replaces the color of each pixel with its negative.

• The effect *Stylize > Solarize*

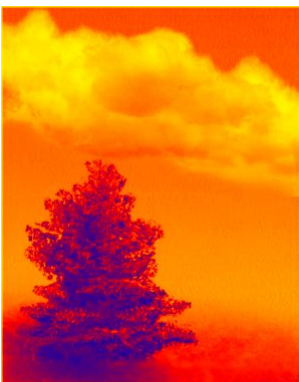


This effect reproduces the photographic effect named solarization which consists of mixing the colors of an image with the colors of its negative.



These two effects have no parameters.

• The effect *Stylize > Color range*



This effect substitutes the colors of one of the channels *Red*, *Green*, *Blue*, *Alpha* or *Luminosity* with those of the gradient of your choice (see lesson 3 for gradients).

In the example opposite: the gradient blue > orange > yellow was applied on the image's luminosity channel:
the yellow pixels replace the light pixels of the image,
the red pixels replace the mid tone pixels,
the blue pixels replace the dark pixels.

• The effect *Stylize > HalfTone*



The *HalfTone* effect reproduces the aspect of a « grid » on the current image and gives the current image the appearance of an « artist's canvas».

* You may set the parameters for the horizontal and vertical cells (*H cells* and *V cells*), *Direction*, *Opacity* of the grid as well as their type (*Line*, *Dot*, *Cross*, *Checks*, *Blocks*, etc.).

* There are also several application modes: *Color on black*, *Color on white*, *Saturation*, etc.

* Finally, you may use the *Jitter* parameters which will slightly modify the shape of the grid.



• The effect *Stylize > Lumix*

This effect exchanges the luminosity values of the pixels in an image or source video footage with those of another image or footage, which gives the impression of seeing an image through the contours of another image (see below).



>>

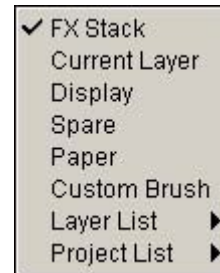


• Some remarks regarding the *Source Image* notion

A source image or footage is used in the *Rendering* box of the *Lumix* effect and some other effects (in particular the *Keyframer*). Let's discuss this further:

TVPaint Animation offers some effects which require the use of an image or footage other than the current image. These are referred to as source images or footages.

Several choices are available for the so-called source images or video footage: the project of your choice, the layer of your choice, the current brush or animated brush, the spare image, the paper, the current display, the *FX stack*.



* The choice *FX stack* will use the current image with the effects of the *FX stack* applied as *Source Image* before applying the parameters set for the *Source Image*.

* The choice *Current layer* allows you to apply the effect from the current layer.

* The choice *Display* allows you to apply on the current layer the effect from the footage viewed when playing your project (the effect will be that all layers appear to be merged, while the hidden layers are not taken into account).

* You may also choose to use the *Spare Image* or *Paper* if they are available.

* When choosing another project, layer or brush, you may adjust the Pre- and Post-Behavior, the position and the animation mode: the number « n » of the *Position* parameter corresponds to the image « n » of your project, animation layer or animated brush.

The *Animation* mode controls the « behavior » of your brush, layer or project: random animation, ping-pong, animation reduced to the image indicated in the position parameter, etc.

If the number of source images is lower than the number of images to which your effects are applied, you may adjust the Pre- and Post-Behavior for your source (random, pingpong, loop, etc.).

As required, you may choose to flip your source vertically, horizontally or both, before using this source.

• The Colors > Image Source effect

The *Colors > Image Source* effect allows you to display the image or the sequence of your choice on the current layer.

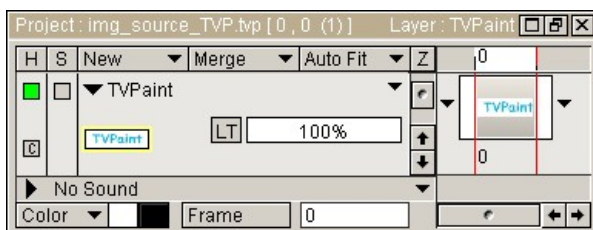
* The *Source* menu use all notions encountered in the last paragraph. As a consequence, you can choose to display the current layer, an other layer, a paper, the spare image, an other project, the current custombrush, etc.

* The *Blend* popup menu is used to choose the mode to be used when drawing the *Source Image* or *Sequence* on your current Layer (Color, Behind, Erase, ...)

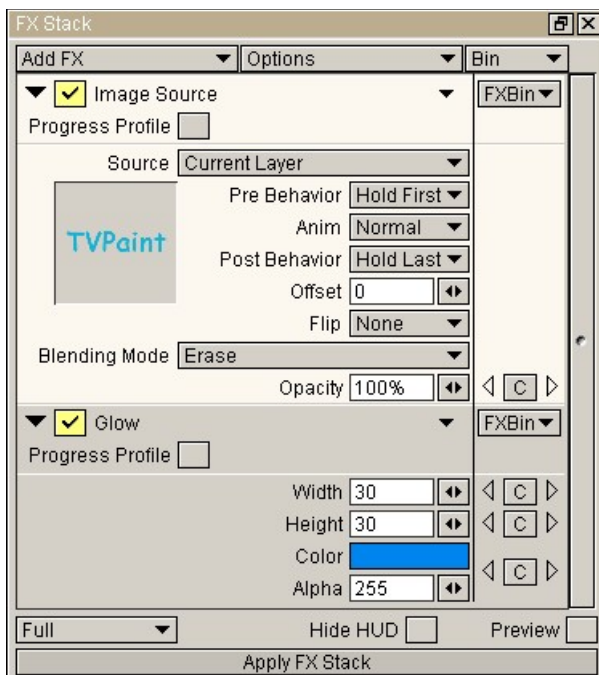
* The *Opacity* parameter allow you to adjust ... the opacity of the displayed image or sequence.

This effect could seem simple, even obvious, but it has a lot of usefull applications :

1st example :



On the unique layer of our timeline, a «TVPaint» logo has been drawn. We are going to replace it by its own glow.



Let's take a look at the FX-stack opposite :

1) The first effect that will be applied is the *Stylise > Glow* effect.

2) The effect *Colors > Image Source* is the second effect that will be applied. The *Source* selected is *Current layer* and the *Blending Mode* is the *Erase Mode*.

In this way, the «TVPaint» logo will be removed just after the rendering of the glow on the screen.



This process works with other effects of the *Stylise* group like *Add Border* or *Bevel* (with *Outer* option selected). (For the *Drop Shadow* and *Toonshading* effects, please study the next example)

TVPaint

original image

>>

TVPaint

after applying the effect
Stylise > Glow only

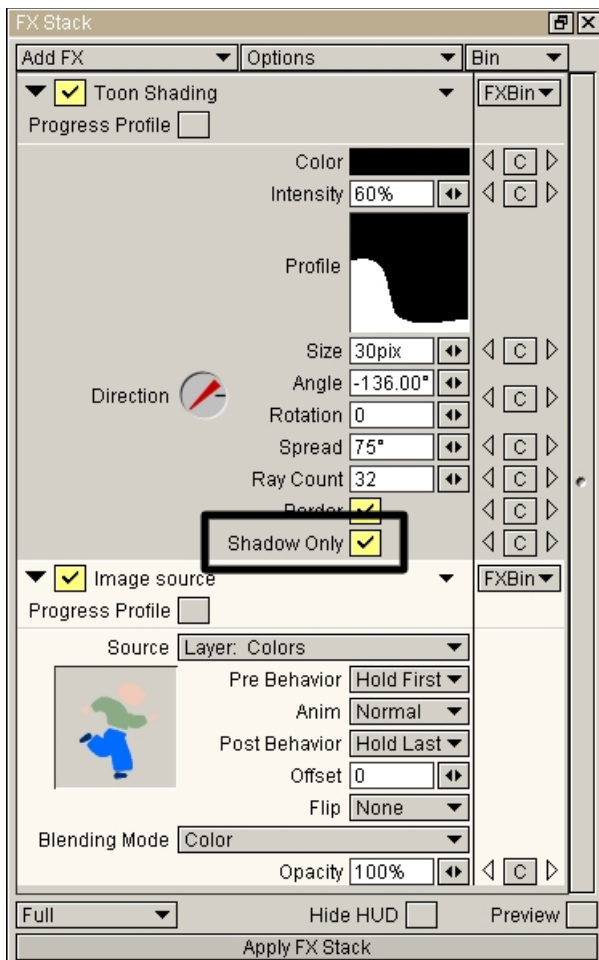
>>

TVPaint

after applying all the FX-stack

2nd example :

In this example, we will create a shadow for the running kid thanks to the *Stylese > Toonshading* effect. This shadow will be rendered on an empty animation layer.



In the FX-stack opposite, the effect *Stylese > Toonshading* will be applied on the animated layer called "Toon Shading". (see the timeline below)

The effect *Colors > Image Source* allows you to specify the reference layer used to render the shadow. Here, the *Source* is the animation layer called "color"

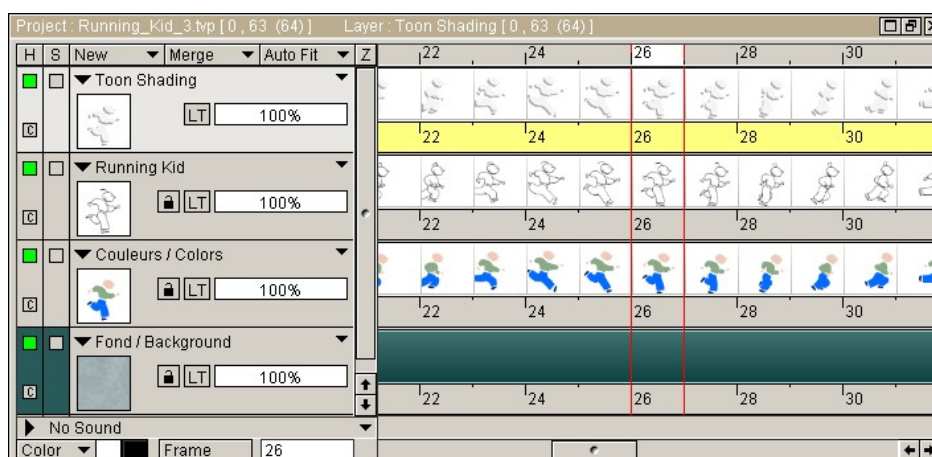
If we use the *Erase* blending mode as we did in the first example, the shadow will disappear. (the toonshadow is inside the running kid)

That's the reason why we will keep the *Color* blending mode and use the *Shadow Only* option of the effect *Stylese > Toonshading*. It allows to create the shadow of the running kid without re-drawing it.

It is then possible to generate a shadow for our running kid on a separated animated layer.

As a consequence, the character is not altered by the rendering of the shadow.

In this example, the effect *Colors > Image Source* allows you to define an image or an animation sequence as reference for the "following" toonshadow effect in your FX-stack.

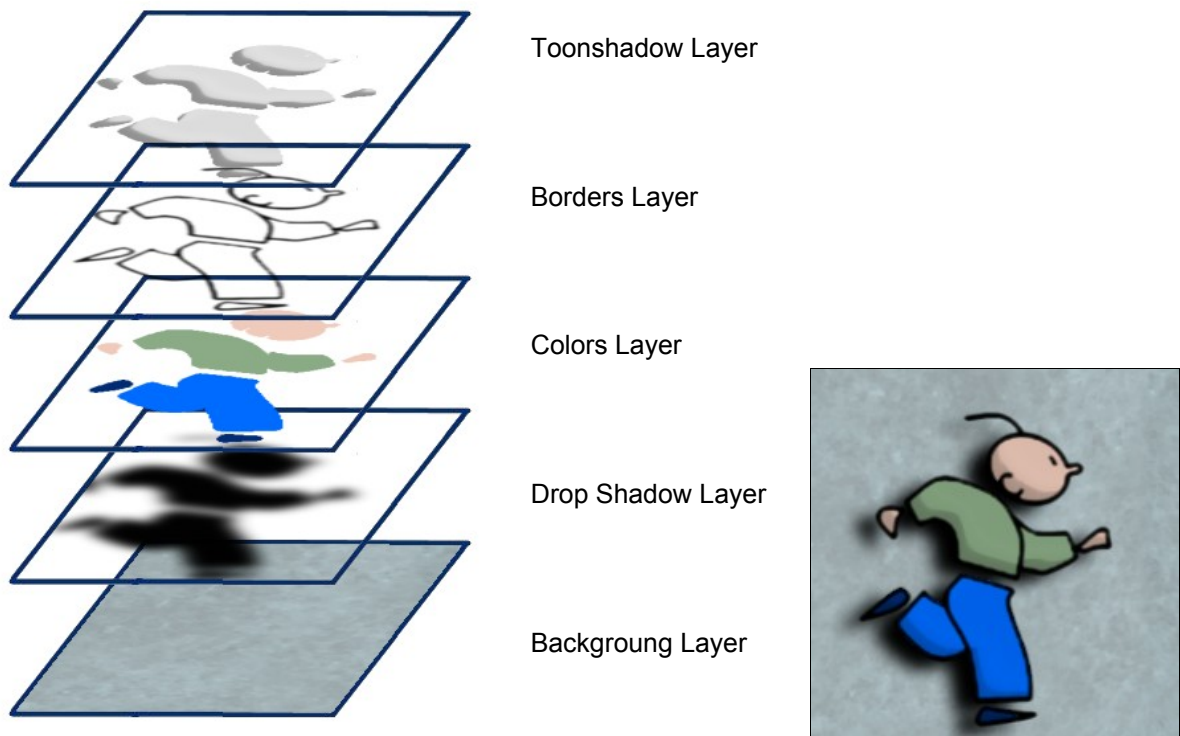




In this example, it is also possible to replace the effect *Stylise > ToonShading* by the effect *Stylise > Drop Shadow*. (the option *Shadow only* is also present in this effect)

In that case, you will obtain a classical shadow. Of course, the character layers (*colors* and *Running Kid*) will stay unchanged.

Here is the 3D view of the layers you can obtain after using the effects *Colors > Image source*, *Stylise > Drop Shadow* and *Stylise > Toonshading*.



Lesson 9

Keyframer and *Paint* effects, Studying movements and paths

In this lesson you will:

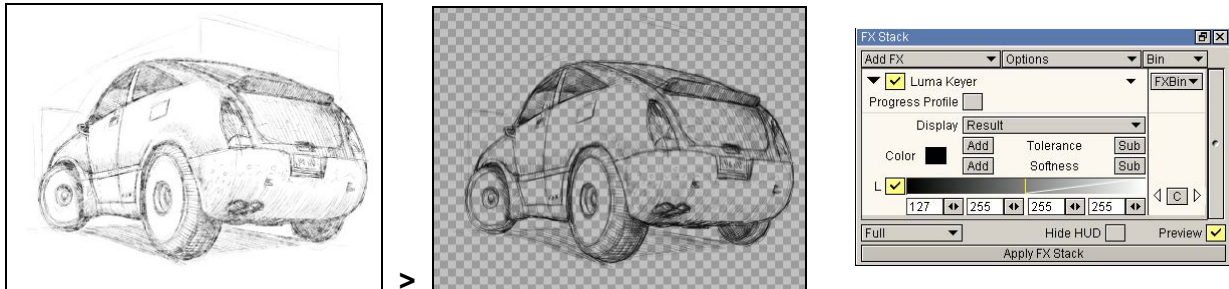
- Study the *Keyframer* effects
- Study the *Paint* effects
- Draw simple geometric forms and floodfill surfaces.
- Move brushes, images and layers using the *Keyframer* tool.

The effects of the *Key* menu

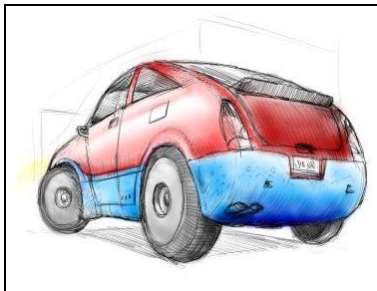
The *Key* menu contains all effects which are used to make a color on the screen transparent. These effects are sometimes called cut-out and incrustation effects.

• The *Luma Keyer*

The *Luma Keyer* effect is used to render pixels transparent according to their luminosity. When you have scanned an image on a white background you obtain a completely opaque layer. With the *Luma Keyer* effect it is therefore possible to make the white pixels of this image transparent:



Let's take a look at the drawing on real paper above. Application of the *Luma Keyer* effect set with correct parameters will render the light pixels transparent (independent of their hue and saturation), progressively increase the opacity of the medium tone pixels and leave the dark pixels intact. This gives us the image shown to the right.



At this point, it is possible to re-color the image, if desired : simply place a layer under the image obtained and spread the colors of your choice on it (see example opposite).

You may also use the shape floodfill tools studied in lesson 5.

These are the functions of the *Luma Keyer* effect:

- * The *Display* popup menu is used to choose between viewing the source image and viewing the result.
- * The color box is used to choose the color the luminosity of which you wish to render transparent directly on the screen.
- * The buttons *+* and *-* are used to adjust the tolerance and softness of pixel cut-out.
- * The mini-sliders allow adjustment of the following, depending on the luminosity and with the help of the diagram below:



The type of pixels which remain opaque

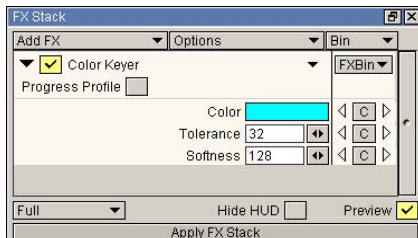
Those which are progressively made transparent

Those which will be completely transparent



It is recommended to combine the *Luma Keyer* effect in a multiple FX stack with the *Colors > Histogram* or the *Colors > Slider* effects to be able to precisely adjust pixel transparency (use the parameters relative to the alpha component) and remove the gray aspect (light) of semi-transparent pixels.

• The *Color Keyer*



The *Color Keyer* effect uses the same principle as the *Luma Keyer* effect. It deletes the selected color on the image or video footage of your choice.

It is no longer required to concentrate on pixel luminosity but on the entire color.

Two types of parameters may be locked with a key: *Tolerance* and *Smooth*.

In the FX stack above we see: the higher the value of the *Tolerance* parameter, the more colors close to « blue » will be deleted.

The higher the value of the *Smooth* parameter, the less abrupt the transition between opaque and transparent pixels will be.



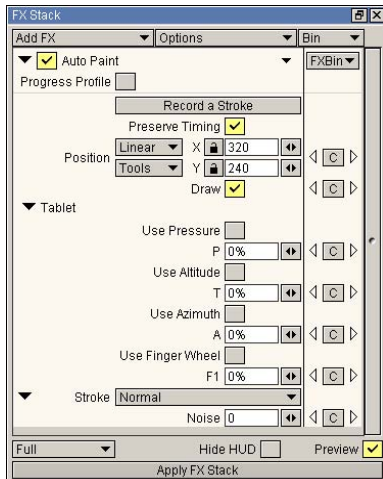
Opposite, after merging the different layers, most of the bluish colors of the sky and cloud become transparent.

The green and dark colors of the tree are further away from blue and therefore opaque.



These two keying effects may, of course, be applied to a complete footage, which makes work easier when using a scanner with loader.

The Paint > AutoPaint effect



Have you ever watched a weather report?

When the program is over, you often see the signature of the speaker(s) displayed on the screen.

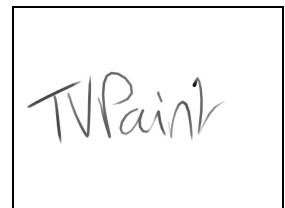
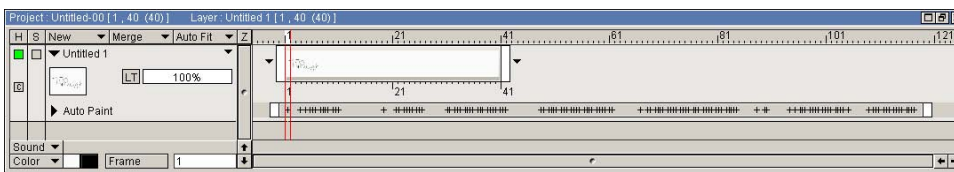
It is possible to reproduce this effect in TVPaint Animation, using the effect *Paint > AutoPaint*.

This is the perfect way to dynamically sign your future animated works of art!

* First, you have to record the stroke which corresponds to the signature: go onto an empty animation layer, click on the *Record a stroke* button in the AutoPaint effect and then draw your signature on the screen.

* When this is done, click on the *Stop* button or press the [Escape] key.

You have now recorded the signature in the program memory. A long series of keys is visible in the timeline (see below).



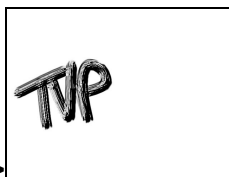
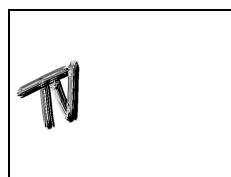
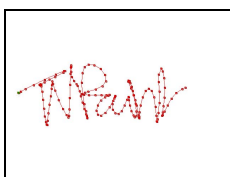
* Delete the current image on the screen (i.e. the signature).

* Select the tool of your choice and adjust its parameters for the future stroke of the signature.

* Stretch your animation layer so that it covers all keys of the timeline.

* Select all its images and then apply the FX stack.

When you play the project you will note that the signature is “drawn” progressively on the screen.



To ensure that your stroke is carried out on the number of images of your choice, two methods are available:

- * You may stretch or contract the set of keys right after recording the stroke as indicated above.
- * You may create an animation layer with the number of images desired and select all images before recording the stroke.

Let's now study the *AutoPaint* effect in detail:

- * Recording the stroke generates a large number of key points on the timeline each of which stores the position of your stylus at a given moment. When the stroke is recorded, you may modify the position of the stylus on the screen for the key of your choice thanks to the numeric fields X and Y.

- * For a given key, the *Draw* button indicates if the stylus was in contact with the tablet or not. If it is not enabled for a given key, there will be no stroke for this key (e.g. this is the case if you lifted the stylus during recording).

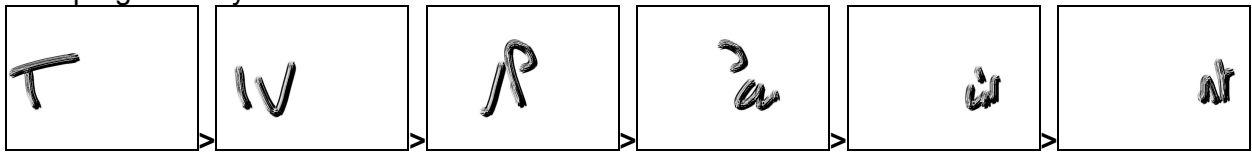
- * Recording a stroke with the *AutoPaint* effect allows for other recordings, too : in particular the data relative to *Pressure*, *Altitude*, *Azimuth* and *Fingerwheel* available on the tablet. It is also possible to choose whether this data will be restored or not when applying the FX stack by checking or unchecking the corresponding boxes.

- * The section *Stroke mode* offers several choices : *Normal*, *Size*, *Full* and *Last*.

These are results obtained using these modes:

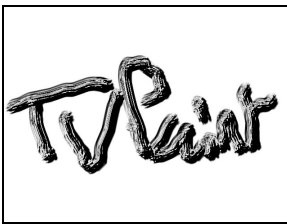
- The *Normal* mode progressively reproduces your stroke on the screen. This is the one we have been using since the beginning of this lesson.

- The *Size* modes requires adjustment of the parameter with the same name and will erase the stroke progressively in time.



- The *Last* mode is a kind of *Size* mode parameter set to value « 1 », which only draws one « point » of the stroke at a time.

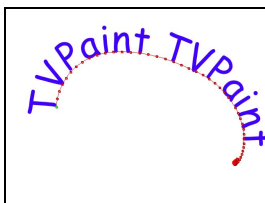
In *Complete* mode the complete stroke is drawn on the screen, independent of the circumstances.



- * The last is the *Noise* parameter: it defines a possible deviation from the original path and is used to obtain less regular curves (see opposite, the TVPaint logo is slightly distorted, as if written with a trembling hand).

AutoPaint is in a way similar to the *Re-apply* option as the result depends on the drawing tool selected just before application of the FX stack.

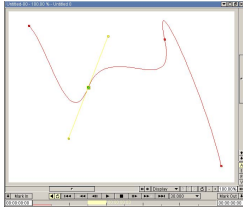
Here, two interesting examples :



Opposite, after recording a simple stroke in the shape of a semi-circular arch, the AutoPaint effect was applied using the *TextBrush* tool in *Letter* mode with the rotation parameter connected to the stylus direction.

The text seems to follow the defined path in time, each letter having its own inclination depending on its position on the path.

Management of *Paths*



In lesson 7, when studying the *Center Blur*, we already discussed the idea that an effect may make use of the *Position* parameters which will then define a path on the screen.

We will now discuss this *Path* notion in more detail.



When an effect authorizes use of a path(s) for one or several of its parameters, you have access to the *Tools* menu in the panel of the corresponding effect as shown opposite.

This is what it contains:

- * You may use the *Pixel tracker* to create a path.
- * You may also record a stroke on the screen, to create a path.
- * The third option of the *Tools* menu allows you to re-use a path you have already created previously in your effects stack and use it with the current parameters.
- * As is the case for the palettes, the tool settings, the effects, etc, a path may be renamed, saved, etc. The option *Path Manager* is used for all these tasks.
- * The option *Add to bin* allows you to save the current path under a name of your choice for later use (we have already done the same for customized palettes, mixers, tools).
- * The *Copy from path bin* allows you to re-use a path saved in the *Bin* for your position parameter.
- * The *Center* option replaces the position values for the current key with those of the center of the image.
- * The option *Reset* deletes all the keys of your effect.

• The *Path recorder*

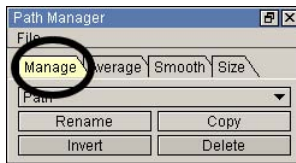
Path recording may also be carried out in any other effect to create a path. The option *Path Recorder* in the *Tools* menu relative to the position parameter(s) of your effect will help you to do this. The steps described above for the *AutoPaint* effect are still applicable in this case.



Using the standard *Path Recorder* allows you to generate a large number of keys containing position parameters, however, contrary to the *AutoPaint* effect it does not allow to restore pressure, azimuth and altitude.

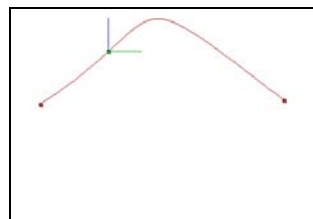
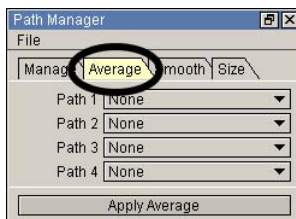
• The *Path manager*

The *Path Manager* mentioned above, has four tabs:

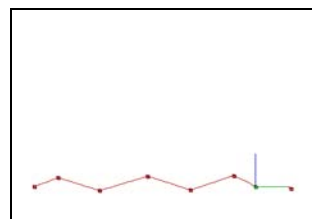


* The *Manage* tab allows you to choose a path amongst those already saved in the *Bin*, and then to rename, copy, delete or even invert it, (the path will in this case be taken in the reverse direction when used).

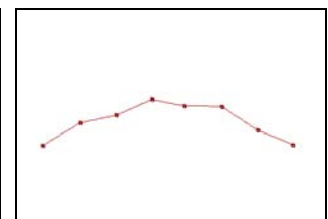
* The *Average* tab has four popup menus for you to choose the *Bin* paths. It allows you to set the values for each animation key of the current path as an average derived from the keys of every chosen path.



1st path

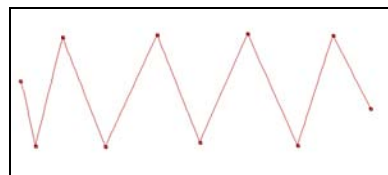
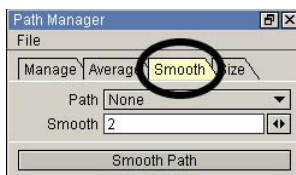


2nd path



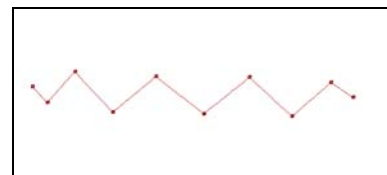
path average

* The *Smooth* tab allows you to smooth the values associated with the animation key of the path chosen (the higher the numeric value, the more the paths will be smoothed after application).



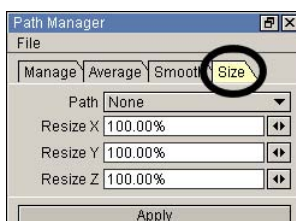
basic path

>>

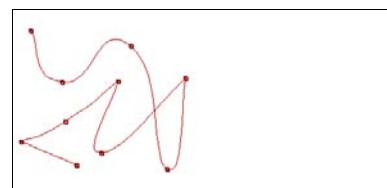


smoothed path

* The *Size* tab allows you to modify the size of the complete path on each of the three axes (horizontal, vertical or depth). This may be useful if you wish to transfer a path from one project to another with a different size.



basic path



path reduced by 50% on the horizontal axis



Using a value of -100% on one of the axes allows to completely turn your path.



To move the entire path on the screen, you simply select all its keys in the *HUD* and then click-slide using the mouse.

• Save paths

We explained above that it is possible to save paths to be used later for an effect of your choice (option *Add to Bin*). However, a path saved in this manner may not be recovered after closing and re-opening TVPaint Animation.

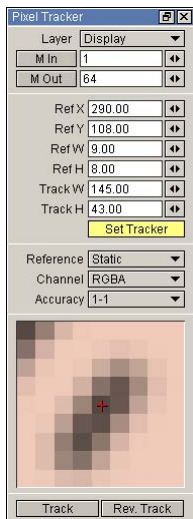
Three methods are available to solve this problem:

- * Save your configuration before quitting the program.
- * The effects of the FX stack and their parameters may be saved in a *Bin FX* menu (see lesson 7). This save mode offers the advantage that it also stores the path(s) associated with your effect so that they may be recovered when re-starting TVPaint Animation.
- * You may also save your paths before closing TVPaint Animation, then reload them after re-start thanks to the *File* menu of the Path Manager.



The saved path is that of the *Manage* popup menu, a loaded path will be added in the path bin and available in the popup menu of the *Manage* tab.

• The Pixel Tracker



There is also another way to create paths: follow the movement of the pixels in an animation in time.

To do this, you use the *Pixel tracker* panel.

The latter is accessible in the effects requiring use of paths, in the *Tools* popup menu or directly via the *Windows* main menu (see the corresponding window opposite).

We will now try to create a path from an eye movement of our little character in the animation below.

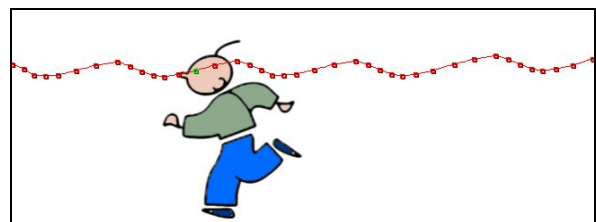
When the path is created, we may, for example, re-use it with the *AutoPaint* effect and the pen tool in smooth mode to create a blur on it.

It is also possible to use a lighting effect to create a luminous spot following the movement of the character, etc.

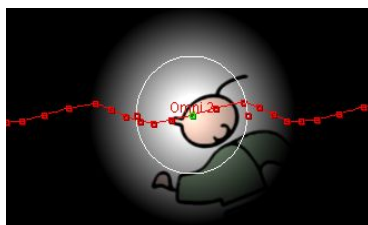


original animation

>>



path created from pixel tracking at eye level

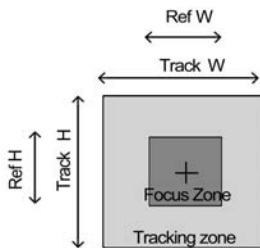


Opposite, the path of the eye was re-used with *Omni* lighting.

This is how to use the pixel tracker panel:

- * In the first section, you must define the layer on which the character whose movement you wish to follow (or any other element) is located. Two time or frame markers determine the section of the layer that will be taken into account for pixel tracking (the entire layer, by default).

* In the second section, you must define a focus area within the current image. TVPaint Animation will try to find this in the following images of your video in order to create a path. To « follow » a human face, i.e. to create a path from the face, the eye is often used to define the focus area. The values *Ref X* and *Ref Y* are used to choose the center of this focus area and the values *Ref W* and *Ref H* to set its width and height. The parameters *Track W* and *Track H* will limit search in the focus area to the number of pixels in length and height of your choice, around the focus area of the first image (see diagram below).



When the pixel tracker tool passes from one image to another, it will memorize the focus area of the first image and try to find it in the next image in the tracking area.

This enables creation of the position keys necessary for path creation.



If HUD display is enabled after having clicked on the *Set tracker* button, you may modify these parameters directly with the following combination : [Ctrl+right click+slide the mouse] or [Ctrl+left click+slide the mouse].

If, for example, you select the right eye of our character as «focus area», and the values for the parameters *Track W* and *Track H* are too small, this will make it difficult to find it in the following images (as our character is moving).

Inversely, high values for these parameters may define the left eye of the character as « focus zone » during the process and this will falsify the path obtained.

* The third section contains three popup menus:

The *Reference* popup menu is used to choose if the reference « focus zone » for the process is always that of the first image selected or will be updated as tracking progresses.

The *Channel* menu will, depending on your choice, restrict the channels to which analysis of movement tracking will be applied.

The *Accuracy* popup menu allows you to define the complexity of the concordance test. If you choose 1-1, the test is carried out at pixel level. The tracking is then fairly rough. If you choose 1-64, the pixels determined by the 1-1 test will be moved 64 times by a 64th of a pixel in order to fine-tune tracking.

* The fourth section is a zoom on the focus area you have selected.

* The fifth section contains two buttons:

The *Track* button starts the process of creating a path with the chosen parameters whereas the *Rev. Track* button has the same effect but reverses the path.

The Motion > Keyframer effect

The *Keyframer* is doubtlessly one of the most used effects in TVPaint Animation.

It is found in the *Effect > Motion* main menu.

It is used to move all kinds of drawings on the screen.

To use the *Keyframer*, you must define the following :

- * The object to be moved on the screen: brush, layer, spare image, paper...
- * The path taken by the object on the screen using animation keys or pre-defined paths.
- * The rotations to be applied to this object using keys.
- * The motion blurs and, if required, pre- and post-behavior.



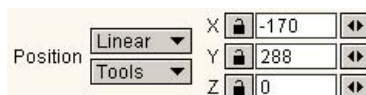
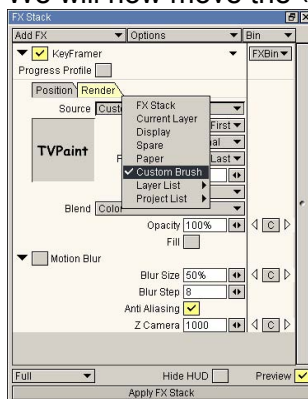
To start our study of the *Keyframer*, we have created a «TVPaint» brush (320*100 pixels) as shown opposite. The word TVPaint is written in black on a transparent background.



In some of the images hereafter, the background chosen is gray so that you can see the white pixels of the HUD.

• 1st example : movement, zoom and motion blur

We will now move the « TVPaint » brush on the screen.



* Go to the *Render* tab and select the *custom brush* as source.

* Go back to the *Position* tab.

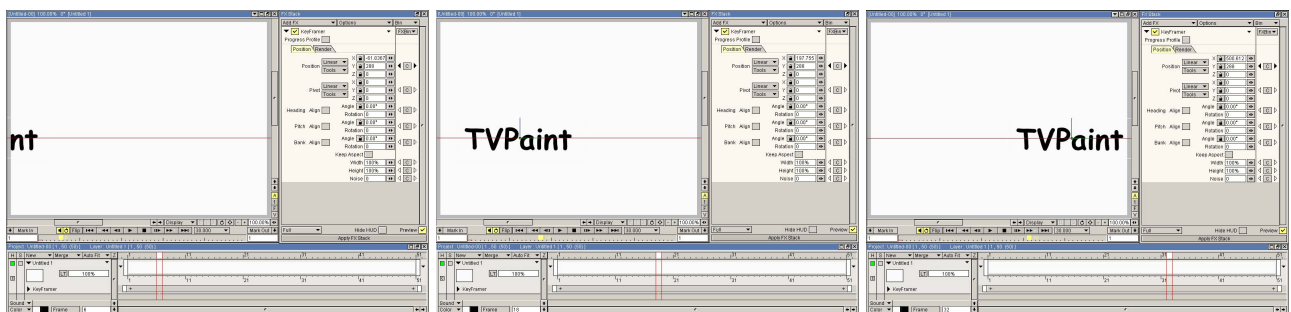
* Place the TVPaint brush outside the current project to the left using the HUD (see below) and then create an animation key for the *position* variable at the beginning of the layer.

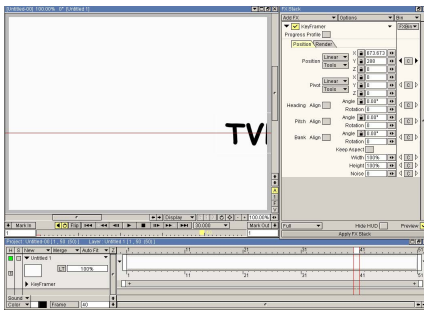
* Now create an animation key for the *Position* variable at the end of the layer and place the TVPaint brush outside the current project as before but this time to the right.

* As needed, you may adjust the position of the movement key points using the numeric fields and mini-sliders (use the values shown opposite). The X and Y fields represent the position of the brush center on the screen.

Playing your project in *Preview* mode allows you to check that your brush appears on the left of the screen and disappears to the right.

project : PAL format, 1 animlayer
with 50 images
1st key : 1st frame
position X=-170, Y=288, Z=0
2nd key : 50th frame
position X=890, Y=288, Z=0



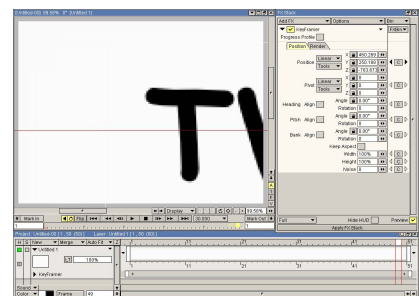
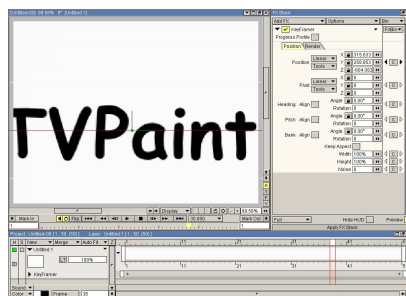
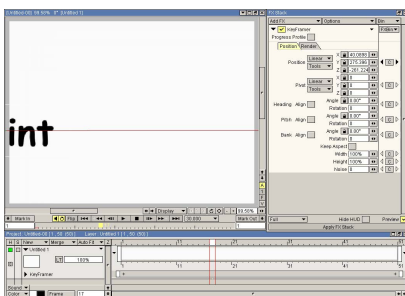


To create a path you may position a brush outside the work zone: the brush then appears hidden and only its outline is visible as *HUD* (see opposite ...).

Do not immediately apply the *FX stack*. Did you notice the *Z position* numeric field? This is used to set the depth of the object moved on the screen.

Let's now modify the second key we created: enter the parameters for the following positions :
X= 470, Y= 288, Z= -800

A fast slide along the timeline allows you to see that our logo moves from left to right but, in addition to that, zooms towards the viewer ! (see below)

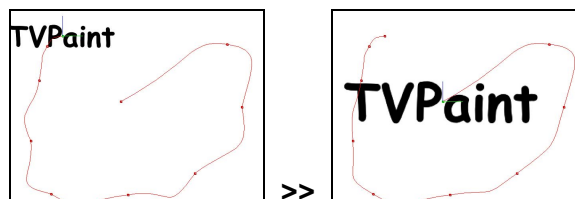


A positive value in the *Z* numeric field would have resulted in the logo moving away.

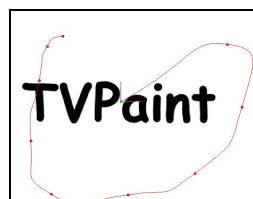
It is possible to generate even more subtle movements as our logo may follow the pre-defined path of our choice thanks to the *Path Recorder* or pixel tracker.

You may also curve the paths thanks to the *HUD* and the keys of your choice (*Linear*, *Spline* or *Smooth*).

For example, in the trajectory below, the logo follows a spline on the screen while zooming lightly towards the foreground.



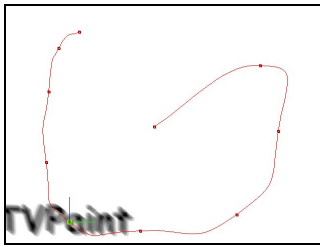
>>



Now we will make it a bit more complicated... It is possible to leave a trail behind our logo, a trail that depends on its speed and trajectory.



Go to the *Render* tab :
the *Blur step* value defines the number of logos which will make up the « trail ».
The *Blur Size* is used to set the parameters of the trail length (see opposite).



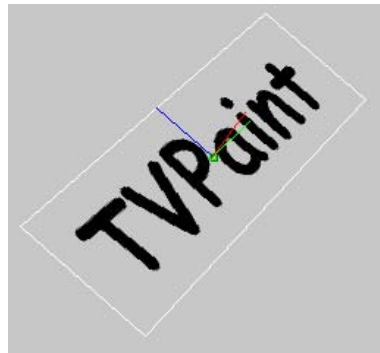
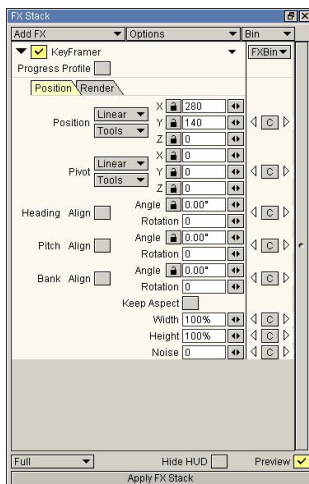
Note that a low value generates a slight blur in the movement direction which is ideal for creating blurs generated by fast object movement.

A zero value will eliminate the trail.



The settings of the progress profile (lesson 7) come into their own here: the movement is accelerated or slowed at your discretion!

• 2nd example: *Pitch, Heading, Bank* and *Pivot*



In this second example, we will pivot our «TVPaint» logo using the pitch, heading and bank parameters.

Reset the values of the *Keyframer* effect to zero, select the «TVPaint» logo as source again and modify the *Bank* angle using the slider. The logo then turns along the blue axis represented on the diagram (see below).



Reset the values of the *Keyframer* effect to zero and proceed in the same way with the *Pitch* parameter. The logo now turns along the green axis represented in the diagram.



With the *Heading* parameter, the logo turns along the red axis represented in the diagram.



The combination of these three parameters gives a wide variety of results. It is now up to you to use these rotations in your animations and videos.

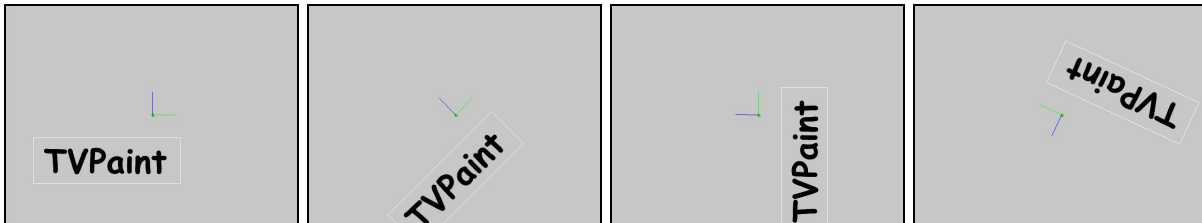
The logo may carry out several rotations around an axis: you simply modify the value of the *Rotation* parameter when creating the animation keys to increase the angle to 360°.

In the examples above, our logo always turns in relation to its center: the axes the logo turns around cross each other in its center.

The *Pivot* parameters may be used to modify the position of the rotation axes in relation to the brush.

Modifying the pivot X coordinate by increasing it by 100 pixels and decreasing the Y coordinate by 100 pixels will generate other types of rotation when modifying *Pitch*, *Heading* and *Bank*, as the rotation axes are outside the logo.

Below you will see the effects of the *Heading* modification for our new pivot.

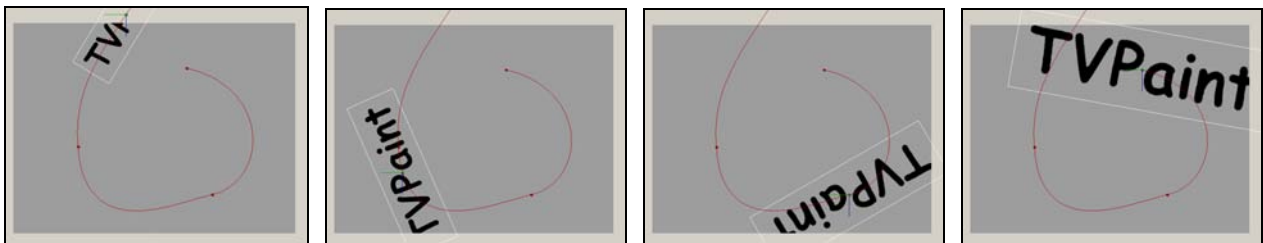


Modifying the Z coordinate of the pivot allows even more complicated 3D movements:

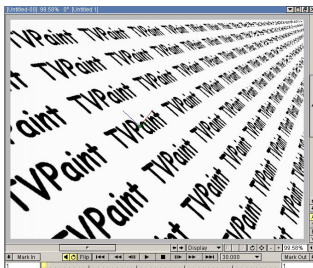


Each of the buttons *Bank Align.*, *Heading Align.*, *Pitch Align.*, when enabled, allows modification of the brush angle depending on the path it follows.

Below: the angle of the *Heading* parameter varies according to the logo trajectory.



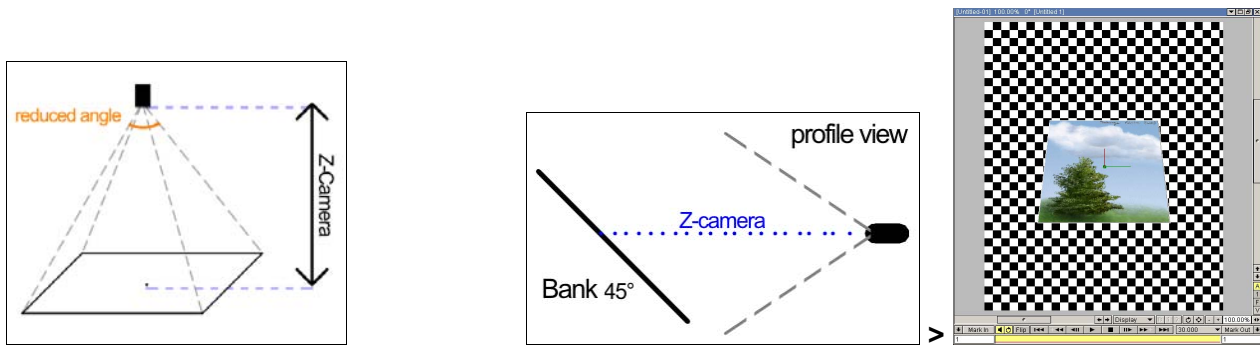
Some words regarding the *Rendering* tab:



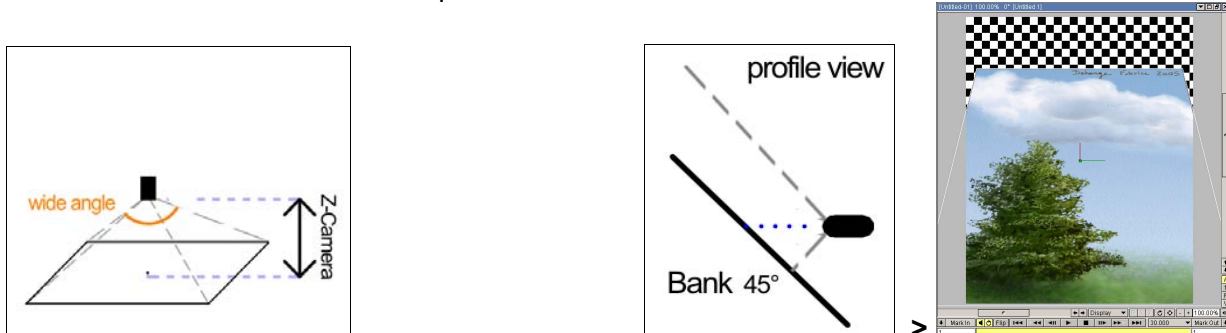
* The *Fill* option is used to fill the screen with the current source. In this case, animating the source will also animate all its copies.

* The *Opacity* parameter is used to adjust logo transparency as time progresses.

* The *Z camera* parameter represents the distance between the « virtual camera » and your image in pixels. The smaller this distance, the larger the opening angle of our « virtual camera ». This enables you to use the « wide angle » effect well known in cameras by using the parameters for *Pitch* and/or *Bank*.



Above, the pitch parameter was set to 45° for our merged image of the tree. The image at the top was obtained with a Z-Camera equal to 1000, the one below with a value of 210.

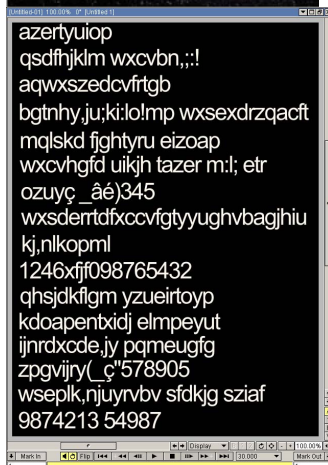


• 3rd example



This third example will allow us to work with different sources (*Rendering* tab) in the *Keyframer* effect.

Let's go back to our « planet » image used in previous lessons. We'll assume that your cartoon is finished. Now you want to scroll the list of participants in the form of end credits



We'll assume that this list is contained in another project much «higher» than the one of your planet (opposite).

Pay attention that the text is written on a transparent background, then select (*Background = None*) in the timeline of this second project.

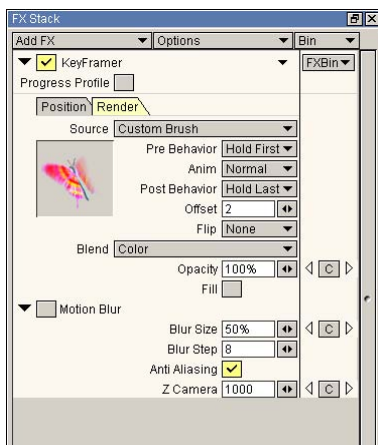
This is how to scroll the list from bottom to top:

- * In the *Rendering* tab, select the *Projects list* as source and then the name of the project containing the list of participants,
- * Place two keys at the beginning and the end of the animation layer with the position parameters close to the illustration on the following page.



* Apply the *FX stack*.

It's done ! ... The list moves from the bottom to the top as intended.



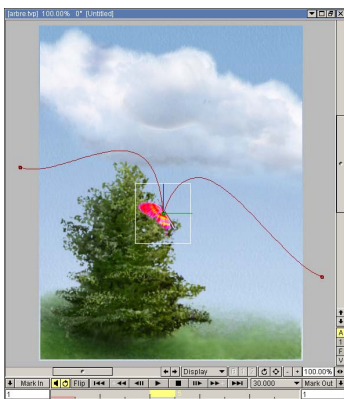
Thanks to the *Keyframer* anything may be moved on the screen: a brush, another project, the layer of your choice, the spare image, the current image, etc...

You simply choose what you want in the *Source* popup menu of the *Rendering* tab.

For example, exchange the current brush with the « butterfly » animated brush in the *Bin* tab.

This animated brush may also be moved as you wish and, why not, follow one of your pre-recorded paths.

Below, our butterfly lands on the tree before flying off again and leaving the screen.



When using animated brushes or animation layers as source images, additional settings will be required. In this case, you have two popup menus at your disposal: *Before* and *After*.

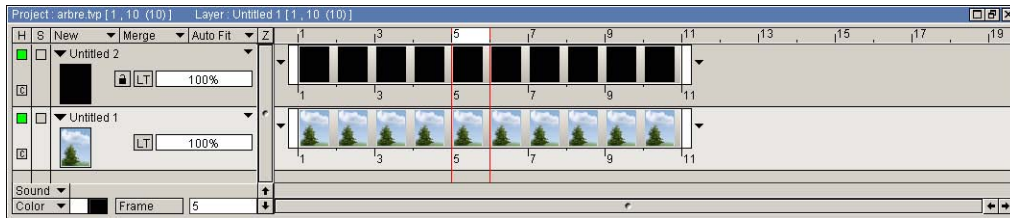
They may be used to define how the images of your animated brush or animation layer would be applied by the *Keyframer* effect if their number were lower than that of the sequence you are working on (application of the brush or animation layer images with *Loop*, *Pingpong*, *Random*, etc.).

For our butterfly we have chosen the *Loop* mode.

• 4th example

This example will help you understand the *Blend* menu in the *Rendering* tab. Load the video footage of your choice and then create an animation layer containing only black and opaque frames just in front.

You should then see the following timeline:



Create any type of movement for the object of your choice using the *Keyframer* tool. Here, we are taking a red « TVPaint » animation logo brush. Its trajectory is of no importance.

Our red logo will, after application of the FX stack, be placed on each black image. So far, nothing new.

If, before applying the FX stack, you select the *Eraser* mode (described in lesson 2) in the *Blend* popup menu (*Rendering* tab) you obtain the result shown opposite.

Our « black » layer was erased at the logo passage areas which made it possible to see the layer underneath.

It is as if our logo had been applied with the *Eraser* color mode. The *Mixer* mode refers to that encountered when using a spare image (see lesson 6).

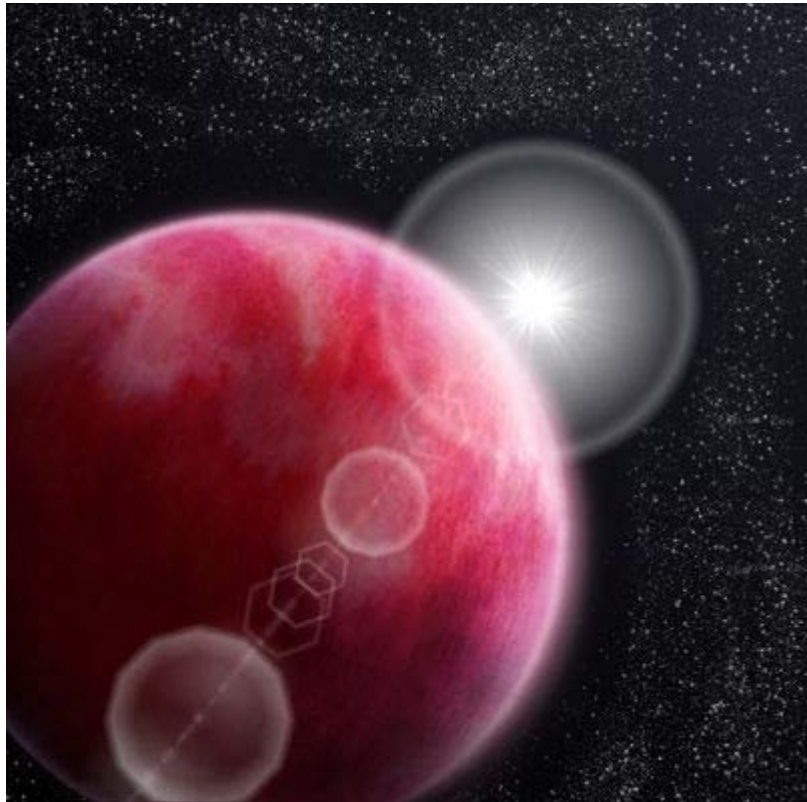
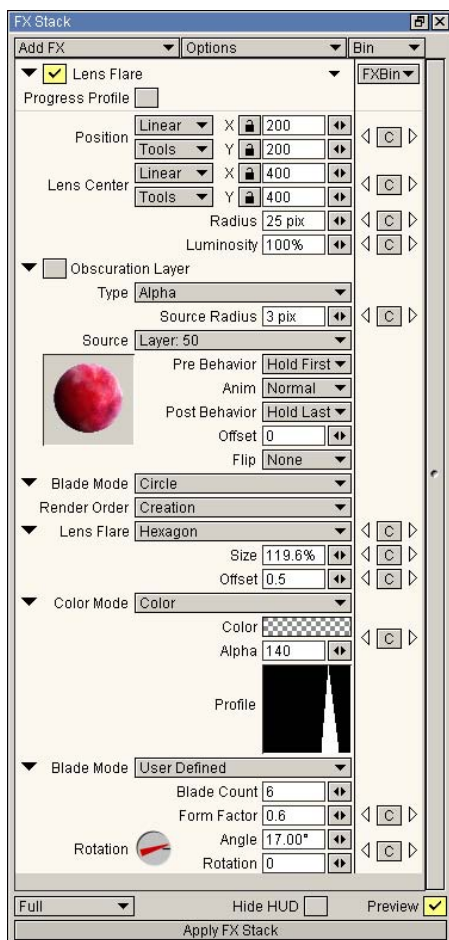
Lesson 10

Rendering effects and Distortion effects, Working with the Multi plane camera

In this lesson, you will:

- Study the rendering effects *Lens Flare*, *Background Generator* and *Time Code Generator*.
- Study the distortion effects *Kaleidoscope* and *Wrapping grid*.
- Learn how to use the *Multi plane camera* effect.

The Rendering > Lens Flare effect



The *Lens Flare* is an over-illumination effect seen through an optical lens. Generally encountered in the world of photography, it occurs when the image framed is excessively illuminated and when a non adequate lens is used. Several types of lens flare are encountered: ring, streaks, circles, ... They are located along the straight line from the light source to the camera lens used. Sometimes the lens-flare effect obtained takes the shape of blades used as the lens diaphragm (see drawing below).

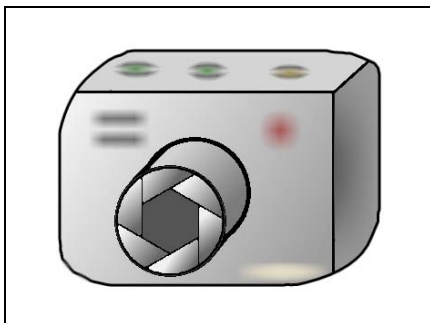
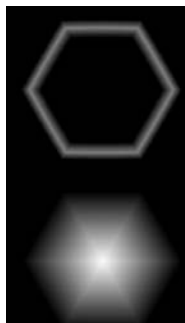


diagram of a camera with a 6-blade diaphragm



examples of the resulting *Lens Flare* effect (hexagonal effects)



photo with a true *Lens Flare* effect

The larger the lens, the more the *Lens Flares* will be visible and the size is proportional to this lens (when using the zoom, for example).

We will now take a closer look at the various options proposed for this effect in order to allow you to obtain results similar to those illustrated in the image above.

When you choose the *Lens-Flare* effect in the *Rendering* effects menu, the first parameter to be entered is the *Position* of the light source and the lens.

The first four numeric fields are used to adjust these positions.

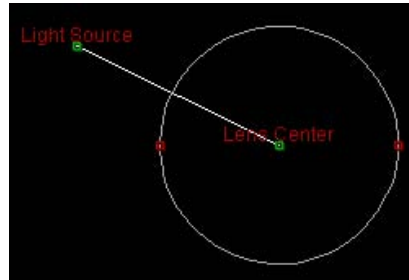
The *Lens radius* is measured in pixels and is used as a reference for the size of future light interference effects you wish to create (ring, streaks, circles ...).

The *Luminosity* parameter controls the luminosity of all light interference visible on the screen.



The position of the light source, lens and lens radius may also be adjusted with the HUD

Position	Linear	X	115	↔
	Tools	Y	75	↔
Lens Center	Linear	X	239	↔
	Tools	Y	136	↔
		Radius	73 pix	↔
		Luminosity	100%	↔



The *Lens Flare* popup menu creates various types of lens flare effects: they may be of the *Generic*, *Streaks* or *Image* type.

It is also possible to rename, duplicate or delete these effects at your convenience.

New	Generic Streaks Image
Rename	
Duplicate	
Delete	
Generic 1	
Streaks 2	
✓ Image 3	

Once a type of lens flare has been created, its name appears in the *Lens Flare* popup menu.

In the header of this menu you will find the name of the lens flare the parameters of which are visible on the screen.

• *Lens Flares* of the *generic* type

Lens Flare	Generic 1
Size	100%
Offset	0.5
Color Mode	Color
Color	
Alpha	255
Profile	

Here are the various *Lens Flare* parameters of the generic type.

You may:

- Change the *Size* of the *Lens Flare*: this value is a percentage of the lens size (the size that you have implicitly chosen when setting the lens radius).

- Change the *Offset* of the *Lens Flare* : in other words, modify the position of the lens flare in relation to the center of the lens and light source.

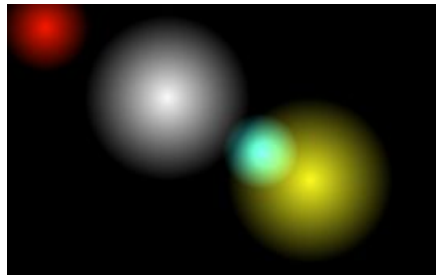
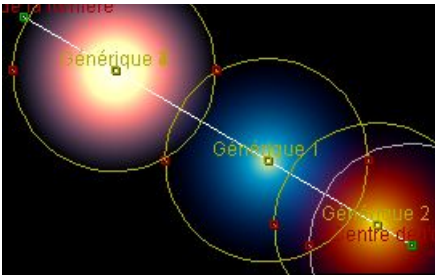
An offset of 0 places your *Lens Flare* at the same level as the light source.

An offset of 1 places the effect at the same level as the lens center.

An offset of 0.5 places your *Lens Flare* in the middle of the two aforementioned points.

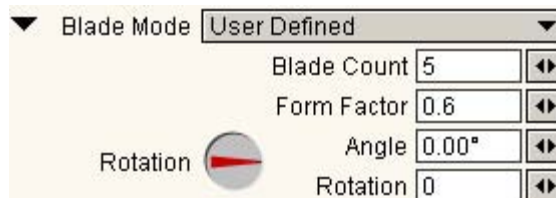
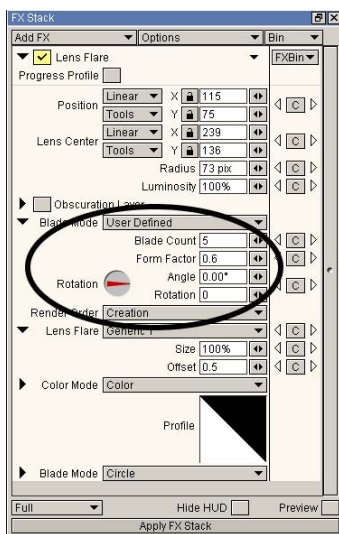
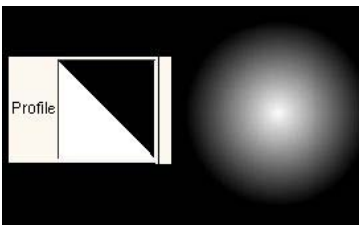
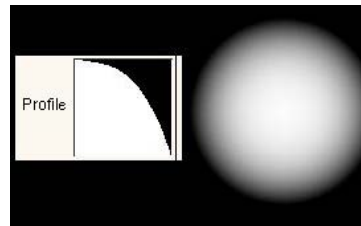
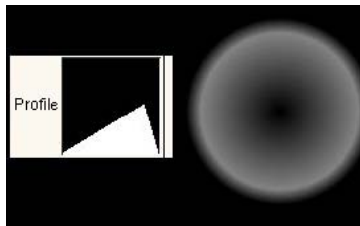
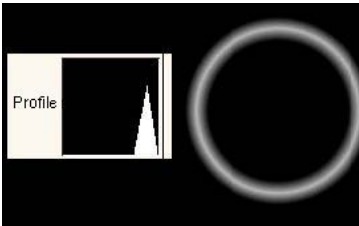
It is also possible to use a negative offset or an offset greater than 1.

- Choose single-color or gradient color artifacts (see below).



- Modify the profile of your artifact using the profile curve.

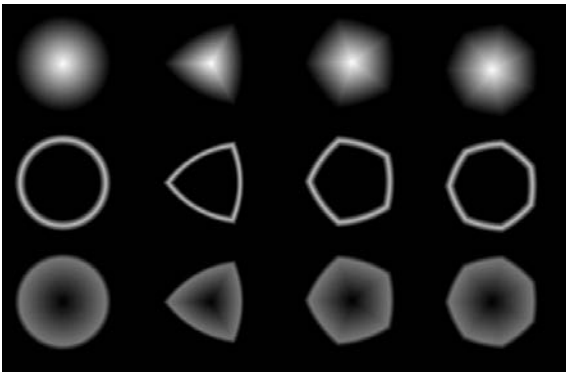
This effect is constructed in the same way as we have already seen in lesson 2. Correctly setting the profile parameters is essential if exceptional results are to be obtained (see examples below).



The *Blade mode* indicated above enables adjustment of all *Lens Flares* of the *generic* type according to the diaphragm blades of your virtual camera (see diagrams on page 2 of this lesson). It is very important to set its parameters correctly if realistic results are to be obtained.

You may choose a *Blade mode* of the *Circle* type (images above) or a user defined *Blade mode* (see next page).

- You may choose the *Blade count* for your virtual camera lens (see examples below, based on the various profiles described above).



From left to right:

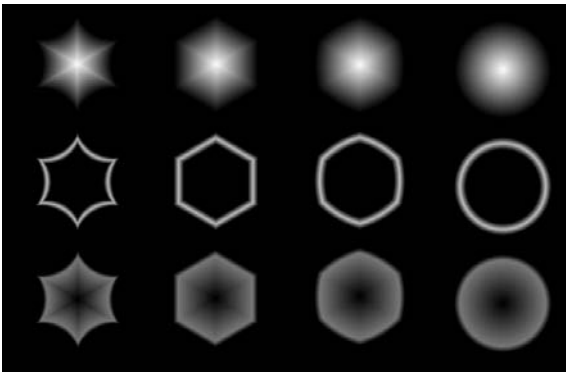
The lens diaphragm of your camera is circular, with three blades, five blades and seven blades.

- You may modify the *Form factor*:

With a factor of 0, the points are linked to form a circle.

With a factor of 1, the points are linked by straight segments.

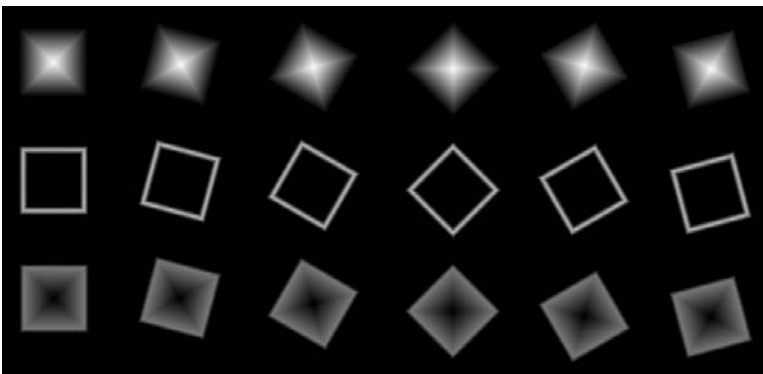
With a factor of 2, the points are linked by incoming arcs.



From left to right:

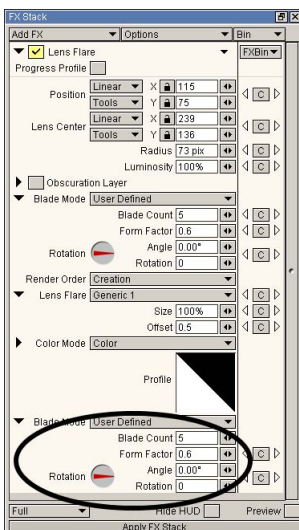
Form factors 2, 1, 0.5 and 0.

- You may modify the *Angle* of your lens flares:



From left to right:

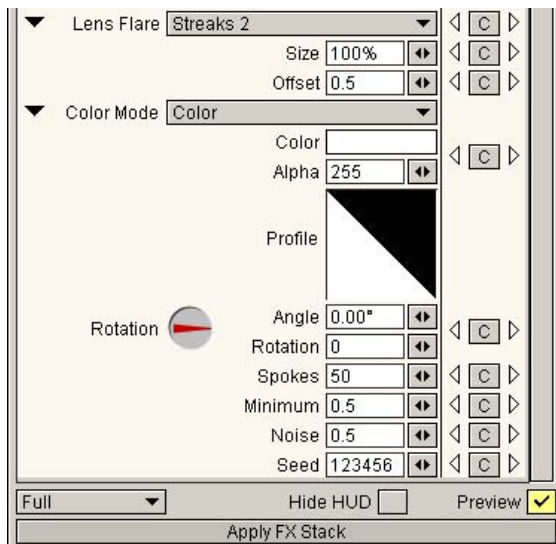
Angles 0°, -15°, -30°, -45°, -60°, -75°.



When required, each *Lens Flare* of the generic type may be given its own *Blades mode* different from the *Global* blades mode described above.

The latter is located at the bottom of the generic *Lens Flare* parameters and offers the same options.

• **Streak type Lens Flares**

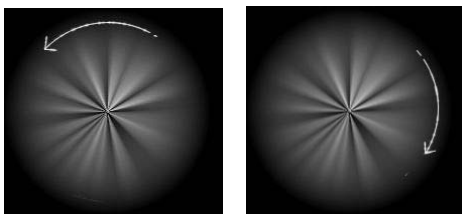


Even if the *Lens Flares* of the *Streaks* type offer a completely different effect than the *Generic lens Flares* (see examples below), the parameters are nonetheless quite similar.

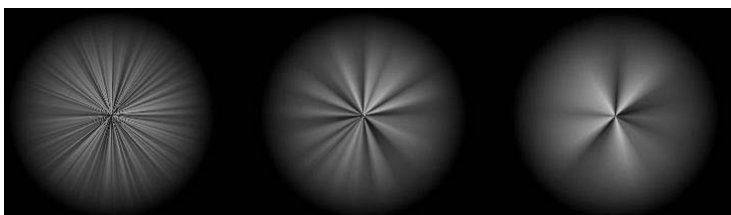
You may therefore set the *Size*, *Offset*, *Color(s)* and *Profile* in the same way as described on the previous pages.

There are, however, several specific options which we will now take a closer look at :

- The *Angle* and *Rotation* parameters are used to rotate light interference effects.

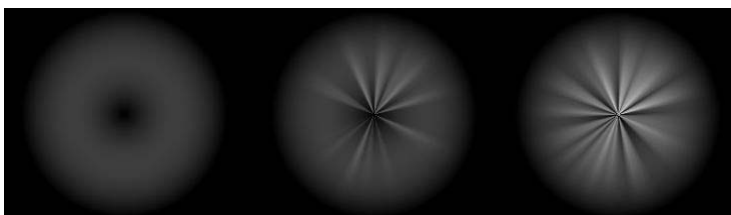


- The *Spokes* parameter is used to select the number of spokes in the streaks



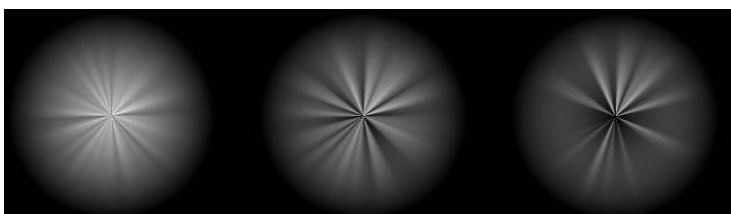
(opposite from left to right the *Spoke* parameter with the values 200, 50, and 20)

- The *Minimum* parameter is used to adjust the contrast between the spokes.
If this parameter is set to 0, maximum contrast is obtained.
If this parameter is set to 1, minimum contrast is obtained .



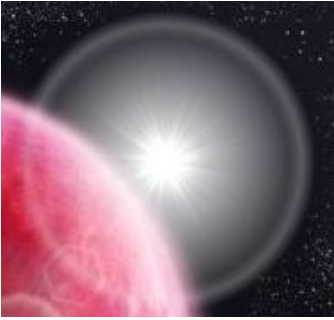
(opposite from left to right with contrast values 1, 0.5 and 0)

- The *Noise* parameter is used to adjust the sharpness of the spokes:
If this parameter is set to 0, the spokes are less sharp.
If this parameter is set to 1, the spokes are more sharp.



(opposite from left to right with noise values 1, 0.5 and 0)

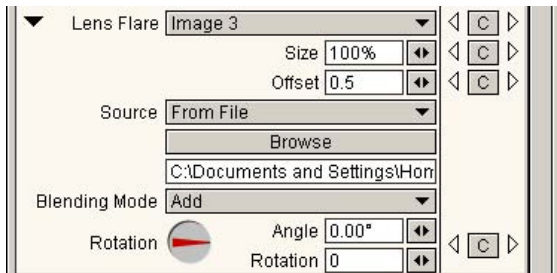
- The *Seed* parameter is used to randomly vary the streaks layout.



Combined use of several types of lens flares and light interference applied to the same point in your project may create a very realistic effect.

Opposite you will see two generic lens flares and one streaked lens flare to create a sun surrounded by a light halo.

• *Lens Flares of the Image type*



Lens Flares of the Image type allow, as the name implies, selection of the image of your choice to create a lens flare.

* This image, referred to as source image, may be a default image, a project displayed on the screen or even a file for which the access path must be given.

* You may set the *Size*, *Offset* and *Angle* parameters as indicated for the lens flares discussed previously.

* Your image will be applied as a lens flare on the current layer. This is possible in the various *Drawing modes* (color, behind, erase, etc.) studied in lesson 2.

• *The Render order for lens flares*

The *Render order* popup menu offers the following four options :

* *Creation*: your light artifacts are calculated and drawn by the program in the order they were created (i.e. as they appear in the lens-flare popup menu, from top to bottom).

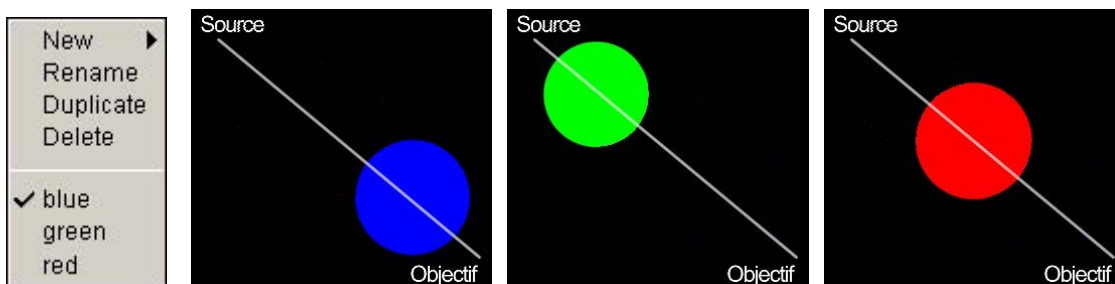
* *Invert. creation*: your light artifacts are calculated and drawn by the program in the inverted order of creation (in the lens-flare popup menu, from bottom to top).

* *Lens to light*: your light artifacts are calculated and drawn by the program according to their offset in the direction Lens => Light.

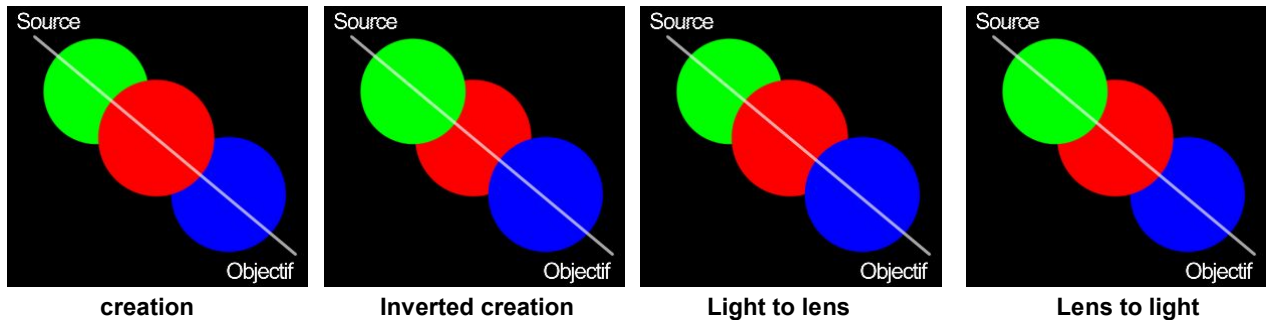
* *Light to lens*: your light artifacts are calculated and drawn by the program according to their offset in the direction Light => Lens.

Take the *image* type artifacts illustrated below, for example.

Based on their position in the *Lens Flare* popup menu opposite, they were created in the following order: blue, then green, then red.



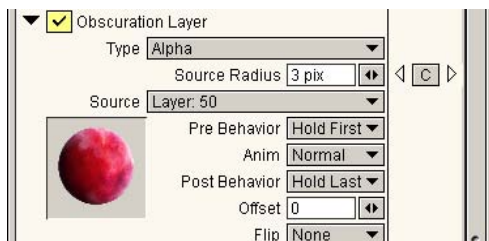
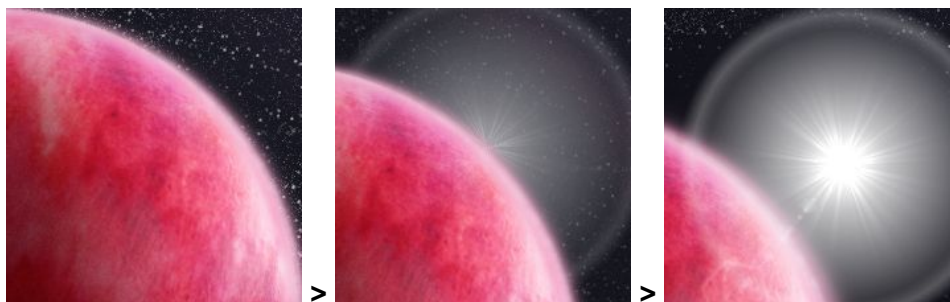
Here you have the effect obtained (for application in color mode) in the various cases:



• The *Lens Flare Obscuration layer*

Let's assume our drawing is animated as indicated below:

When the planet moves and the sun becomes visible, the *Lens Flare* effect becomes visible at the same time.



In general, if an object of any kind passes in front of the light source, the lens flare tends to disappear.

The *Obscuration layer* parameters above allow you to manage this phenomenon.

* To do this, you must first define what is going to block the light source. This may be an image or animation in a layer, project, brush, etc... (*Pre*, *Post Behavior*, *Animation Mode*, *Position* will also be defined if necessary).

* The *Type* of obscuration to take place when the effect is applied must be indicated here:

- The *Alpha* option will block the lens flare when an opaque object passes in front of the light source.
- The *Invert alpha* option will block the lens flare when a transparent object passes in front of the light source.
- The *R.G.B* option will modify the lens flare color so that it becomes identical to that of the object passing in front of the light source.
- The *R.G.B + A* option functions in the same way as the *R.G.B* option but also takes into account the opacity of the pixels in the same way as the *Alpha* option.

* We generally obtain a *Lens Flare* effect when the lens of your camera is pointed towards a very small and very bright light source.

The Rendering > Background generator and Time code generator effects

The Rendering > Background generator effect

The *Background generator* effect is used to create horizontal, vertical or four corner color gradients. These gradients are applied to the current image as described in lesson 2. You may choose any color you like as well as the opacity and then have them change with time by creating animation keys.

Below, you will find two examples of gradients used in *Color* and *Add* mode.

It is also possible to change the colors of the planet, or even place the planet within a bluish atmosphere... ideal for creating fantasy worlds!



original image



gradient in *Color* mode



gradient applied in *Color* mode



original image

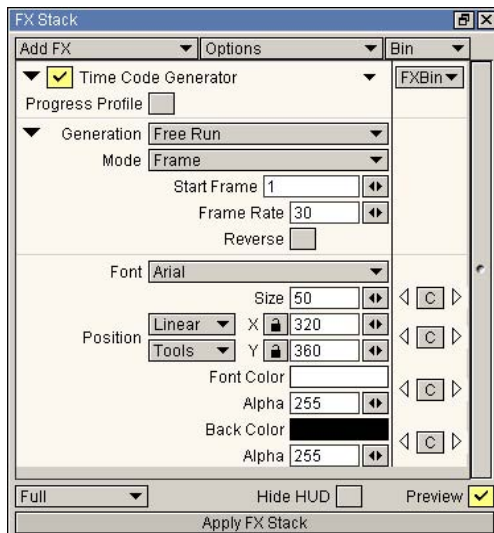


gradient in *Color* mode



gradient in *Add* mode

• The *Rendering > Time code generator effect*



This effect displays the time code of the current image in the current layer at the position of your choice.

Three modes are available:

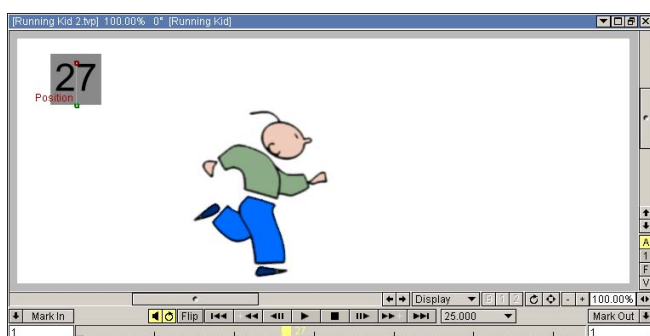
- * *Current* project mode duplicates the timeline data in number of frames or time code depending on the selections made (*Frame* or *TimeCode* refer to lesson 4).

- * *Free run* mode is used to define the parameters to be taken into account for the entire current layer independent of the timeline: You must therefore specify the position of the first frame, the number of frames per second and the display (frame or time code in hours, minutes, seconds and frame number). The *Invert* option is used to create a count-down effect.

- * *User defined* mode works in the same way as *Free run* mode with the simple difference that all frames of the layer have independently set parameters thanks to the use of the animation key system.

Regardless of the mode chosen, the second section of the panel enables:

- * selection of the *Font* of your choice,
- * *Size* variation,
- * setting of *Position* parameters for the current project,
- * modification of font and background *Color* and *Alpha*.



Opposite, an example of an application with the current frame number in black with a gray background.

The effects available in the *Distortion* menu

The effects available in the distortion menu, distort the current image or animation and enable the user to obtain a wide variety of results and/or movements.

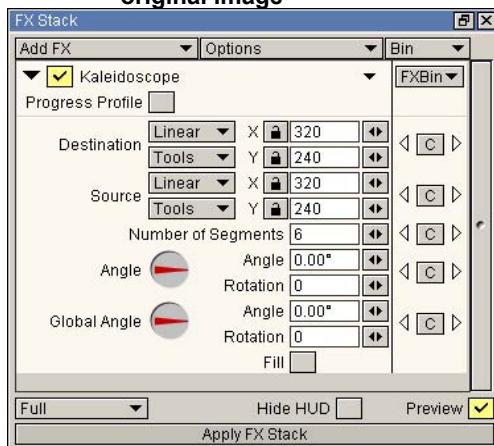
• The *Kaleidoscope* effect

As the name implies, the effect imitates the view through a kaleidoscope. In the following paragraphs, the projects will be considered as having the layers merged.

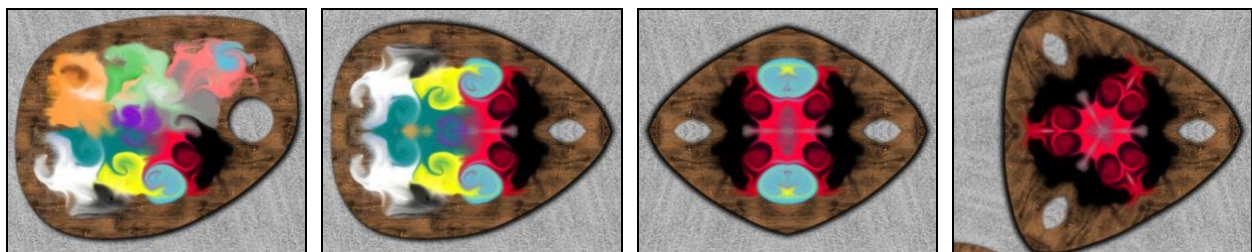


original image

use of the *Kaleidoscope* effect



The number of segments is the number of symmetric axes used to obtain the final image (see below).

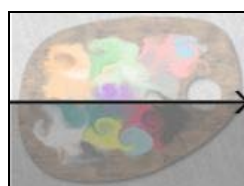


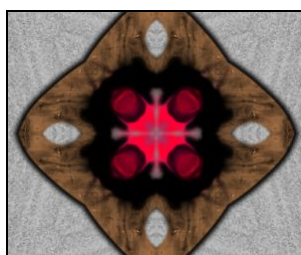
original image

a horizontal symmetric axis

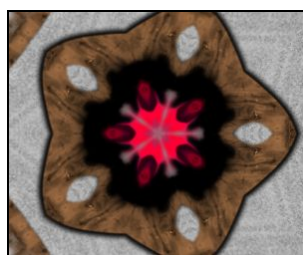
two symmetric axes (horizontal and vertical)

three symmetric axes

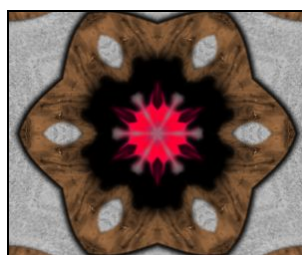




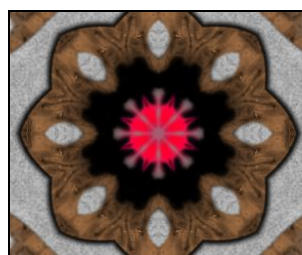
four symmetric axes



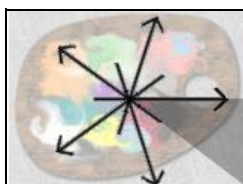
five symmetric axes



six symmetric axes



eight symmetric axes



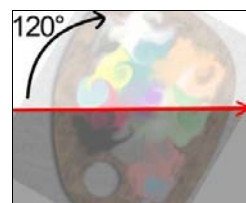
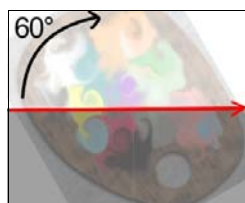
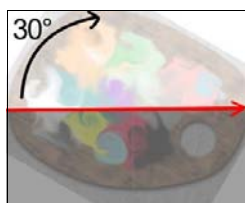
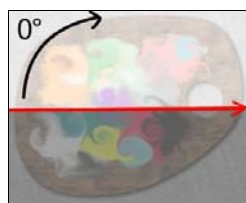
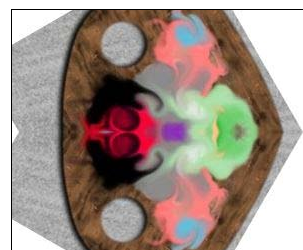
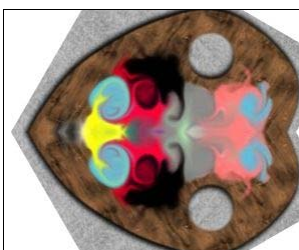
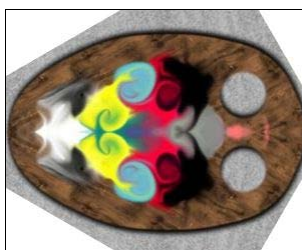
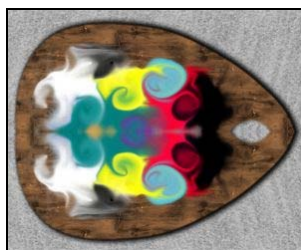
And so on...

The value of the first angular parameter varies the axis formed between the symmetric and the horizontal axes.

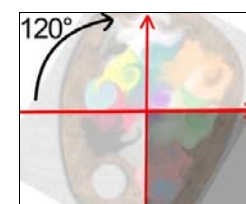
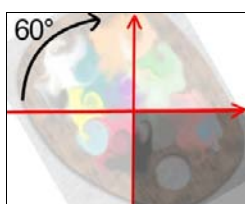
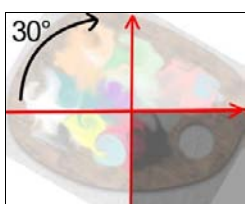
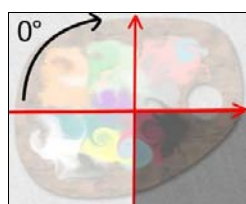
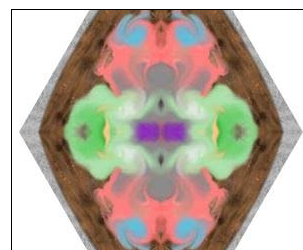
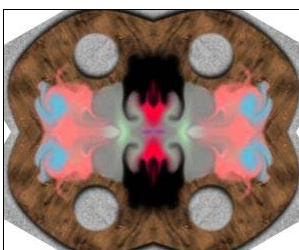
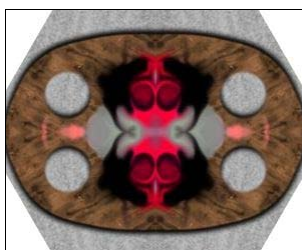
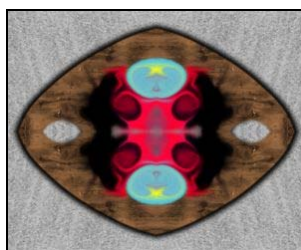
The grayish diagrams indicate the area in the original image which will be duplicated by the symmetry.

In black, the rotation angle applied before symmetry in relation to the red axes.

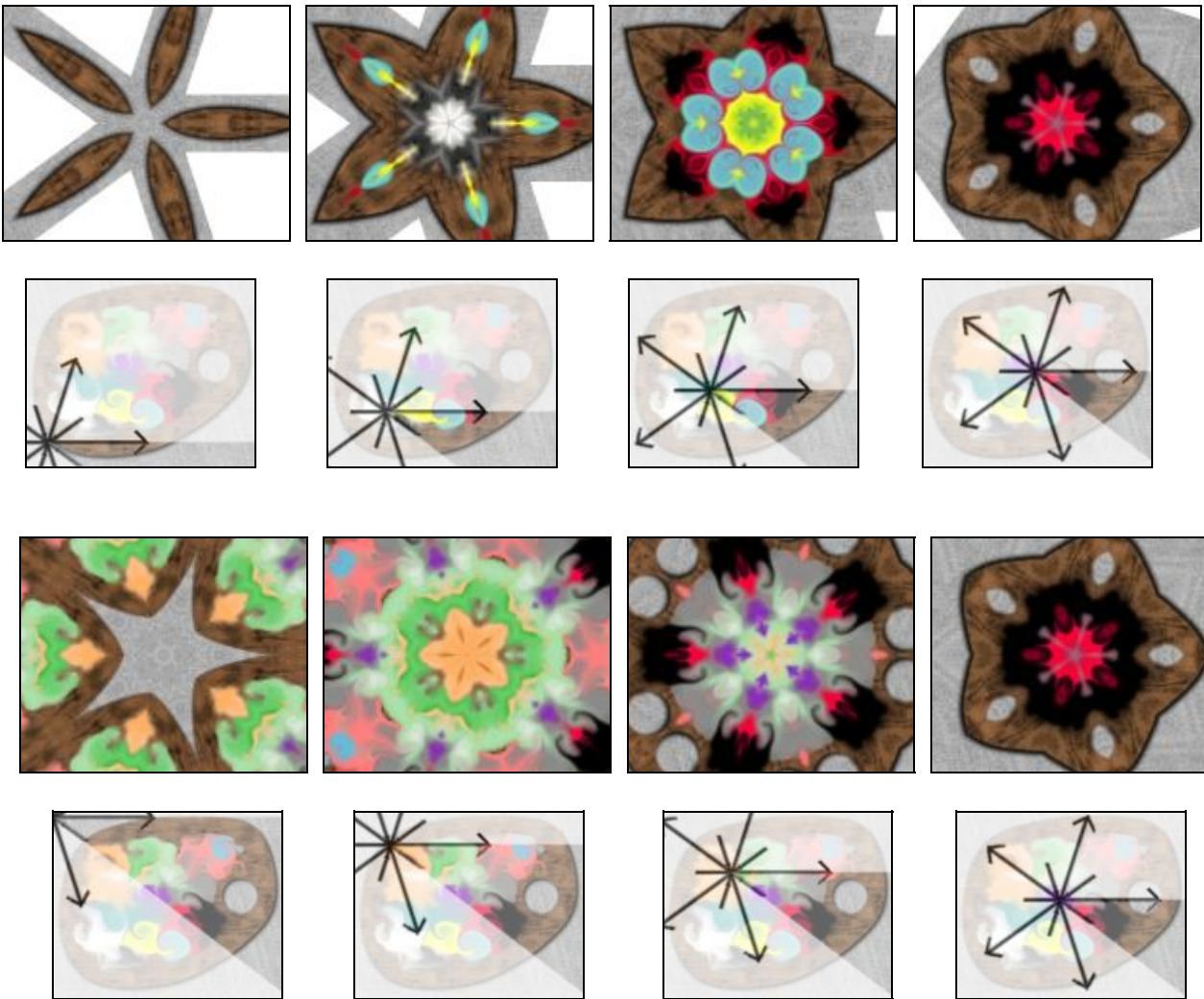
Here for one symmetric axis :



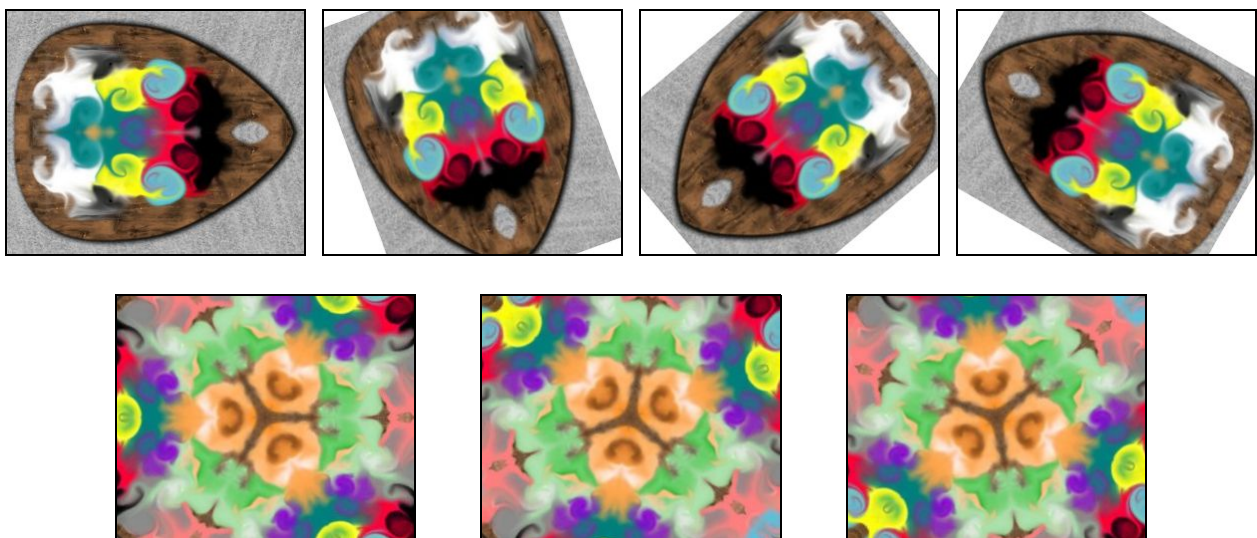
Here for two symmetric axes :



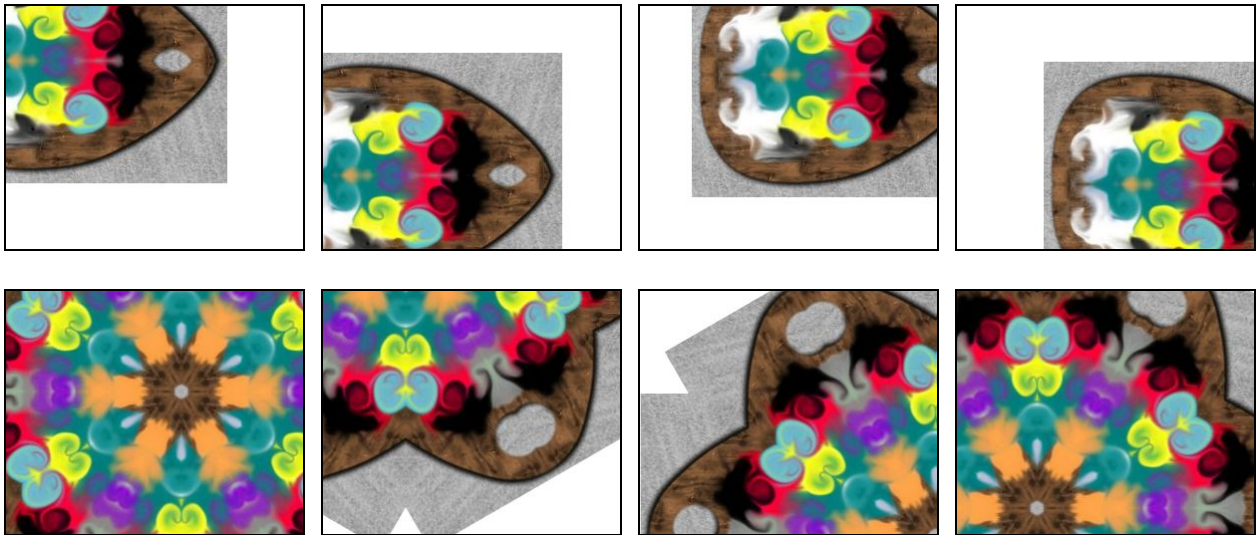
The *Source* coordinates define the position on the screen of a point at which the symmetry axes cross each other (see the various examples hereafter).



The value of the second angular parameter is used to vary the global angle of the image obtained:



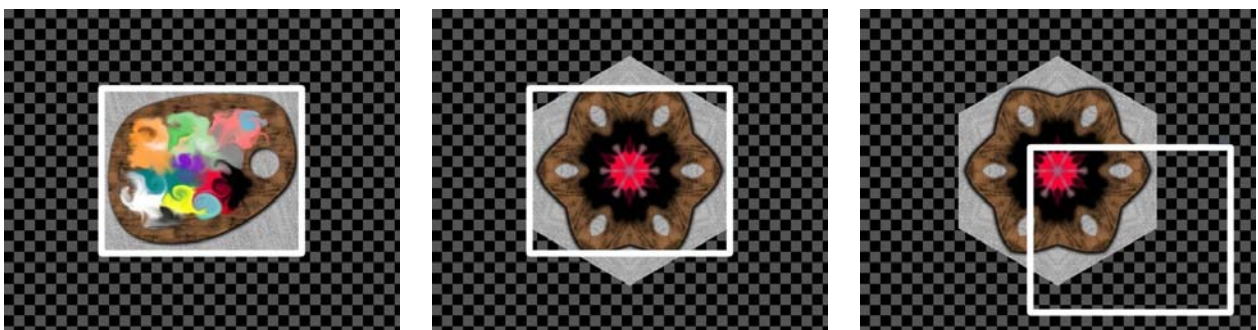
The *Destination* coordinates define the position on the screen of an image centre obtained after application of the effect (see the various examples hereafter).



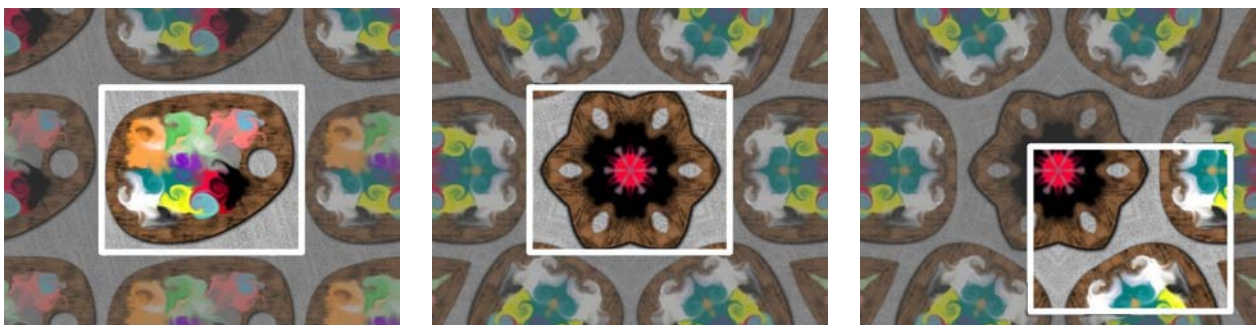
When the *Fill* option is disabled, the kaleidoscope effect is calculated according to the current image. When it is enabled, the calculation is also carried out on all reproductions of the current image.

Below, the zone inside the white rectangle represents the current project window. All zones inside and outside the white rectangle represent the space used to calculate the effect.

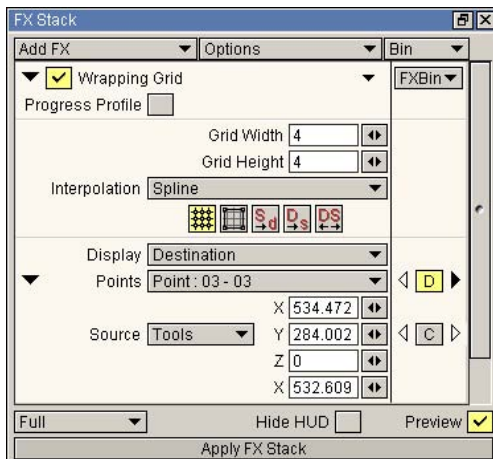
In the 1st case, the option is disabled, the effect is calculated from the current image.
In the 2nd case, the option is enabled, the effect is calculated from the current image and its reproductions.



In both cases the original project is represented with the result after the effect is calculated and the other showing the result obtained when the destination parameter is set to another point.



• The *Wrapping Grid* effect

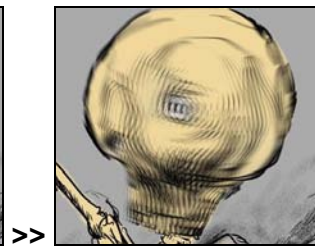


The wrapping grid is an extremely useful animation tool and is capable of distorting the images in time according to the criteria of your choice.

The *Wrapping grid* effect, when correctly used, can produce quite spectacular results: wave movement, 3D rotation of faces, movement of hair blowing in the wind, etc... (below, you will find a summary overview of the possibilities proposed).



1st image



movement



last image

(project skull.tvp)

Once the effect has been placed in the FX stack, a grid is displayed on the current image.

Some hints for beginners:

* The use of two grids will be necessary for your effects to work correctly: these grids are referred to as *Source* and *Destination* grids.

The *Display* popup menu is used to select on which of the two grids you intend to work.

Depending on your choice, the *HUD* will be modified accordingly: the letter *S* appears when the source grid is displayed and the letter *D* appears if the destination grid is displayed.

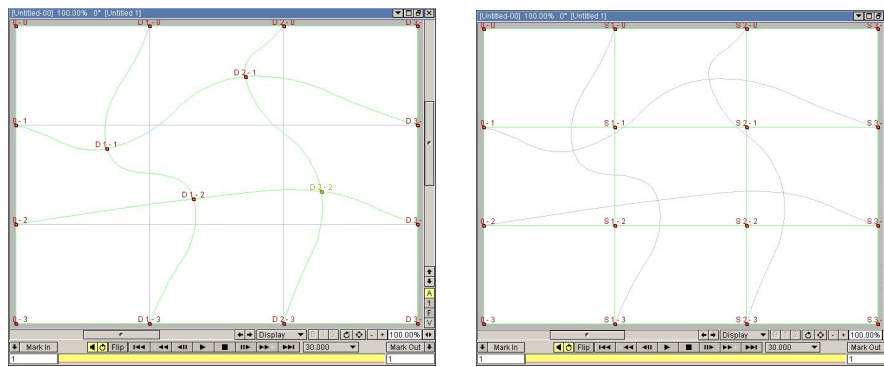


intersections in the *Source* grid



intersections in the *Destination* grid

In the *HUD*, when the source grid is displayed, the destination grid is always visible behind in a less bright color. When the destination is displayed, the opposite case applies (see next page).

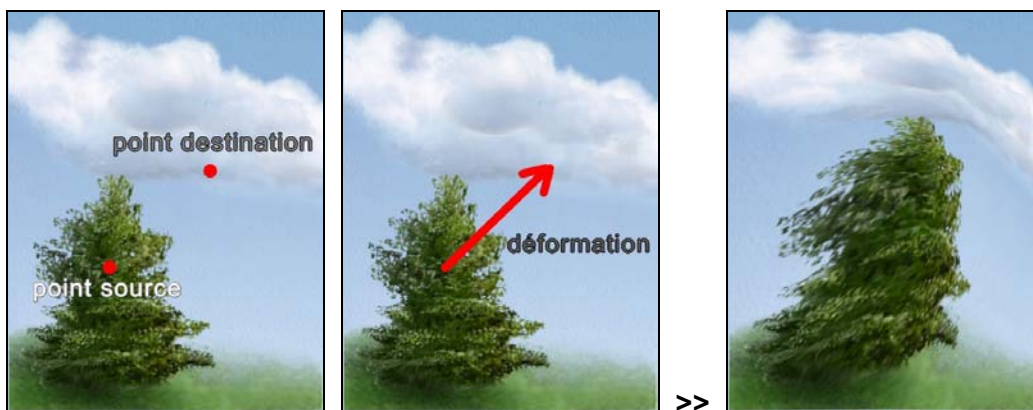


Display of *Source* and *Destination* grids (the current grid is green, the other is blue)

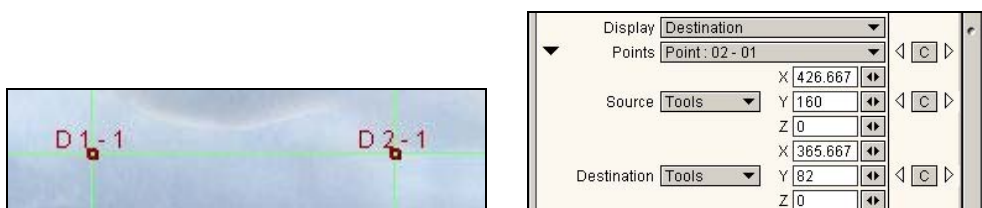
* Modification of an intersection in the *Source* and/or *Destination* grid distorts the current image accordingly.

The image is distorted, stretched or contracted over a narrower or wider area on the screen so that the points on the source grid of your initial image are moved to the same location as the points on the destination grid.

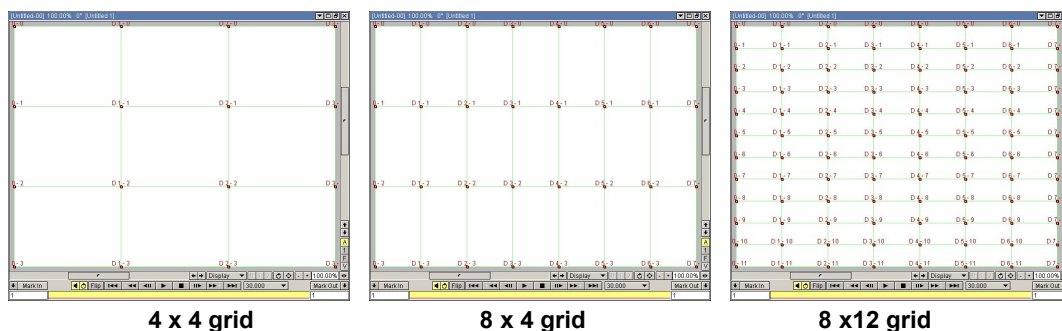
Below, source and destination points on a grid with the resulting distortion.



* The *Point* menu is used to edit each grid point present on the screen. The latter may be identified by their position on the grid (see below).





* The first two numeric fields are used to select the number of intersection points on your grids (*Source* and *Destination* grids have the same number of intersections). You may increase or decrease the height and/or width of these grids.



4 x 4 grid

8 x 4 grid

8 x 12 grid

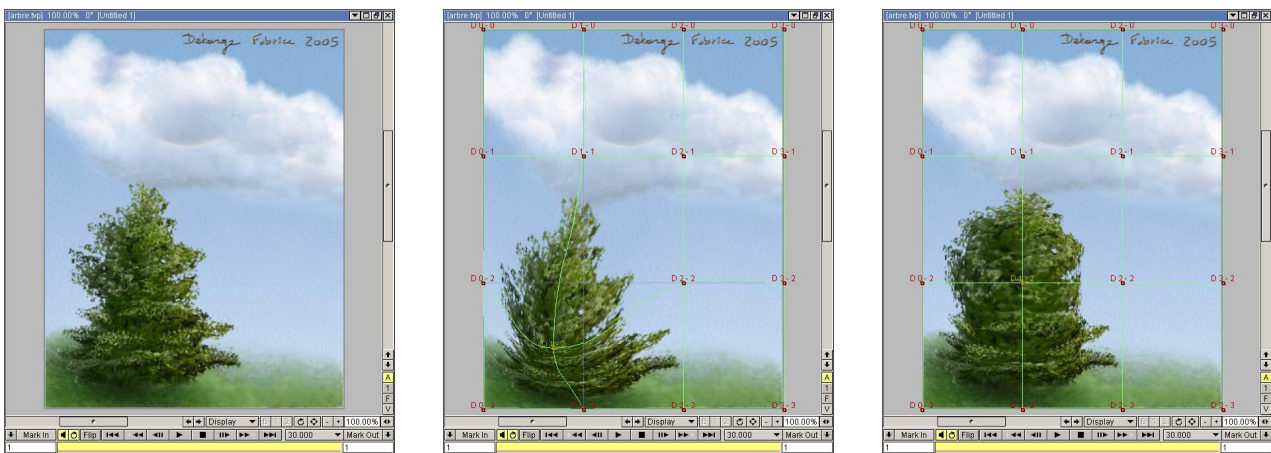
* The five buttons      present in this panel are used respectively to:

- Edit grid points.
- Distort the grid as a whole.
- Copy the source grid to the destination grid.
- Copy the destination grid to the source grid.
- Swap source and destination grids.

Edit grid points

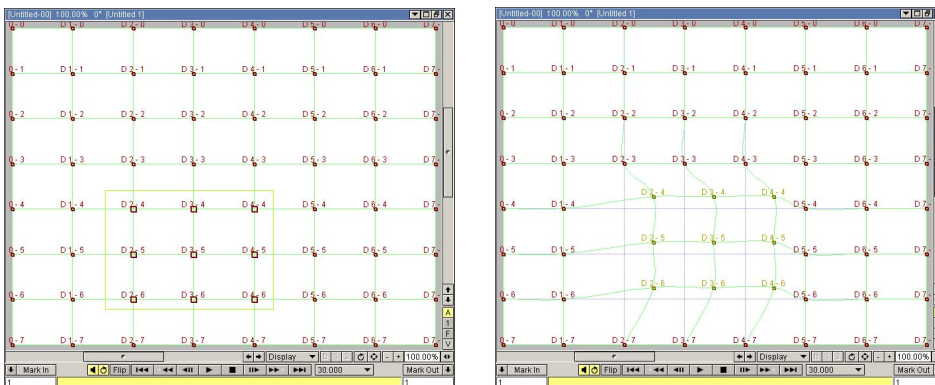
* When this option is enabled, each intersection point of your grid (source or destination grid) may be moved in space along three axes (*width*, *height* and *depth*) the effect of which will result in immediate distortion of the current image.

You may also use the predefined paths to manage intersection movement.

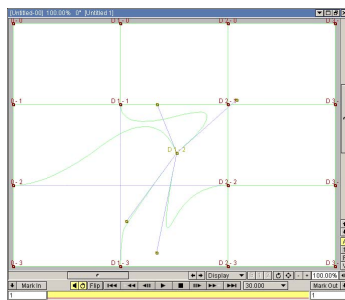


Above, from left to right, the initial image, movement of the destination intersection along the X and Y axes, movement of the destination intersection along the Z axis.

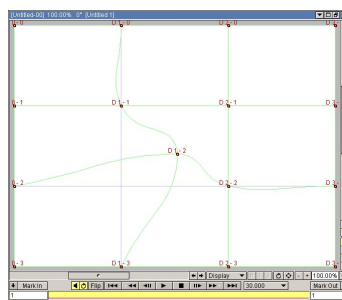
* It is possible to select several intersection points when the HUD is visible by drawing a rectangle inside the HUD. Once this has been done, it is easy to carry out all movements with a single click and slide on an intersection.



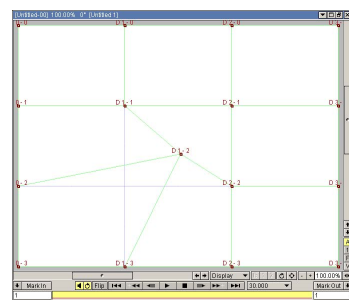
* It is possible to choose an intersection interpolation mode (linear, spline or smooth) in the first effect popup menu (see below).



spline interpolation



smooth interpolation



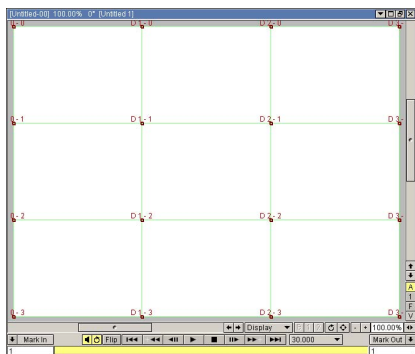
linear interpolation



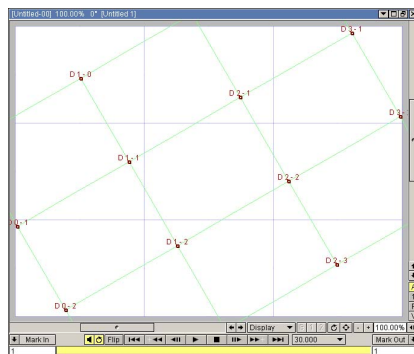
If the interpolation mode chosen is *Spline*, use of the [Shift] key when moving the handles enables movement of one handle at a time.

Edit grid bounding box

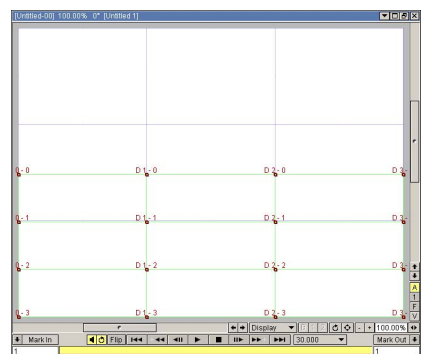
When the second icon is selected, it is possible to distort the current grid as a whole by rotating it or by modifying its dimensions (see below).



original grid



grid with 30° rotation



grid with height divided by two

Swap the source and destination grids

This option is practical when creating a distortion opposite to that of the current distortion.

Below, the rear end of the arrow represents the *Source point* of the grid and the arrow tip corresponds to the *Destination point*.



distortion: source => destination

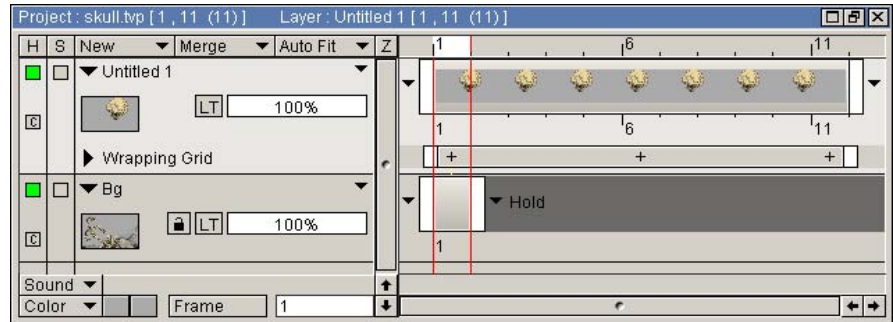
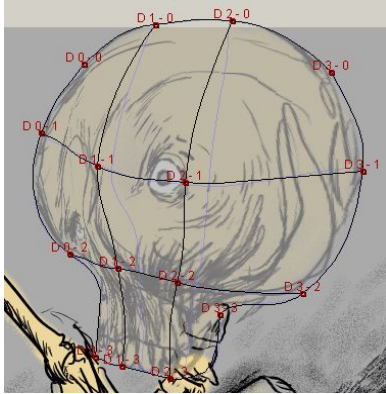


distortion: destination => source

Distortion of the current image in time.

We just saw how to distort an image in space using the source and destination grids. To distort the current image in time as was done for the «skull.tvp» project, you must:

- * Duplicate the latter along the entire layer.
- * Create a single source grid and pay attention to place intersections at all strategic points on the image (eye, teeth, etc ...) and ensure the grid covers the lines of your drawing.



- * Create a *Destination grid* slightly different from the *Source grid* for at least the first and last frames of the animation layer and then create the corresponding keys.

The result is a distortion, and consequently, a movement which takes place over a period of time.



The method described above is not the only way of using this effect. Many others exist. You should try them out and share your impressions in the on-line forum.

Multi plane camera

• The concept

With the multi plane camera effect you may control movement of several planes with background scenery. Each plane has a specific depth and consequently, its own speed in the eyes of the observer.



In the image above, the following are placed one on the other in the order of furthest away to closest:

The starry sky, the mountains, the forest, the first row of trees, the running kid and finally the second row of trees much closer.

When the animation is complete:

- * The trees in the front will move from right to left very quickly as they are closer to the viewer.
- * The mountains at the back will also move from right to left, but much slower.

• The blur caused by focusing

This effect can also take into account the fact that the human eye cannot focus on all elements of the scenery at the same time.

Just like in traditional photography, if you focus on a close object, the objects further away will be blurred and vice versa focusing on a distant object will result in blurring of closer objects.

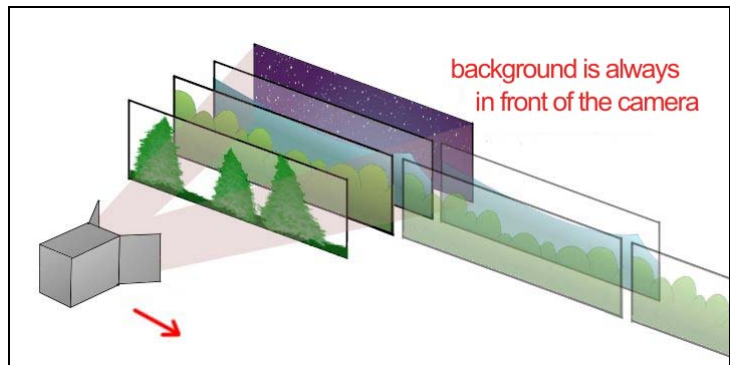
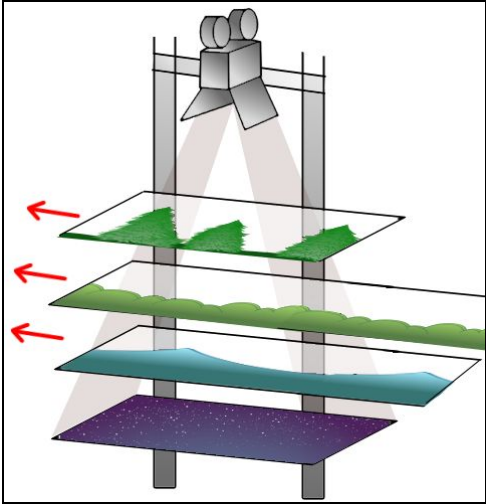


In the photos above, the tree is a long way from the rose. In the left photo, the camera has focused on the rose and the tree is blurred. In the right photo, the camera has focused on the tree and the rose is therefore blurred.

• Traditional multi plane camera (editing table), computer multi plane camera

Below on the left you will see the schematic diagram of a traditional multi plane camera setup often referred to as editing table. Each plane is placed on a sheet of glass and is moved progressively while filming.

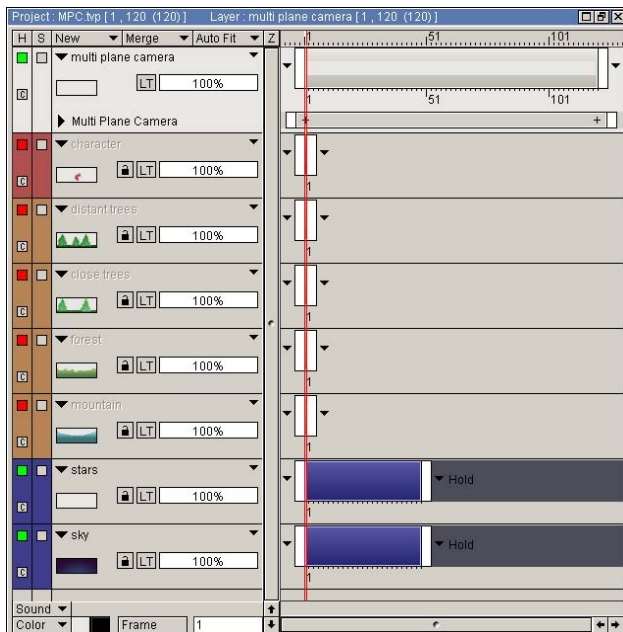
Our computer multi plane camera effect, seen below right, does not function in the same way: In this case, it is the camera which moves progressively while filming and the scenery is automatically duplicated horizontally (the starry sky background does not move and is always placed in front of the virtual camera).



• The project used in this chapter

The drawing shown on the previous page corresponds to the MPC.tvp project which will be taken as a basis to study the multi plane camera effect.

Here, you have the corresponding timeline:



Layer where the effect is applied

Layer «character»

Layer «distant trees» (far)

Layer «distant trees» (near)

Layer «forest»

Layer «mountain»

Layers «sky» and «stars» which do not move

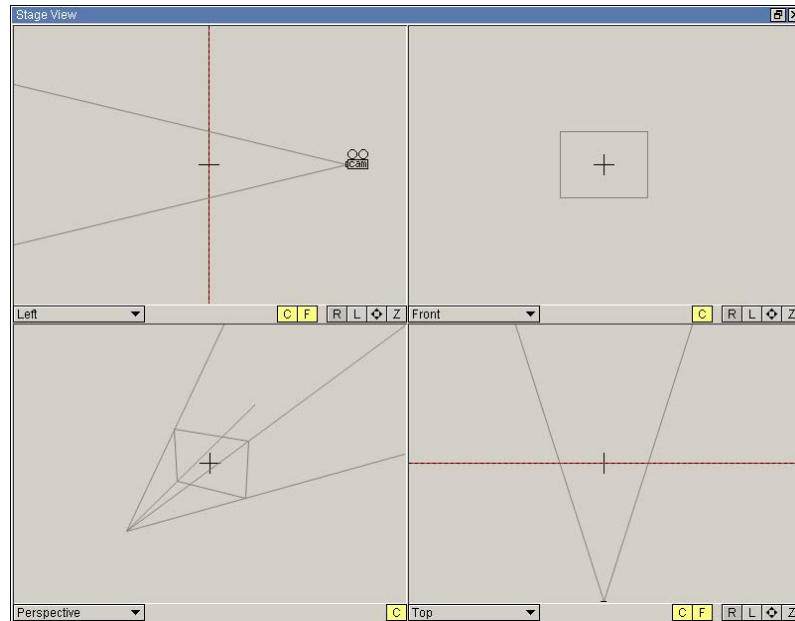
The layers «mountain», «forest», «distant trees », «distant trees » and «character» will be used to reproduce the desired animation.

• 3D views

This effect has an *Open stage* button which allows you to view the multi plane camera from various angles. These 3D views will make adjustment of settings much easier.

The default settings are as follows:

- * A perspective view (window bottom left)
- * A left side view (window top left)
- * A front view (window top right)
- * A top view (window bottom right)



The following buttons are available in each panel to simplify viewing:

- * The **Z** button allows you to zoom with a click and slide on the right mouse button.
(shortcut : [alt + right click] + move your mouse.)
- * The **L** button is used for panning with a click and slide on the left mouse button.
(shortcut : [alt + left click] + move your mouse.)
- * The **L** button when selected, ensures the zoom and panning options are only applied to the current view.
- * The **R** button is used to reset the view to its default values.
- * The **C** button displays the camera and the «viewing angle»
- * The **F** button displays the focusing plane. In other words, the plane on which the image is focused. This plane is seen as a red dotted line in the left and top views.

The focusing plane is also visible in the perspective and front views in the form of a gray rectangle. This will be studied in greater detail at the end of this lesson.

The popup menus of each window allow you to customize your viewing options: left, right, top, bottom, front, back, camera and perspective.



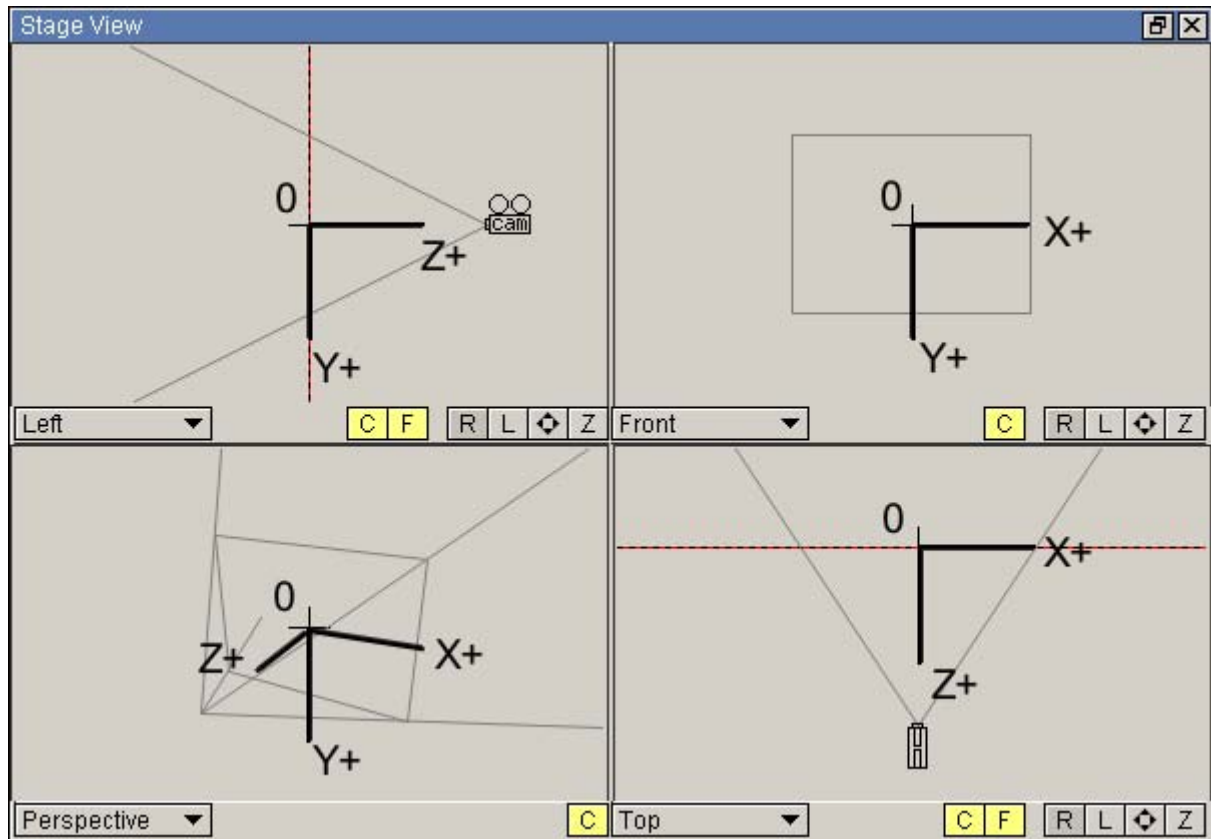
The front and back views are not in perspective. If you choose to use them, remember that you are viewing the various planes «orthogonally projected» on the Oxy plane (see next page).

• Positioning in space

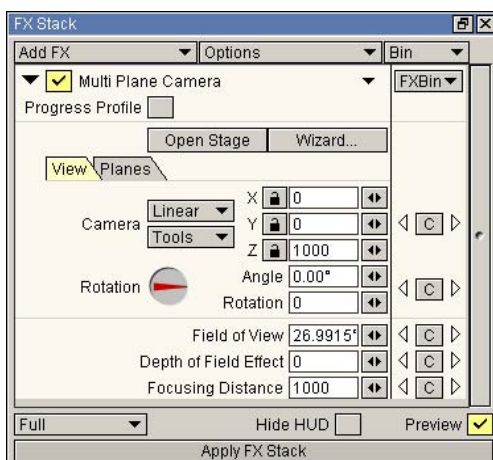
Of course, we will not be working in the same way as with a 3D software, but it is still important to know your position in space when working with this effect.

Compliant with the diagram below :

- * The crosses visible on the 3D view represent the coordinate point (X=0, Y=0, Z=0) which will be used as our reference point when positioning our camera and objects (mountain, forest, etc.).
- * The indications X+, Y+ and Z+ indicate the direction of the orientation of the camera in space.



• The View tab

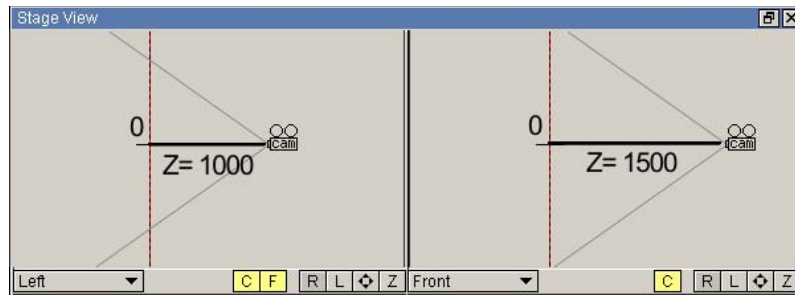


The multi plane camera effect has two tabs:

- * The *View* tab relative to the camera and its setting parameters
- * The *Planes* tab relative to superimposed planes making up the final animation.

The coordinates X, Y and Z of the *Camera* are in fact the coordinates of the virtual camera filming our scene in accordance with the space dimension described in the chapter above.

If, for example, you change the Z coordinate from 1000 to 1500 units using the mini-slider, the center of the camera will be moved further away from one another and the image you see will be changed accordingly.

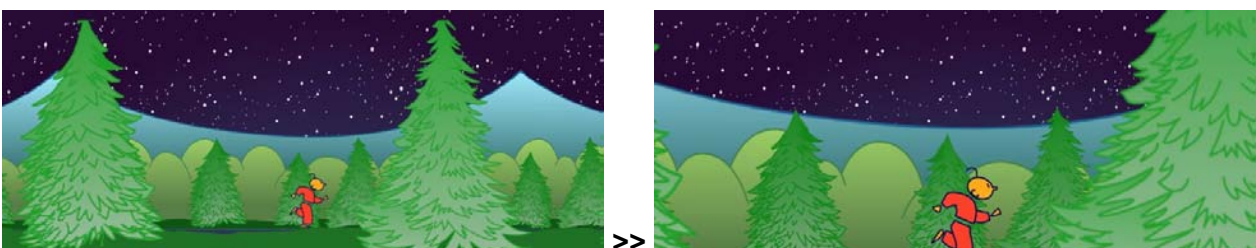
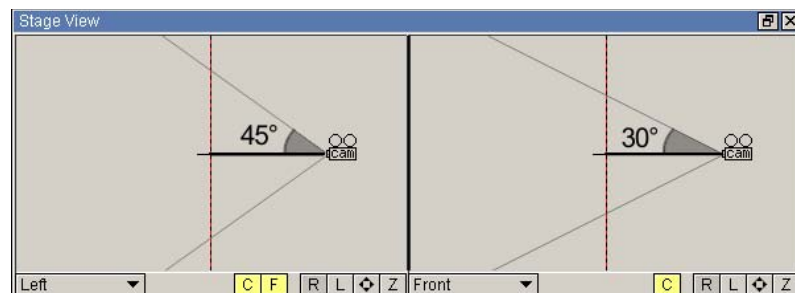


It is possible to move the camera directly from the window of your choice in the 3D viewing mode: simply click and slide with the left mouse button on the gray line or on the camera icon.

* The *Angle* and *Rotation* parameters rotate the camera around the Z axis (To simplify matters, these two parameters are not taken into account in the 3D view).



* The *Field of view* parameter represents the camera viewing angle. The wider the angle, the greater the number of objects illustrated on the screen.



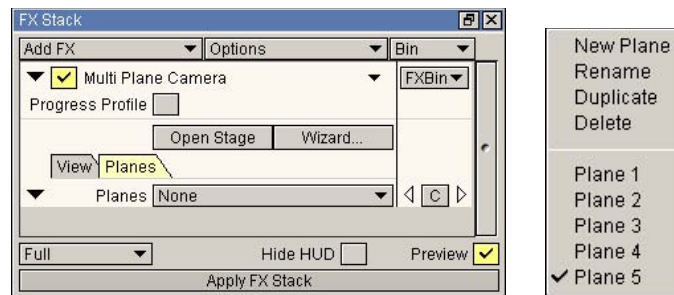
wide field of view

narrow field of view

* The Depth of *Field* effect and *Focusing Distance* parameters will be discussed at the end of this lesson.

• The *Planes* tab

Now that you have placed your camera in space and chosen a viewing angle, we will now place our planes one at a time using the *Planes* tab. If you have not used the Wizard, this tab is empty.



The *Planes* popup menu is used to rename, duplicate or delete planes. The header of this menu contains the name of the plane for which the options are displayed in the panel.

• Create an animation with the multi plane camera effect, part 1

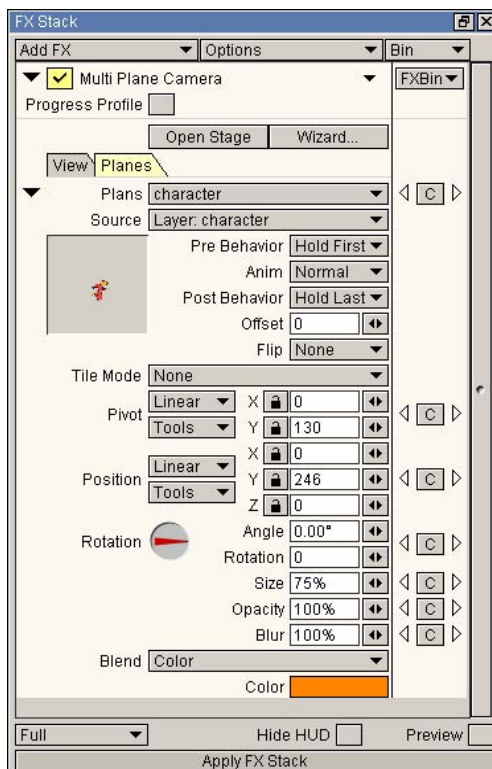
- * Begin by loading the project «MPC.tvp»
- * Go to the «multi plane camera» layer
- * Open the FX stack and delete its content
- * Select the *Multi plane camera* effect in the *Add FX* menu

In the *View* tab :

- * Set the camera position parameter to (X=0, Y=0, Z=1000) and leave the angle at 0°
- * Select a field of view of 30°, a *Depth of Field* effect zero and focusing distance 1000.

In the *Planes* tab :

- * Create a new plane and name it «character». A panel similar to that indicated below will appear.



At this point, you must:

- * Choose a *Source* image to create the plane.

As was the case for the *Keyframer* effect, the source may be of various types (project, layer, paper, spare image, etc...) and you may set the pre-, post- behavior, animation mode settings, etc...

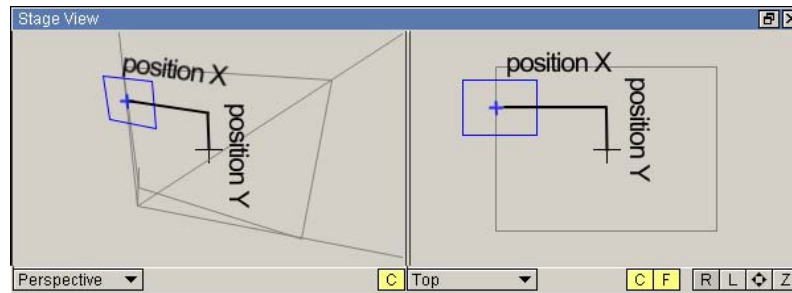
We will select the «running kid» layer for our project.

- * Choose a tile mode: Choose « none » in tile mode for our running kid.

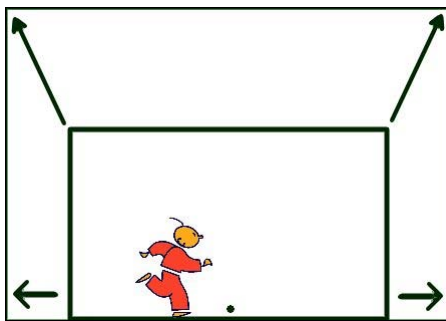
- * Set the Pivot and Position parameters. These parameters have the same functions as those discussed in the *Keyframer* effect, but don't worry, we will be taking another close look at them.

• The *Position*, *Pivot* and *Size* parameters

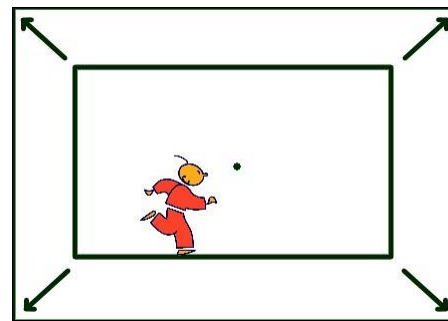
* When the *Pivot* parameter is zero, the *Position* parameter represents the distance between the coordinate point ($X=0$, $Y=0$ and $Z=0$) and the center of the source image chosen.



* The *Pivot* parameter allows you to use a reference point other than the center of the source image to adjust the position and size of your plane. This is very useful when you decide to modify the *Size* of your source image: *Size* modifications use this pivot point as origin point (below in orange).



Increase a plane's size with pivot at bottom



Increase a plane's size with pivot centered

Once you have understood this concept, positioning planes becomes much easier. All you have to do is:

- * Position your pivot,
- * Place your plane at the bottom of your project,
- * Adjust the size of your plane.

Let's go back to our «running kid» plane and apply the aforementioned procedure using the following settings:

- * *Position* parameters : $X=0$, $Y=246$, $Z=0$
- * *Pivot* parameters : $X=0$, $Y=130$
- * *Size* parameters: 75% of initial size

• Create an animation with the multi plane camera effect, part 2

* Now that your position, pivot and size parameters are correctly set, you may, if you wish, modify the angle and opacity of your plane as well as adjust the blur to be created with the focusing parameter (we will discuss this again later).

It is also possible to select a color mode to be used for drawing the plane (color, tint, add, screen, etc...).

For our «running kid» plane, we have chosen *Angle* zero, *Size* 75%, *Opacity* 100% and *Blur* 100%. The Blend mode is *Color*.

* The *HUD color* box allows you to choose the *HUD* color for the current plane. This will help avoid any confusion when several planes are present on the screen (we have chosen a reddish orange color for our «running kid» plane).

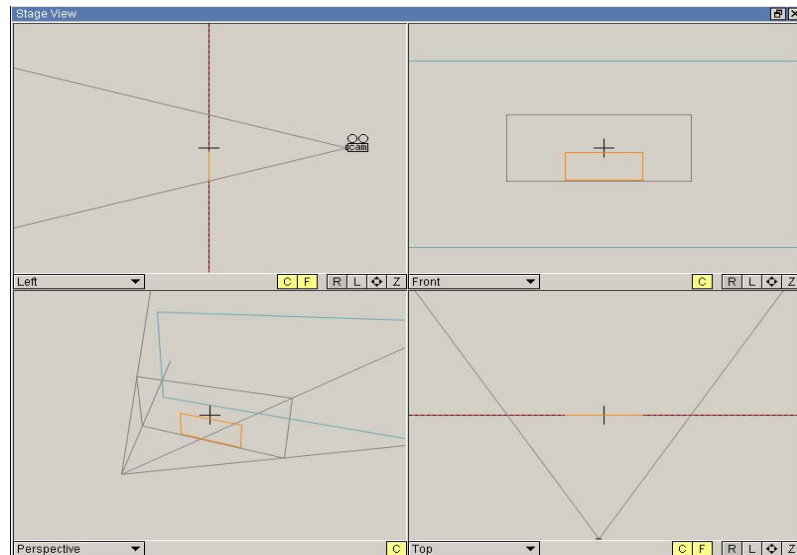
• Create an animation with the multi plane camera effect, part 3

We just created our first plane named «running kid».

We will now create a second plane «deeper» than the first. To do this:

- * Create a new plane and name it «forest».
- * Choose the «forest» layer of our project as source.
- * Our plane shows the forest located behind the running kid. We must therefore give it a position value $Z < 0$ (as our «running kid» plane also has the position value $Z = 0$). In this case we choose $Z = -1500$.

The 3D view is adapted immediately: You will notice that the «forest» plane is green (or any other color you may have chosen previously) and an «orange» «character» plane.



- * You may now adjust the Pivot parameter ($X=0$, $Y=210$) and the remaining position parameters ($X=0$, $Y=850$). The plane must then be «stuck to the ground»

- * All that is left is to choose the Size (300%).

The «forest» layer was created with the *Panning* tool in the main panel (refer to lesson 6 for further details). You may therefore duplicate it horizontally to avoid having to create too many planes. To do this ...

- * Use the *Tile mode* popup menu.



without tile mode



with horizontal tile mode

Now that the second plane has been created, all that remains to be done is create the remaining planes in the same way: «close trees», «distant trees», «mountain», with the only difference being that the «close trees» plane will have a Z value greater than 0.



If necessary, the FX stack corresponding to the parameters we wish to obtain is attached to the MPC.tvp project. You must therefore close it and load it again in order to go to the next stage quicker.

• Creating movement: move the camera



Now everything is ready to move the camera and obtain the desired result.

To do this:

- * Return to the *View* tab,
- * Go to the first frame of the «multi plane camera» layer in the timeline,
- * Create an animation key for the *Camera* value with $X = -700$,
- * Go to the last frame of the «multi plane camera» layer in the timeline,
- * Create an animation key for the *Camera* value with $X = +700$,
- * Use the *Play* button in your project window to view the result.

That's it!



Do not confuse camera movement and possible changes in the position of your planes.

The use of animation keys with plane position parameters is only useful if the latter effectively move (if the camera is fixed: mountain, forest and trees are fixed).

In such a case, this method would be justified if we had created an additional plane to illustrate movement of the moon in the sky (if the camera is fixed: the moon still makes an arc across the starry sky).

• Create and manage focusing blurs



During our animation, all the planes seen in the 3D view on the previous page are in focus.

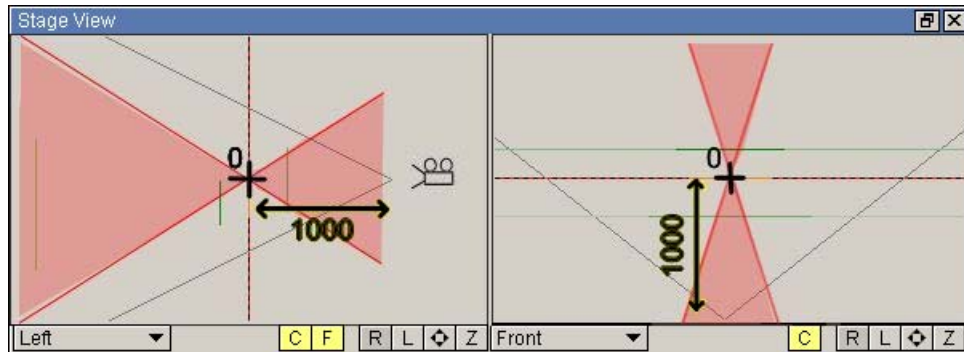
However, to create a more realistic effect, you may wish to create a camera focusing blur effect (refer to page 20 of this lesson, section *Focusing blur*).

You will therefore have to go back to the *View* tab and adjust the *Focusing distance* (i.e. indicate at exactly what distance the camera will be focused).

If you have followed all the steps of this lesson, your running kid will be at a distance of 1000 units from the camera and your focusing distance is also 1000 units.

The running kid is therefore in focus. In order to blur the other elements (mountain, forest, trees...), the Depth of *Field* effect parameter will need to be increased (when at 0, no blur is applied).

This is illustrated by the creation of a red cone in the 3D view (see below) and a blur on the screen.



The further the objects are away from the apex of the cone, the more blurred they will be. Inversely, the closer they are to the apex of the cone, the slighter the blur will be.



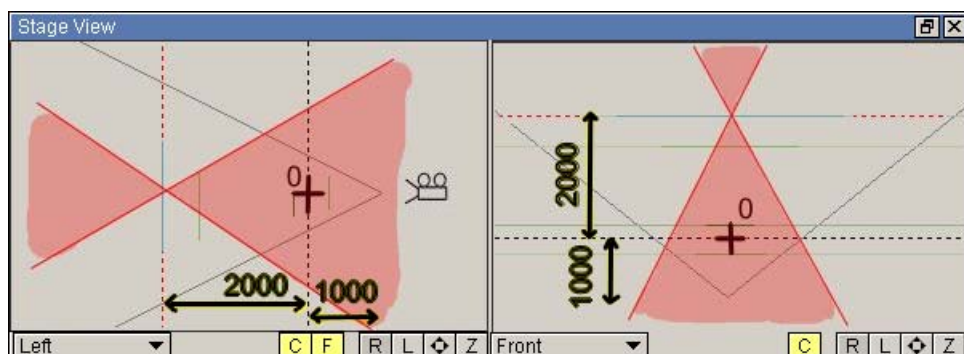
If your focusing distance is now 3000, your camera is located at 1000 units from the center point and the mountains are 2000 units on the other side of the center point ($1000+2000=3000$), the mountains will be focused and the other planes will be blurred.

Considering the position of the cone in the 3D diagram, it is also safe to say that the closer the camera comes, the more the image will be blurred (see next page).



The focusing plane is also visible in the perspective view and in the front view in the form of a gray rectangle.

In the case of the perspective view, you will see a gray «viewing angle» at the focusing distance.





In the diagram above, the blur is applied to your plane either inside or outside the red cone. This only indicates the blur amount.



The *Blur* parameter present on each plane of the *Plane* tab is used to adjust the blur for each plane individually. It is expressed as a percentage of the blur generated by the *Depth of field effect* parameter.

● Make the kid run


Now that the various elements of our scenery move correctly and the focusing blur has been adjusted, we may, for example, decide to move our red running kid using another animated source at the «running kid» plane level.

* You may choose to use the «Running_Kid_1.tvp» sequence studied in lesson 5 by modifying the position parameters of the «running kid» plane using animation keys (in this case he is not running on the spot).

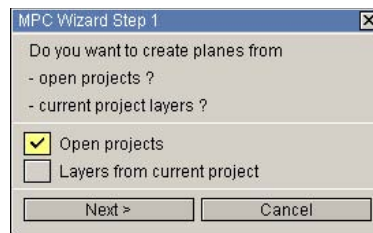
* You may also use the «Running_Kid_2.tvp» project studied in the same lesson (*). In this case, you will probably not need to modify the position parameters with animation keys as the running kid moves from left to right.

(*) This project was created using the *Keyframer* effect with the «Running_Kid_1.tvp» sequence as source.

● The multi plane camera wizard

You have certainly noticed the  button entitled *Wizard* to the right of the *Open stage* button. This button will help you quickly place the various planes in order to create a sequence using the *Multi plane camera* effect. Naturally, it was important to first study the global functions offered by this effect before introducing you to the latter function.

So now click on the *Wizard* button. The window which then opens asks if *Wizard* should create planes using external projects or from the layers of the current project. These are the 2 most common cases.



Create planes from projects

Choosing option 1 implies that you have first opened the projects you wish to use for the planes of your animation. Ensure the projects you intend to use are open before validating this window. Once validated, each project will become a plane in our *Multi plane camera* effect. The next window to appear invites you to stage these planes. This staging may be adapted to meet your specific needs.

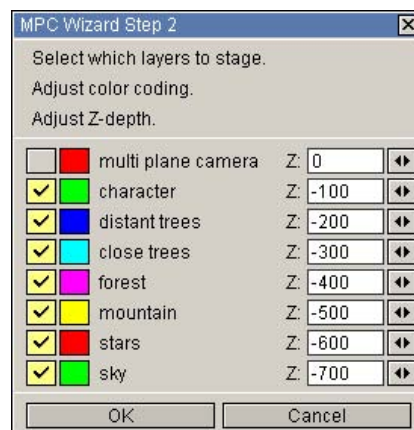
This is how the window looks:

The animation plane is created as the first plane and the other planes are listed in a column below it. Each plane has a check box which allows you to choose whether or not this plane should be used in your animation. The planes order is inverted compared to the order in which you opened your projects (the last project opened is the first plane, the first project opened will be the last plane). You will have noticed that each plane has a Z axis position value. With the default settings, each plane is given a Z value which is a multiple of -100: 0 for the first plane, -100 for the second, -200 for the third, etc... Therefore, all you have to do is define the Z values for each plane as you require and then validate your choice. All your planes will then be incorporated into the effect with the Z values defined above and all that remains is for you to animate them.

Create planes from the layers of your current project

Assuming the project MPC.tvp supplied on the CD is open, check the «layers from current project» box and then validate your choice.

The *Wizard* will then take each of the layers of the current project and incorporate them in each layer as a plane. The planes staging window, corresponding to stage 2, appears and displays each layer with the associated Z value:



In this window, you have the possibility to define whether or not each plane is to be enabled together with the customized Z axis position value (or not) for each plane.

You may also modify the HUD color.

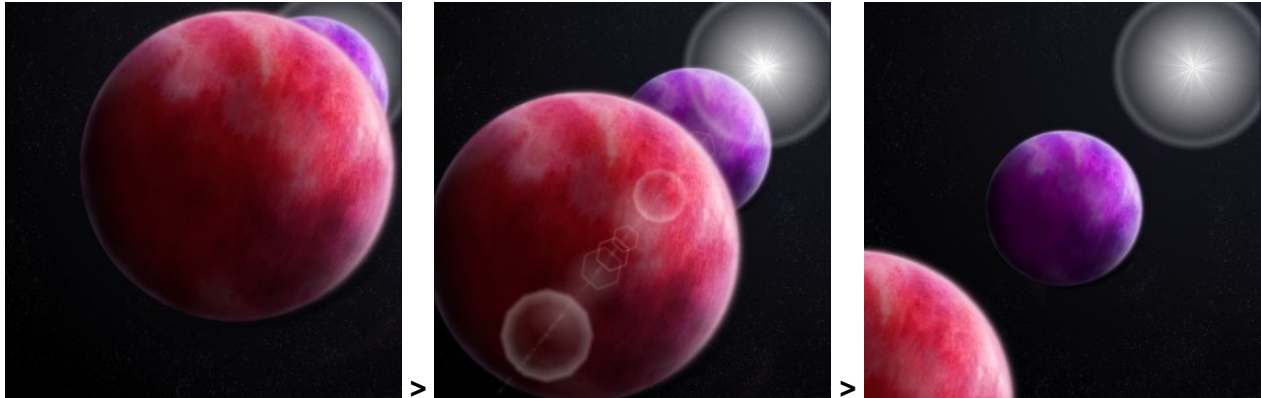
Now all that remains is to click on **OK** and the Wizard will automatically create all your planes using the layers.

• Other situations

We have now learned how to use the multi plane camera effect with a simple example.

Our *Multi plane camera* function may also be used in other situations:

Below you will see the transversal movement of the two planets with a fixed sun and *Lens Flare* effect.



The multiplane camera can also be used to zoom between the planes you have created :

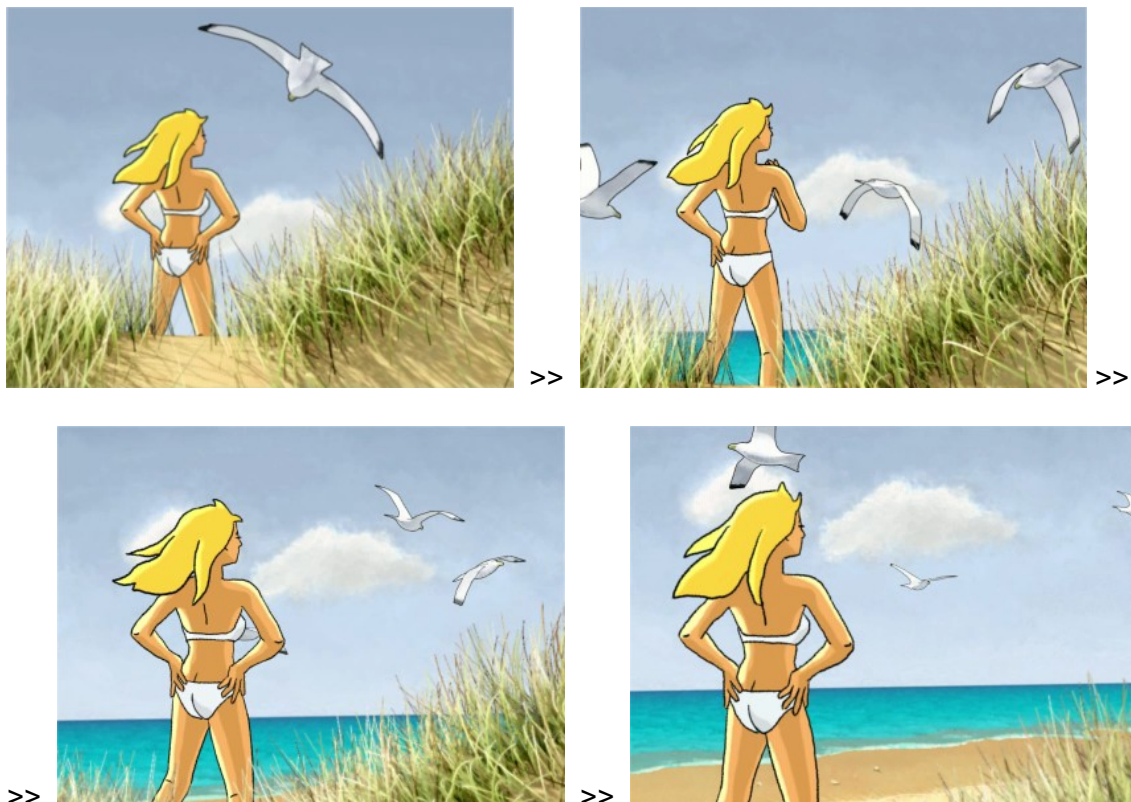
- * After you have created the planes with the wizzard, go in the *View* tab and on the first frame of the «multi plane camera» layer in the timeline.

- * Create an animation key for the *Camera* with a negative value for the Z axis.

- * Go to the last frame of the «multi plane camera» layer in the timeline, create an other animation key for the *Camera* with a positive value for the Z axis,

- * Apply the *FX-Stack* to the whole layer.

- * Use the *Play* button in your project window to view the result : the firsts planes should disappear smoothly as shown in the exemple below.



Now you try it!

Lesson 11

The particles generator

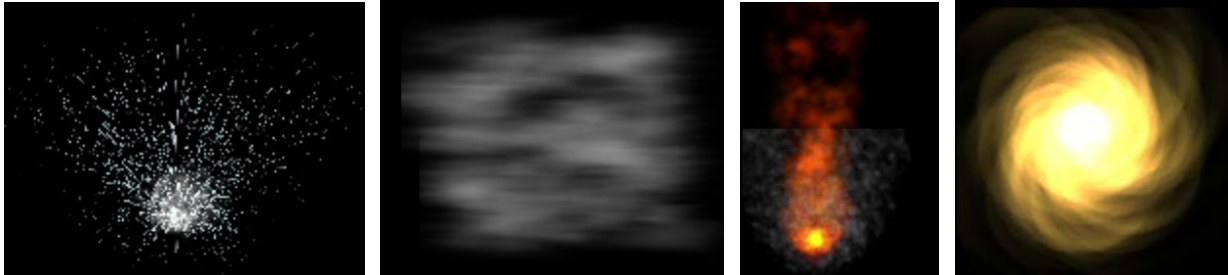
In this lesson, you will learn:

- To create a particles system.
- To modify a particles system.
- To use a particles system in order to add special effects to your videos or put the finishing touches to your animations.

Presentation and concept

Let's take the following elements into consideration: fog, smoke, fireworks, snow, fountains, sunshine, a tennis ball bouncing off the ground.

These natural phenomena and other objects taken from daily life don't seem to have anything in common except maybe that a lot of time is required to make a successful and correct animation of them.



Let's study them more closely:

- Fog and fountain are made of fine water droplets: they are suspended in the air and more or less opaque in the case of the fog; they are projected into the air by a source and fall back with the force of gravity in the case of the fountain.
- Sun and fireworks are respectively composed of helium, hydrogen and various chemical products. The latter are concentrated in a ball for the sun or expelled into the atmosphere in the case of fireworks.
- Smoke is also composed of various chemical products, generating different types of smoke. As it is very light it is not subject to the force of gravity and moves with the wind. The tennis ball, however, bounces several times before coming to a standstill and the wind has little influence on it.

In each case, we deal with « particles » in the broader sense of the word: water droplets, chemical products, tennis ball, etc. These particles move and are affected by the force of gravity, the power of wind or air resistance, etc. They may bounce or come from several places at once. The place or places where the particles come from are referred to as « emitters ».

TVPaint Animation does not only make it possible to draw such particles but also to manage their movement using the parameters described previously. This offers considerable time saving when creating animations and other special effects (drawing and animating the particles one after the other would require months of work...).

You have understood already that it is the effect referred to as *Rendering > Particles Generator* which will help us succeed in this matter.

• Learn by example

You will very quickly notice that the particles generator is an effect which offers a wide range of options.

Generally, you need to learn how to set :

- * the parameters of the world (or universe) in which the particles will move: wind, gravity, collision...
- * The parameters of the particle emitter(s): movement, angle, rotation...
- * The particle parameters: life span, velocity, number, opacity...

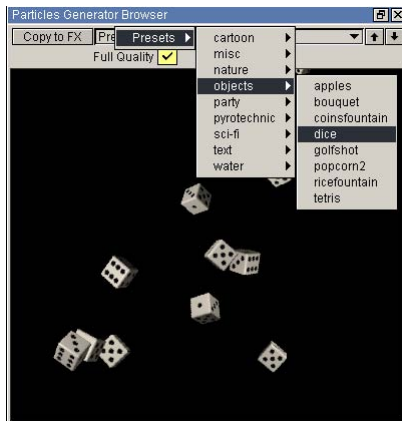
The multitude of parameters is so vast that it may discourage the beginner. For this reason and for didactic purposes, numerous pre-defined examples have been included in this program to help you master this powerful drawing tool.

Many users use them as a model to introduce the particles into their own creations. These pre-defined examples, sometimes referred to as presets, are accessible via the *Bin FX* menu.



The *Bin FX* menu appears as illustrated opposite:
You are already familiar with the functions *Add*, *Load* and *Save*: they are present for each effect available in TVPaint Animation. However, the functions *Browse* and *Preset*s are new.

Choosing *Browse* opens a window that is specific to the particles generator (see below).



In the popup menu you may choose a pre-defined example from the following categories: *cartoon*, *misc*, *nature*, *objects*, *party*, *pyrotechnic*, *sci-fi*, *text*, *water*.
(Using the buttons ▼ and ▲ you may scroll from one example to another.)

When you have chosen an example, its name will appear in the header of the popup menu and you may observe the changes made to the particle system directly in the window.

Two boxes may be checked in order to improve the quality of the particle animation depending on the power of your computer: *Full Quality* and *AAliasing*.

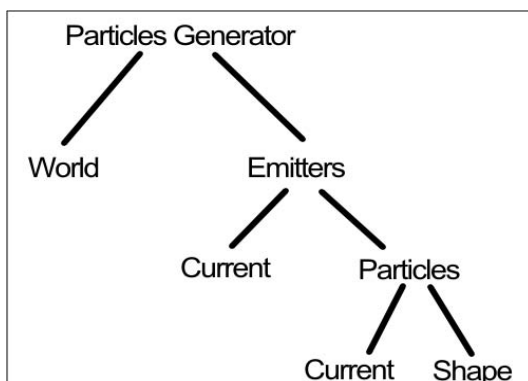
If a pre-defined example is close to the result you wish to obtain for your project, you may choose to set the parameters of the particles generator according to this example. To do this, just click on the *Copy to FX* button then close the window above. Now you study the example in detail and modify it to your needs.

We will come back to this process to illustrate some situations.

The tabs of the *Particles Generator* effect

The *Particles Generator* works with various tabs and sub-tabs which are not necessarily all visible at first use.

Below you will find a summary before starting a detailed description:

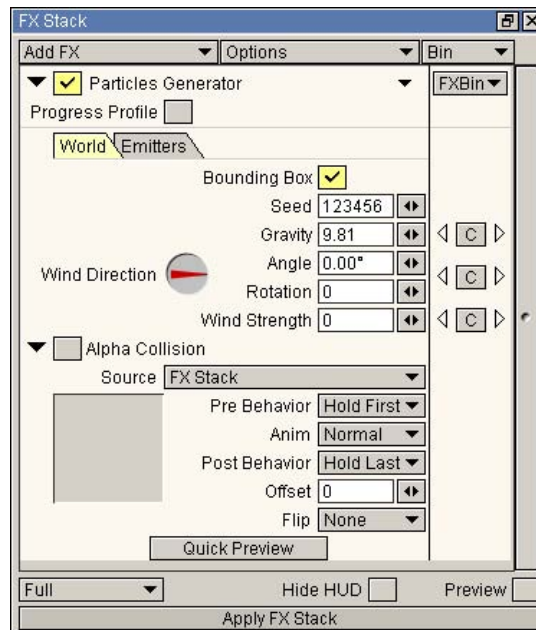


The names in the lower levels are sub-tabs.

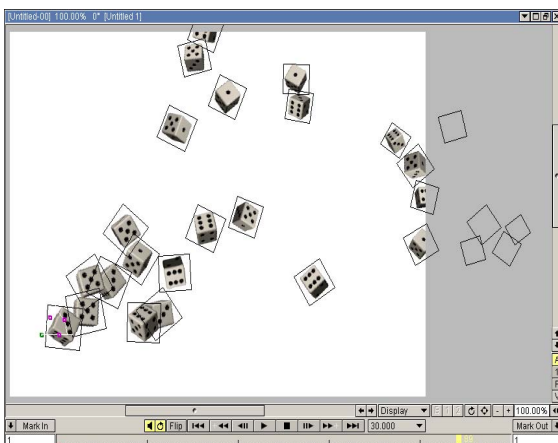
For example, the particles tab has two sub-tabs:
Current and *Shape*.

• The *World* tab

The *World* tab is used to manage the parameters of the « world » in which our particles will move (see below).



Two preview options are offered in the *World* tab: the check box *Bounding box* and the *Quick preview* button.

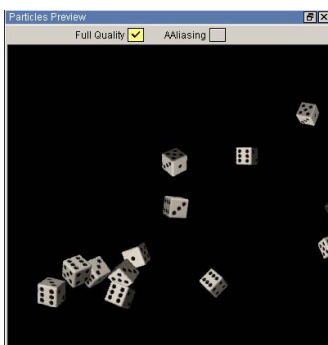


- The *Bounding box* check box is used to display a colored rectangle around the particles present in the current project window when the preview button of the FX stack is enabled.

The particles going out of the project which are susceptible to come back under the influence of certain factors (wind, gravity, etc.) are also framed.



Although this option may render the preview a bit complicated when many particles are on the screen, it is very useful to distinguish the position of low-opacity particles.



- The *Quick Preview* button displays a window very similar to the one which allows you to choose a predefined set of particles.

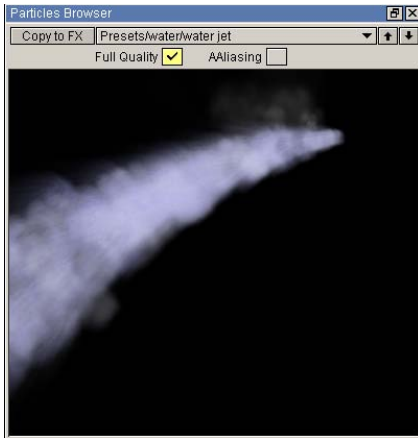
Here, you cannot select a predefined example and any parameter modification within your effect will have a direct impact on the animation shown to you.

This is very useful to interactively view and modify a particle animation before applying the effect to all frames of a layer.

This button is present in all other tabs and sub-tabs of the particles generator effect.

The *Seed* parameter is used to generate a random particle emission using calculation algorithms.

This parameter enables changing the rendering so that two effects which would be identical elsewhere are different.



Select the pre-defined example (*water >water jet*) and copy it to the particles generator (see left).

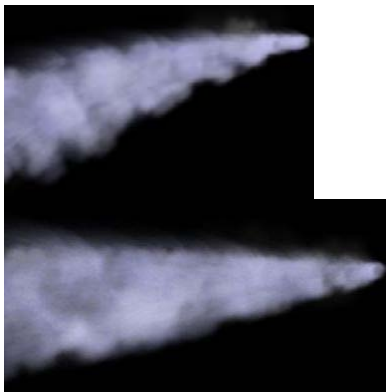
In this example, our particles are water droplets projected from right to left.

Open the quick preview window. We will be able to study the influence of the various parameters available in the *World* tab on the movement of the latter.

The *Gravity* parameter is used to take the earth's gravity into consideration during particle movement.



- When the gravity is increased to, e.g. a value of 10, the water droplets will fall to the ground faster, because the distance between the emitter (water jet origin) and the drop point is shorter.



- Decreasing the value to 0.5 will increase the distance traveled by the droplets.

The distance between the point where the droplets are emitted and the drop point is longer.

- When the gravity is set to zero, there is no gravity and the water droplets will follow a straight trajectory.



- TVPaint Animation offers the possibility to work with negative gravity values, which has the effect that the force of gravity may be inverted (the water droplets will then go up).

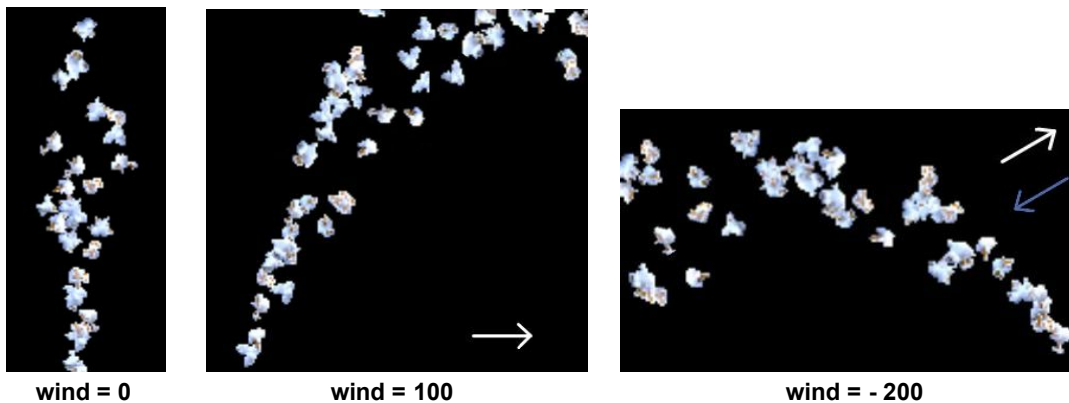
This is useful in certain cases, for example, to represent metal particles drawn by a magnet.



In order for the force of gravity to have an impact on our particles, it is necessary to attribute a *Weight* to them. We will come back to this when we talk about the specific particle parameters.

Let's take a look at the pre-defined example (*objects > popcorn*): the popcorn kernels are our particles and they move vertically to the top before falling back under their own weight.

The parameters *Angle*, *Rotation* and *Wind strength* allow you to simulate the impact the wind has on the particles (see examples below), and to make them more or less move in a direction of your choice (wind with a negative value affects the particles in a direction opposite to the one you have chosen).

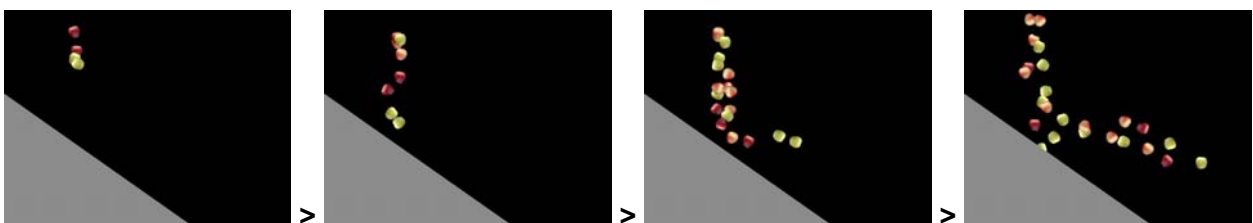


Note that using animation keys will allow you, if necessary, to change the direction of the wind in time as well as its strength (to avoid creating a wind that is too uniform).

The *Alpha Collision* menu is similar to the *Source* tab studied in lesson 10 when using the *Keyframer*. We will not go back to the concepts *Source*, *Pre-Behavior*, *Animation*, *Post-Behavior* and *Offset*.

There is, however, a functional difference: when the *Alpha Collision* box is checked, the particles will take into consideration the shape of the image(s) selected by you as source and, in case of a collision with one of them, bounce off them.

Draw a slope with an angle of approximately 30° with the horizontal line on all images of a layer with 120 images. In the particles generator, choose the pre-defined example: (*objects > apples*), check the *Alpha Collision* box and then select *FX stack* as source. To finish, apply your effect.

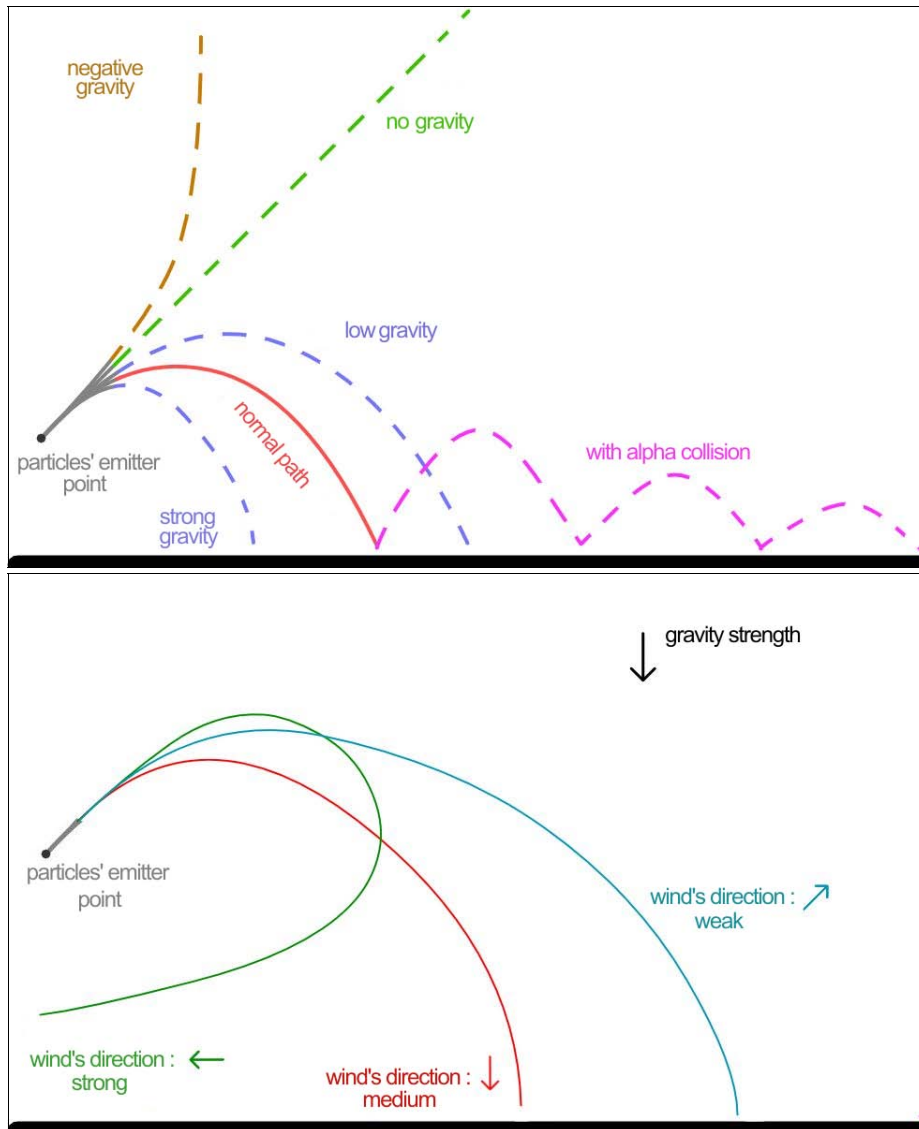


You will note that the apples bounce off the surface that you have just drawn!

This may be taken even further as the surface on which the particles bounce may evolve in time (for this, you have to choose an animated source).

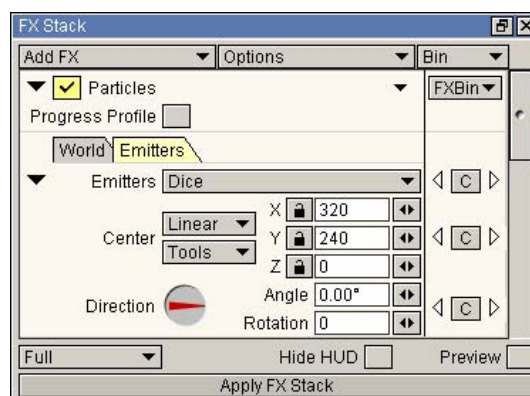
It is even possible to modify the height of the particle bounce, as we shall see later.

Below, you find two summary illustrations for the trajectory of any object.



• The *Emitters* tab

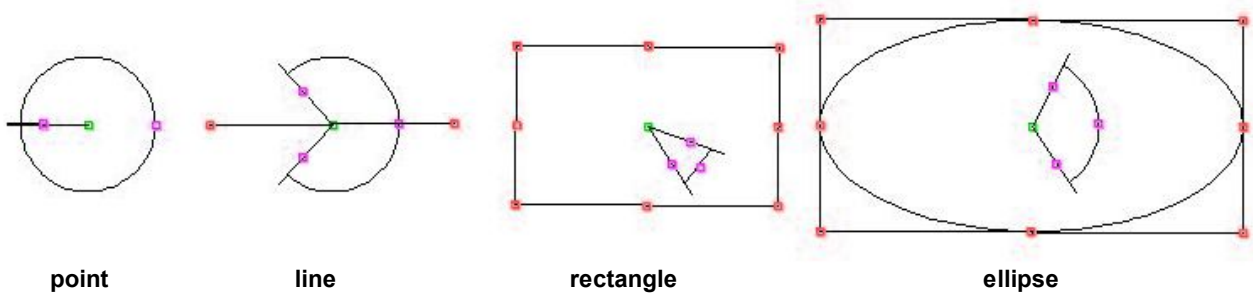
The *Emitters* tab (see below), as its name implies, is used to set the parameters of the sources emitting the particles.



The following emitters may be chosen :

A point (see pre-defined example *sci-fi > galaxywarp*), a line (see pre-defined example *objects > tetris*), a rectangle (see pre-defined example *nature > lava* or *cartoon > eyes*), an ellipse...

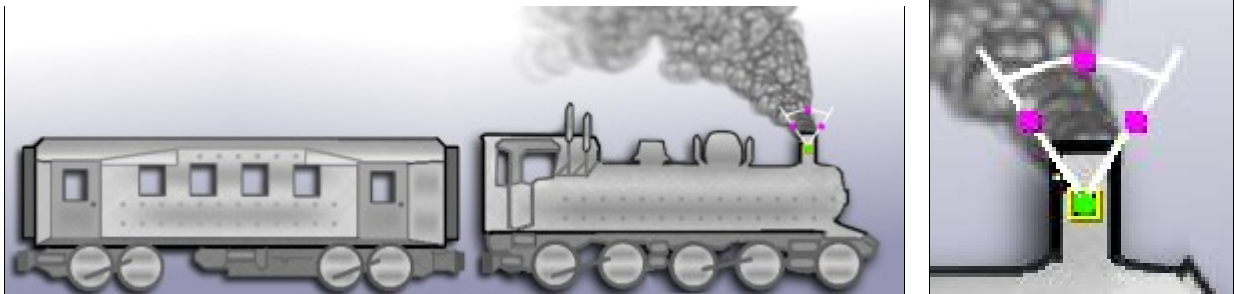
These are the various HUD displayed according to the chosen emitter:



The center of the emitters is shown in green, its shape is marked by red dots.

The purple handles describing the shape of circular arcs indicate the angle at which the particles are projected. We will study them in detail when discussing the *Emitter > Current* tab.

Below, the smoke coming from the steam engine was created using a *Point* type emitter.



Above, a zoom on the HUD.

These particle emitters are, of course, virtual. If you use the particles generator effect for animating water coming out of a fountain or tap, or smoke coming from a steam engine, you just have to draw the fountain, tap, steam engine...

It is possible to work with several emitters, placed where you want. The *Emitter* popup menu will facilitate your task as it offers you the possibility to *Create*, *Rename*, *Delete* and *Duplicate* emitters (note that the name of the emitter you are working on is displayed in the header of the popup menu).

Using several emitters may be useful when, for example, you wish to animate a building starting to burn: with several emitters, fire and smoke may come from several windows or chimneys with varying intensity (see below).



All these types of emitters have a center that you may place wherever you wish using the X, Y and Z coordinates (the « Z » coordinate is used to set the depth parameter as you have already seen when studying the *Keyframer*).

The *Tools* and *Interpolation* (*Linear*, *Spline* or *Polynomial*) popup menus are used to define the path to be followed by your emitter source in time.

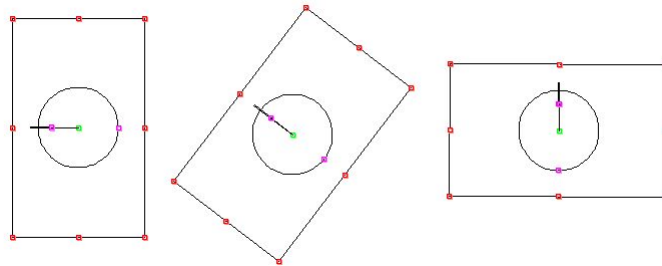
By clicking on the little padlock buttons, it is possible to « lock » your emitters in space so that they cannot be moved along the axis (or axes) of your choice. This enables, in particular, avoiding untimely movement.

The locked points may be subject to animation keys and « intermediate » points in time maybe created from the locked points.



The animation keys influence the position of the points in time and not in space.

The *Angle* option is used to point the emitter in the direction of your choice. It is also possible to turn your emitter using the animation key system. The *Rotation* parameter is used to manage rotations of more than 360°.



Some settings, not shown above, are specific to the emitter you choose to work with. Depending on the emitter chosen these are: length of the line, length and width of the rectangle, size of the two ellipse axes.

You will note that, once the emitter is created, two tabs appear: the *Current* tab and the *Particles* tab.



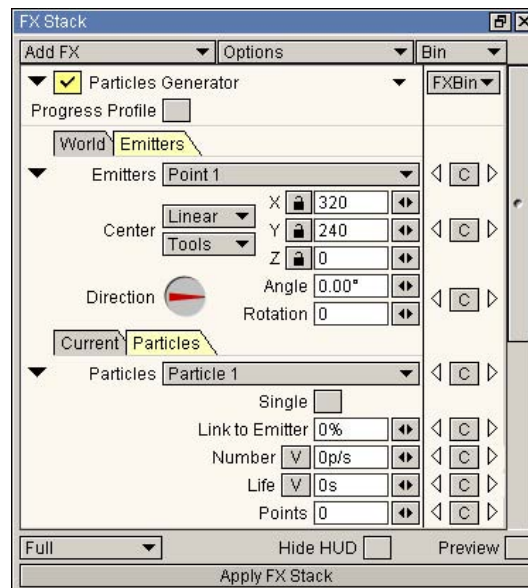
• The *Emitters > Particles* tab

The *Emitters > Particles* tab is used to manage the particles projected by the emitter.

The *Particles* popup menu enables creation of one or several sets of particles. Several types of particles may be emitted: see the pre-defined examples (*sci-fi > galaxywarp*), (*party > magic candle*) or (*pyrotechnic > explosion-b*) to convince yourself.

You may also duplicate, rename or delete a set of particles via this same menu. The name of the set of particles you are working with appears in the header of the popup menu.

As soon as a set of particles is created, new parameters for setting the particles appear (see next page).



All particles appear, move along the screen and then disappear again. The time the particles move is referred to as the *Life span* of the particles.

The *Life* parameter is used to adjust the particle life span in seconds:

- it is short for fireworks : *party > magic candle*
- it may also be long: *nature > fog*.

The *Number* parameter contains the number of particles emitted per second:

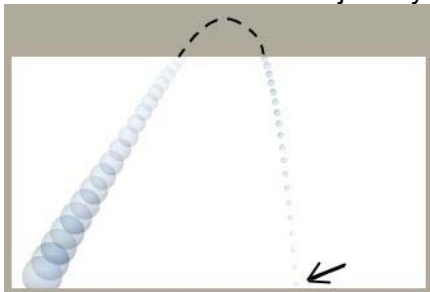
- if required, this parameter may be very high: pre-defined example (*sci-fi > galaxywarp*)
- or reduced : pre-defined example (*object > dice*)

A decimal number enables emission of a very small number of particles. For example, a setting of 0.3 generates a particle every 3 seconds, a setting of 0.01 generates a particle every 100 seconds.

When the *Single* box is checked and one particle has been emitted, no other particle will be emitted before the last particle has reached the end of its life, whether it is still on the screen or not. The pre-defined example (*object > golf shot*) is ideal for testing this option.

Let's assume that the *Life span* of our *golf ball* particle corresponds to the time it spends in the air (once the ball has landed, it is no longer possible to see it in the sky and it is too far away from the field of view to see it on the grass from afar).

If you check the *Single* box, a new golf ball will be shot only when the first ball has landed, independent of the fact whether the latter has left the screen on its trajectory or not (and even re-entered it on the same trajectory ... see below).



Shooting the second ball when the first has landed (i.e. at the end of its life ...).

The *Number of Points* is only valid with the emitters line, rectangle and ellipse.

It is used to distribute the zones from which the particles are emitted along the contours of the emitter you are using.

Below, the particles of the pre-defined example (*party > stage lights*) are used with a *Line* type emitter then with an *Ellipse* type emitter.



Line type emitter

From top to bottom :
Point parameter = 0 or 1
Point parameter = 3
Point parameter = 5



Ellipse type emitter

Point parameter = 9

A parameter referred to as *Link to emitter* is present in this tab: it is used to define whether the particles will follow an emitter or not when it moves along the path chosen by you.

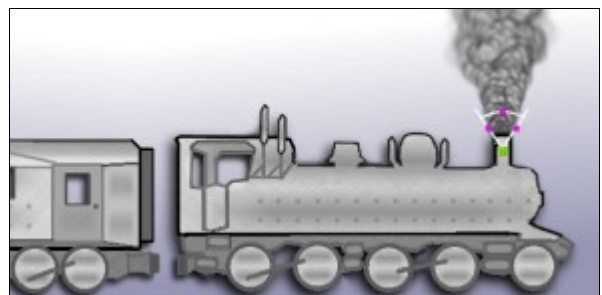
1st example: a steam engine was drawn on the screen. The *Keyframer* effect was used to simulate steam engine movement from left to right.

A *Pixel tracker* was used to create a path which follows the engine's chimney. Therefore, when the train moves, an emitter following this path will always be at chimney level.

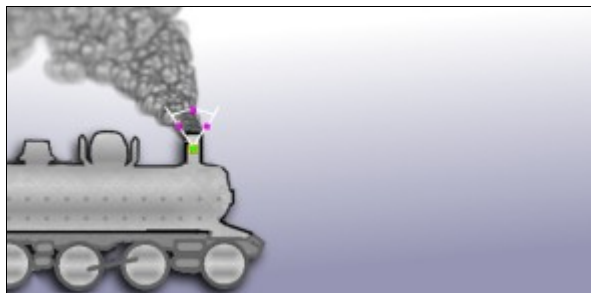
In the images below, the smoke particles are linked with the emitter which is the engine's chimney set at 100%. The movement of the smoke is not natural.



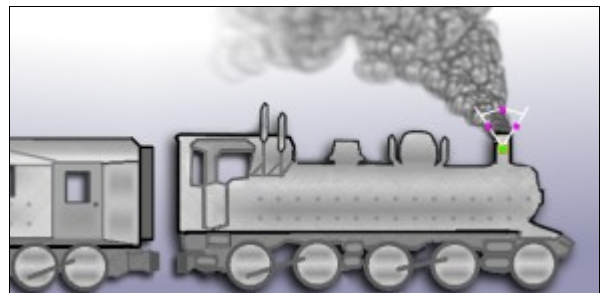
>>



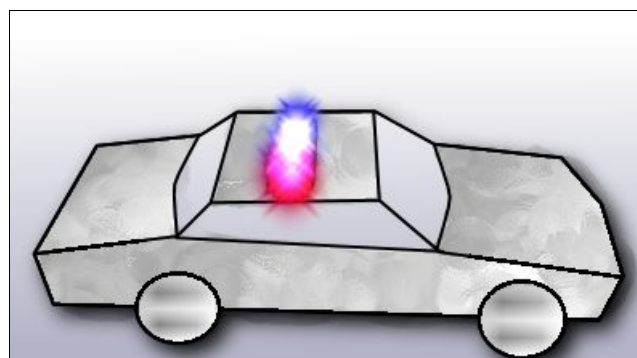
In this drawing, the parameter *Link to emitter* is 25%. This time, the smoke movement is correct.



>>

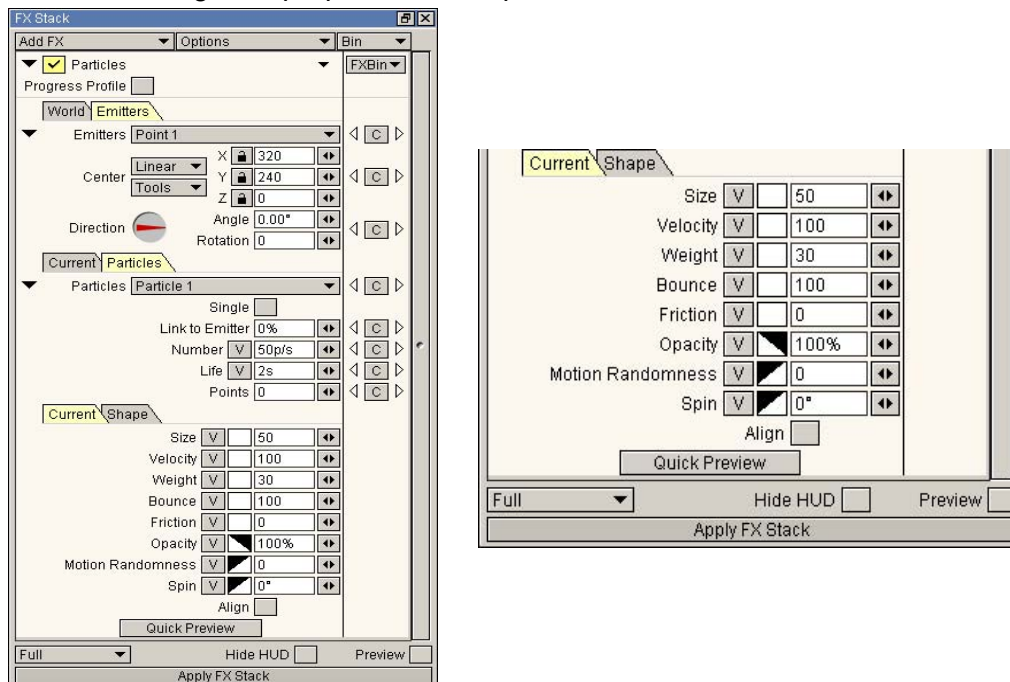


2nd example: the beacons below, as they are particles, are necessarily linked to their emitter: the roof of the police car. They move at the same time as the car when it is driving. The *Link to emitter* is therefore 100 %.



• The *Emitters* > *Particles* > *Current* tab

This tab is used to manage the properties of the particles themselves.



The most simple are *Velocity* and *Size*: any pre-defined example may be used to study these two notions.

The parameters *Weight* and *Bounce* are more subtle :

- The *Weight* of a particle has an influence on its movement if the *Gravity* parameter in the *World* tab is not set to zero: the heavier a particle, the more the force of gravity will accentuate its movement. The lighter it is, the less effect the force of gravity will have.

A *Weight* of zero has the result that the particle is not subjected to the force of gravity.

If you place the pre-defined example (*nature* > *sun*) in the stack and then modify the gravity parameter, you will note that this has no influence on particle movement.

- The *Bounce* parameter is used to set the particle bounce strength (the *Alpha Collision* box of the *World* tab must be checked and a collision source chosen...).

Below: the *Bounce* of a tennis ball thrown left to right for different parameter values: 85, 100 and 115 (note that values over 100 cause unnatural bounces relative to the laws of physics...)



- The *Friction* parameter is set to slow our particles down. If the particles move through the air (which is most often the case), we are dealing with air resistance. The latter is low and a parameter set at a value close to zero will be sufficient.

There are, however, other situations : let's assume that the balls are thrown at floor level. These balls will slow down and stop due to the friction of the floor. If the same balls are thrown on a lawn, they will be stopped even faster.

The pre-defined example (*objects > dice*) also provides an interesting case: by increasing the *Friction* parameter to 180, and due to the fact that the particles grow smaller in size during their life span, one gets the impression that the dice roll on a surface and, after a certain limit, fall into a void.

- The *Opacity* parameter is used to set particle transparency.

This is very useful, for example, when you are animating soap bubbles: these wouldn't be perfectly opaque...

- The *Motion Randomness* parameter controls the movement of imperfect particles and accentuates the realistic aspect of the particle jet. It is used, for example, to create an uneven fog, movement of bubbles in the air, smoke, etc.

This parameter is used to avoid having to create too many animation keys which would be required to render a trajectory uneven. This parameter comes into its own with the *Variation* parameter described hereafter. The pre-defined example (*party > popcorn*) uses this method.

- The *Spin* parameter controls particle movement around its local axis (the latter is defined in the *Handle* popup menu of the *Shape* tab which will be discussed below...)

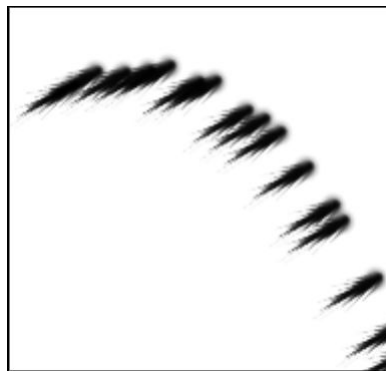
Its use may provide various results. As required, study the pre-defined examples (*objects > dice*) and (*objects > tetris*).

- The *Align* parameter, if enabled, acts on the rotation parameter and directly turns the particles according to their trajectory.

See below : two particle jets with and without alignment.

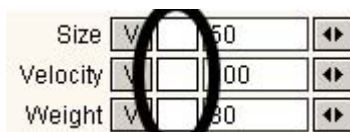


with alignment



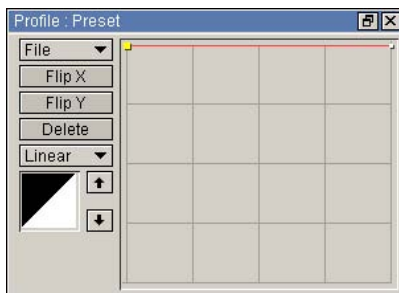
without alignment

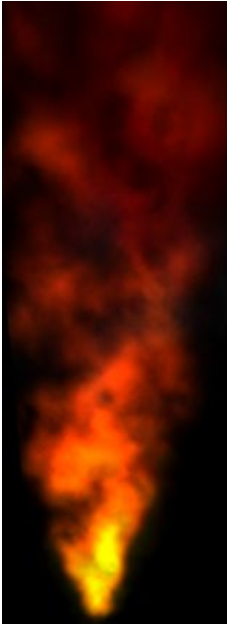
All parameters studied have the parameters *Variation* and *Profile* to their left.



The profile preset is used to vary a parameter (*Size*, *Velocity*, *Opacity*, *Bounce*, etc.) during the life span of a particle.

Click on one of the profile icons (circled in black in the example opposite) to open a traditional profile window. We have already seen these when studying the drawing tools.





Let's take the pre-defined example (*pyrotechnic > smoketrail*) shown opposite.
The three circled profiles at the beginning of the page are those used in this example.
You will note that the particle behavior and profile size and opacity are well balanced:



* The smoke particles are small close to the emitter source and become bigger as the smoke dissipates in the air.



* The smoke particles are opaque at the beginning (yellowish-orange zones) and become transparent at the end (red-black zones).



A parameter with the profile indicated opposite does not vary during the period the particles are displayed and remains at the value you have chosen.

The *Variation* represented by the *V* button is used to render the parameter with which it is associated more or less random. RMB click on the *V* icon to enter a numeric value in this field.

For example, if the particles *Size* parameter is set at 50, a *Variation* with a value of 25 means that each particle emitted will have a random size ranging from 25 to 75.

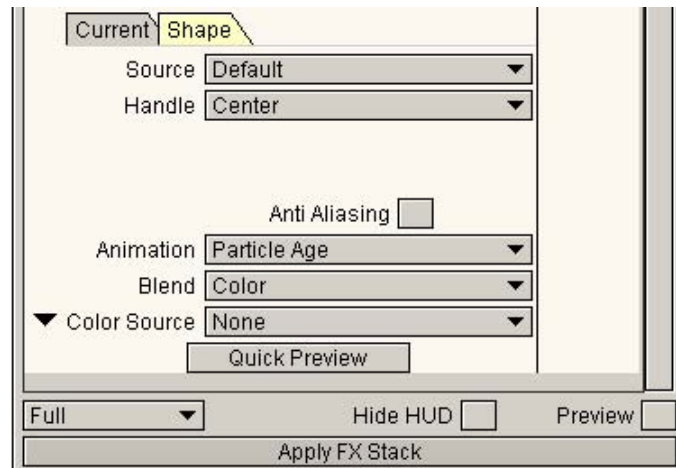
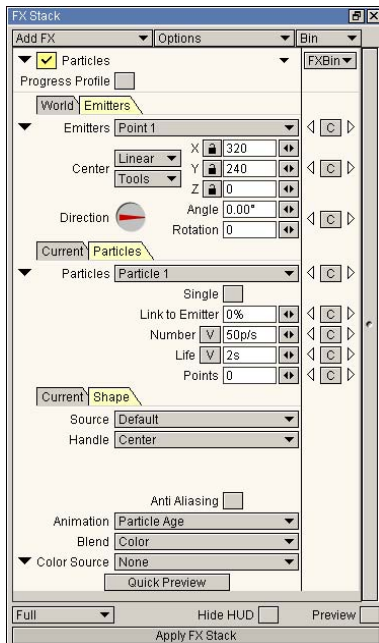
In the example given above (*misc > plumefury*), the variation function was used to attribute the particle *Size*, *Spin* and *Life* random values.



Combined with the *Motion randomness* parameter and correctly used, the *Variation* function provides excellent results. It is almost impossible to tell that a computer was used to create this effect!

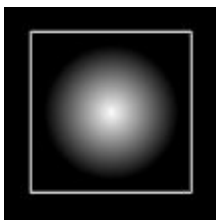
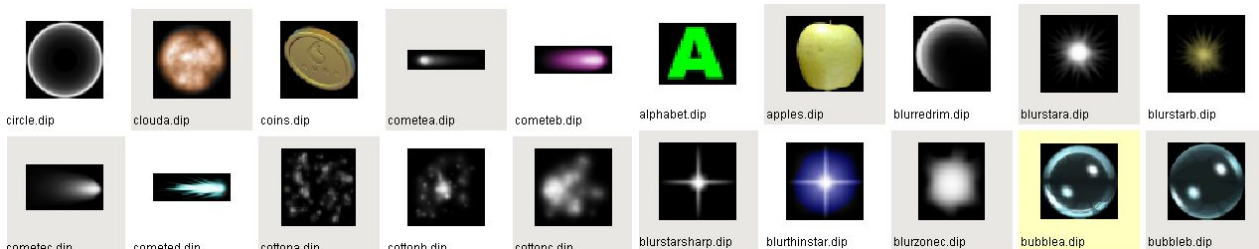
• The tab *Emitters > Particles > Shape*

This tab is used to define the type of particles to be used.



The *Source* popup menu is used to select either a default particle (circular with an opacity level decreasing towards the edges) or an image of your choice. When required, the image may be a brush, animated brush or current project.

In the case of brushes, you may select it using the file requester.



Opposite, use of the default particle.

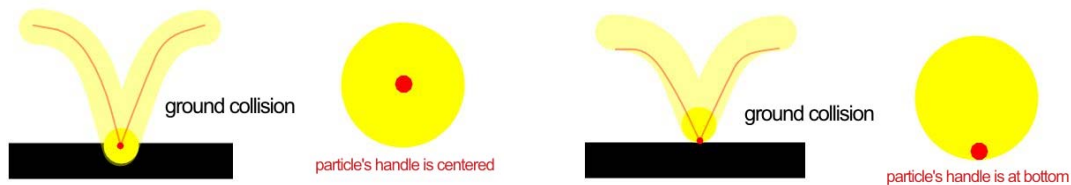
The *Anti-aliasing* option allows you to finalize the general aspect of the particles. We have already discussed this when studying the drawing tools (lesson 2, Further details).

The *Handle* menu works in the same way as that encountered when studying the brush and animated brush tools. It defines the particle axis which is the reference axis when a spin is imposed on the particle.

You may choose a handle located in the center of the particle (more precisely, in the center of the *HUD* rectangle surrounding it) or in one of the four corners of the latter.

As a last resort, you may even place the handle manually.

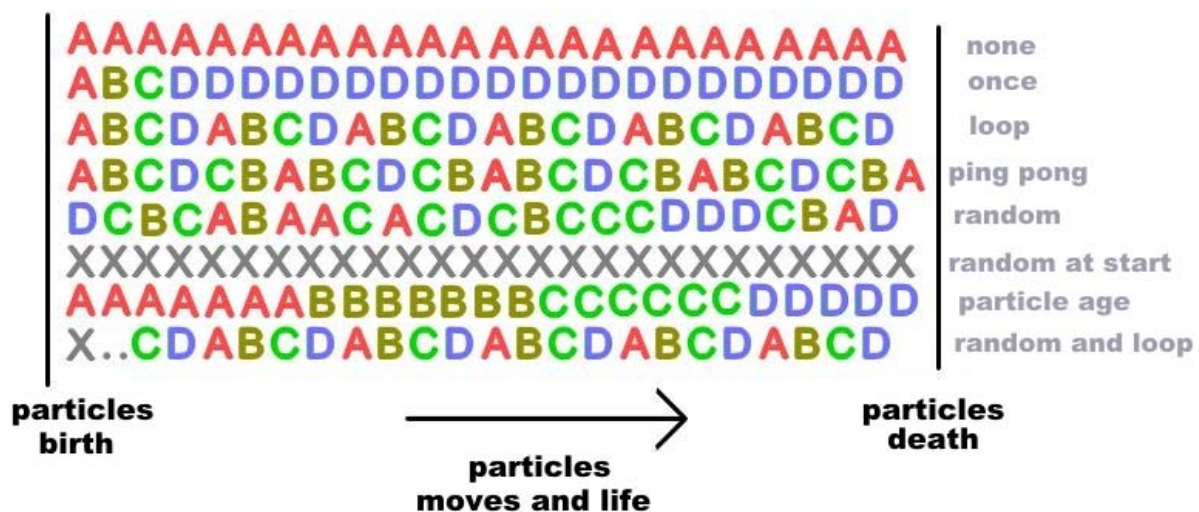
The *Handle* is also used as a reference point when calculating collisions. Furthermore, if you need to calculate a collision, it may be wise to place the handle elsewhere than in the center of the particles in order to obtain better results (see diagrams below).



When the *Source* chosen is an animated brush, the *Animation* popup menu is used to set the order in which the source images appear on the screen:

- The *None* option authorizes display of the AnimBrush's first frame only.
- The *Once* option is applied to each frame of the animated brush one after the other and stops at the last.
- The *Loop* option is also applied to each frame of the animated source one after the other, but starts a new cycle each time it reaches the last frame and so on until the particle dies (see predefined example: *objects > coin fountain*).
- The *Random and Loop* option randomly selects a start frame amongst the frames making up the animated source, then repeats these source frames in order starting from the selected frame. When the source footage has come to an end, it starts again (see predefined example: *cartoon > eyes*).
- The *Ping pong* option is used to first repeat the animated source frames in a rising order. Once the last frame is attained, it repeats the frames in a descending order and so on until the end of the particle lifespan.
- The *Random* option is used to display the animated source frames randomly.
- The *Random at start* option is used to display the animated source frames randomly for each particle, and then to keep it until the end of the particle life span (see predefined example: *objects > tetris*).
- The *Particle age* option varies the source frame displayed according to the age of its particle. All animated source frames are displayed once during the particle lifespan.
- With the *Particle direction* option the animated source frame chosen depends on the direction of the source in space. A coin thrown into the air, for example, will show one side on the way up and another on the way back down to the ground.
- With the *Generator's direction* option the animated source frame chosen depends on the angle formed between the particles generator and the horizontal plane (see above in the chapter *Emitters* tab page 7 with examples line, point, rectangle or ellipse).
- With the *Emitter direction* option the animated source frame chosen depends on the angle formed between the particles emitter and the horizontal plane (see below in the chapter *Emitters/Current* tab, page 18).

4 images AnimBrush : ABCD X = A, B, C, or D



The *Blend* popup menu is used to choose the mode to be used when drawing the particles on the screen (*color*, *behind*, *erase*, etc...). Refer to the predefined example (*nature > sun*) for an example of how to use the *Add* mode.

In lesson 2 you were given a detailed description of the drawing modes available in TVPaint Animation (the *Substitute* and *Mix* modes refer to the modes encountered when using a spare image).

The *Color source* popup menu is used to modify the particles' color:

- The *Color* option is used to give a tint of your choice to the particles (use the *Color* box and *Alpha* parameter).

An *Alpha* value of 100% will totally change the natural color of the particles.

- The *Gradient* option is used to modify the color of particles emitted based on a color gradient (refer to the predefined examples: *party > fireworks* or *misc > worma*).

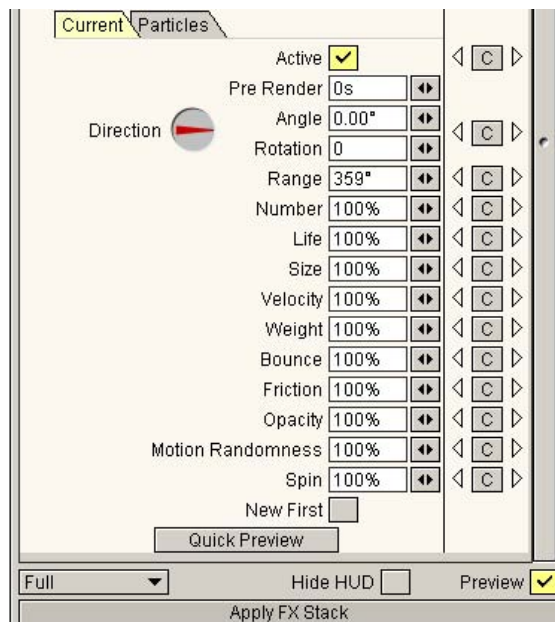
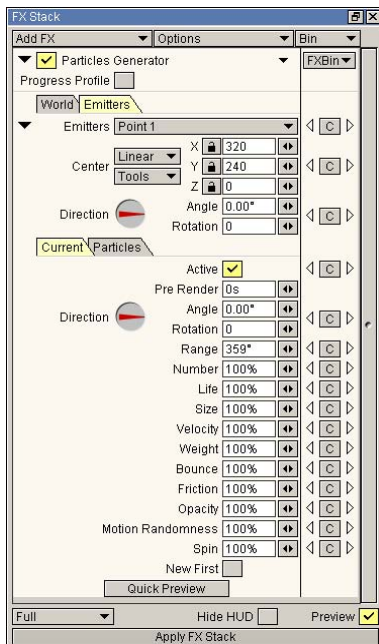
- The *Mode* menu contains some of the options already seen in the *Animation* menu above. However, these options do not apply to all consecutive elements of an animated brush, but to the colors of your particles in accordance with the color gradient chosen. The color gradients chosen to be applied to your particles will depend on the choices you make in this menu.

In the example (*party > fireworks*) the particles' color covers the entire color spectrum of your particles for as long as they live.

In the example (*party > stage lights*) the particles' color is chosen randomly and kept as long as the particles live.

• The *Emitters > Current* tab

Let's take a closer look at the *Current* tab:

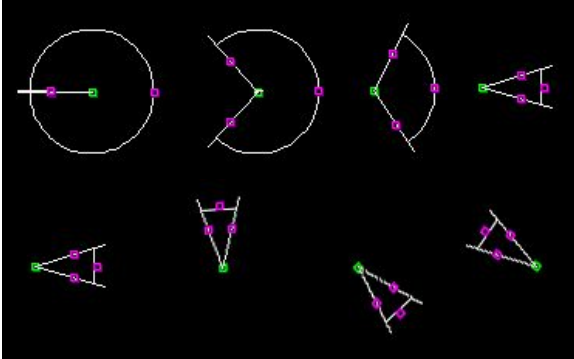


The *Active* button either displays or hides the emitter named in the *Emitters* popup menu (of course, your particle settings are retained). This function will render your task easier when working with several emitters at the same time and a large number of particles are displayed on the screen. In order to understand the way the parameters described below work, we recommend you make full use of the *Quick preview* window.

The *Pre-Render* parameter displays the particles on the screen after the number of seconds entered here have timed out.

Let's go inside the framework of a typical set of particles (*pyrotechnic* > *smoketrailc*).

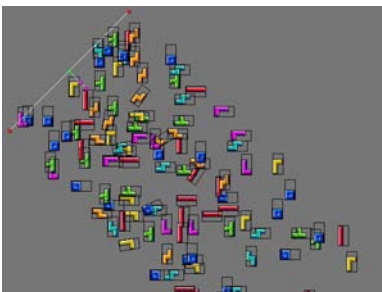
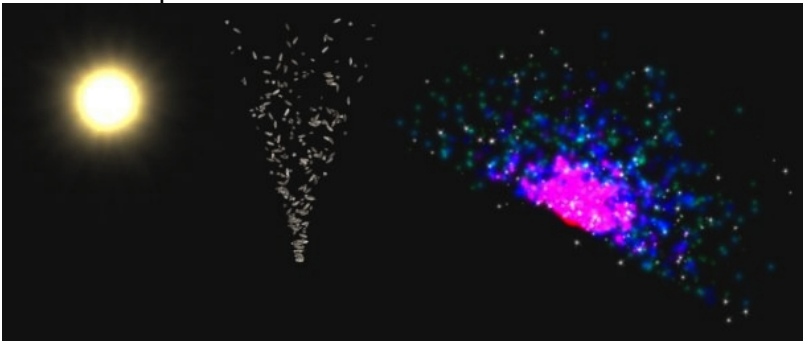
Setting the pre-render value to 10 seconds will ensure you do not see the outset of the flames as they will already be well developed right from the beginning of the animation.



The *Range* parameter is used to define the emitter opening angle. The particles bundle will then be emitted within the arc defined.

The *Angle* and *Spin* parameters are used to define the *Direction* in which the particles are ejected (see opposite).

Some examples:



Do not confuse *Direction of emitter* and *Direction of the bundle* of particles from the emitter.

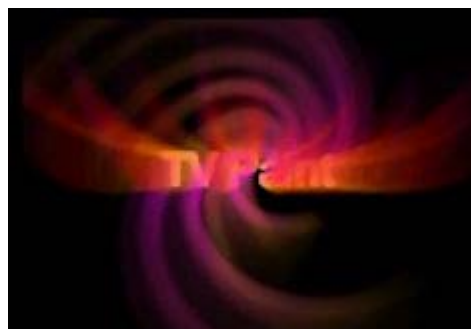
In the example opposite: the emitter is a straight line at an angle of 45° (oblique) and the direction of particles emitted is -90° (to bottom right) with an opening angle of 1°.

The *New first* check box, when checked, ensures that newly emitted particles are displayed in front of the older particles.

The result obtained with the predefined example (*text* > *titre1*) is similar to this option:



New first box not checked



New first box checked

All other parameters: *Number*, *Life*, *Size*, *Velocity*, *Weight*, *Bounce*, *Friction*, *Opacity*, *Motion randomness* and *Spin* are the same as those encountered in the *Emitters* > *Particles* > *Current* tab.

However, in this case we are dealing with «master» controllers: they are set as a percentage and have a direct influence on all particles of the emitter at the same time.

This is extremely practical when you wish to increase or decrease the size of all particles at the same time without modifying the size value for each type of particle emitted. This also eliminates the need for numerous calculations for each operation.

The use of animation keys with the master controllers often allows you to save a great deal of time.

To finish off, you may have noticed the animation key controllers next to the *Emitters* and *Particles* popup menus.



These are used to create animation keys for all parameters of the emitter or particle named in the popup menu header at the same time.

Appendix 1

The Sketch panel

The Sketch panel

The *Sketch* panel comprises some useful preset tools which will allow you to create and clean sketches, as if you were drawing by hand.

The *Sketchator* tools are designed for users who work with both computer and graphic tablet and who want to keep their old drawing tools. (pencil, eraser, ...)

Here is a detailed description of the panel :



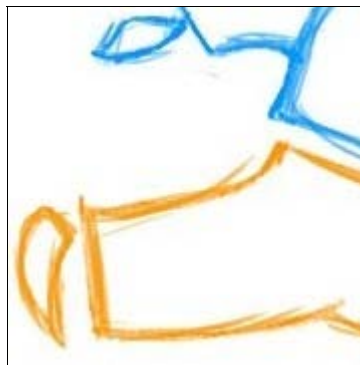
- * The *pencil* icons allow to draw sketches as if you had real pencils. Three colors are available : black, orange and blue. The blue and red pencils draw with *Behind* mode though the black pencil draw in *Color* mode.
- * The *paintbrush* icons allow to paint any pre-existing line into the color. You can turn any line blue, red or black.
- * The *flask* icons allow you to turn your image into blue, orange or black.
- * The first serie of erasers allow to erase only the color that is displayed on the icon.
- * The *cross icons* delete the color(s) : orange, blue, orange and blue, black while leaving the other colors intact.
- * The *eraser* icons allow to ... erase a portion of the image. The first eraser is small and thick. The second eraser is bigger and smoother.

Now, let's study how to draw and clean a sketch step by step :

* Firstly, open a new layer.

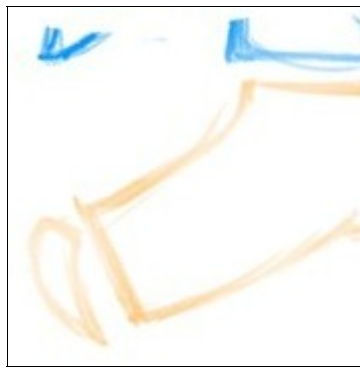
* Rough out your drawing with the blue and the orange pencils.

The two colors, orange and blue, can help you to differenciate the portions of the image (here, the head and the legs are in orange, the arms are in blue.)



* If you need to do so, use the two erasers at your disposal to refine the image.

In the example below, the first eraser was used on the head of the character, the second eraser was used on the legs.



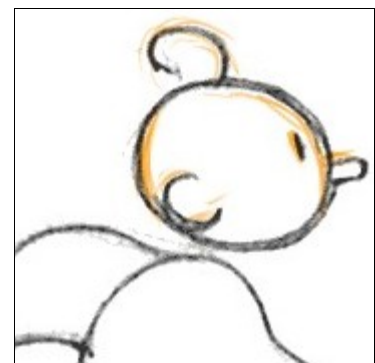
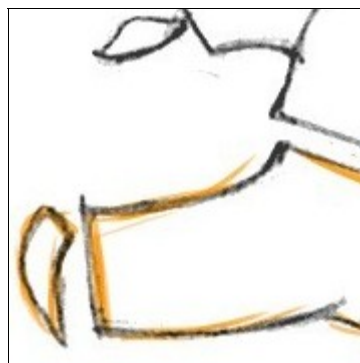
Either you draw or erase, don't forget that the rotative drawing disk can help you to work with more precision.

* Once the sketch with orange and blue colors is finished, use the black pencil to clean up the drawing.



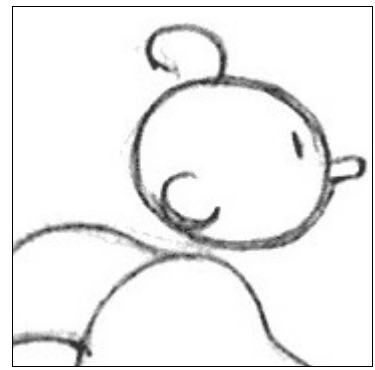
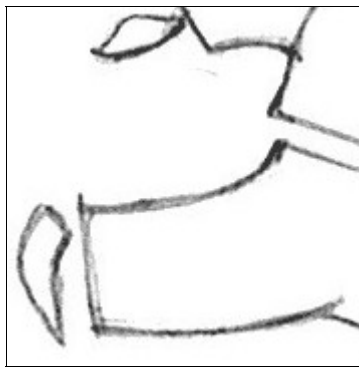
* Now use the *blue cross* icon : you now have deleted the blue construction lines of the arms : only the black construction lines are now visible.

The orange and black areas of the image (head and legs) are still visible.



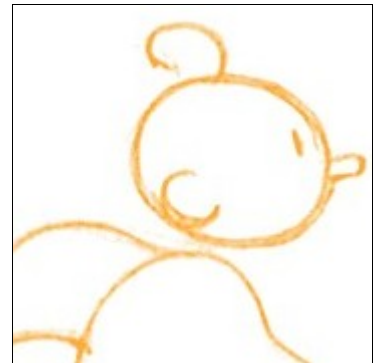
* If you use now the *orange cross* icon, only the black lines will stay on the screen. The sketch is more precise than at the beginning.

When you use the two colors blue and orange to draw, it is easier to choose whether part of the image should be erased or kept.

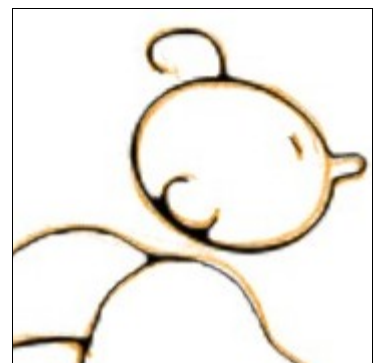
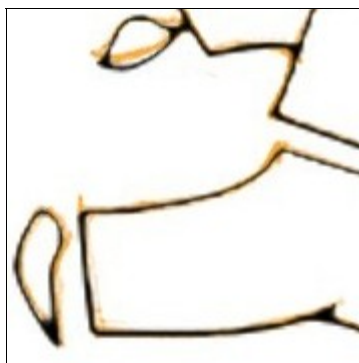


* At this state of the process, you can stop here or continue to have a better result.

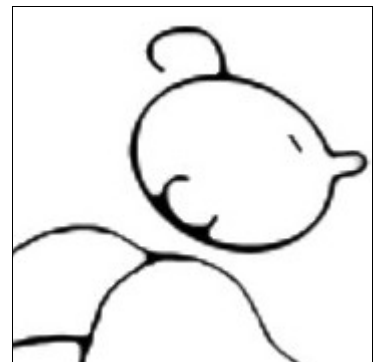
* We have turned here the lines into orange by using the *orange flask* icon. It is still possible to add some lines or to refine the image with the erasers.



* Here again, we draw with the black pencil on the orange construction lines.



* Now we get of the orange construction lines : The image is not rough anymore. (if it is not the case, you can return to the previous steps)





This method is not the only one that can be used with the *Sketchator* panel : you can use three colors in a different way or you can use only two colors.

It should be easy for you to adapt the *Skechator* to your workflow.