User Guide

OCView 7

The **Microscope Store**

Version: 7

All the users of OptixCam please kindly note that the information and references contained herein may be technically varied from time to time due to the unceasing development of OptixCam's products. The appendixes attached hereto include no guarantee on the technical processes or product characteristics described herein. In addition, OptixCam shall not be held liable for any printing error or inaccuracy contained herein except to the extent that OptixCam is aware of the existence of the same or the same is caused by OptixCam's intentional neglect.

This Guide only gives a general picture on the relevant information and technical processes and doesn't apply to all kinds of circumstances. If there's any doubt, please consult OptixCam. This Guide is under copyright protection. OptixCam reserves all the rights to this Guide. The content hereof will be updated according to the technical modifications and supplements of the products on a regular basis. This Guide only reflects the current conditions of OptixCam's software.

1. Introduction to OCView

OCView is modular software specialized for image acquisition, processing and analysis (hereinafter referred to as "OCV"). It's mainly comprised of two modules:

Image Acquisition

OCView applies to a great variety of cameras and the cameras output by OptixCam production line can guarantee the optimal integration effect. With the perfect combination between the camera and OCView, our users can achieve with ease the complicated images and image sequences so as to simplify the camera operation and image preview.

- Sequential Image Acquisition

Image Processing and Labeling

The images acquired will display on the screen immediately and may be processed with various tools:

- Contrast, lightness and color adjusting

- Size changing and rotating of image

- Sharpness increase/detail orientation

- White balance and image graying

OCView can footnote the images according to your instructions to help you label the images conveniently.

Image Processing

The other major functional module of OCView is for image processing. The values measured (such as the length, area and angle) will be shown in a worksheet from which such values may be exported. Meanwhile, we have formulated a detailed wizard for the calibration procedure to ensure user-friendly operation. Of course, all kinds of functions can be executed or deleted at will through the menus or toolbars.

2. Basic Operation of OCView
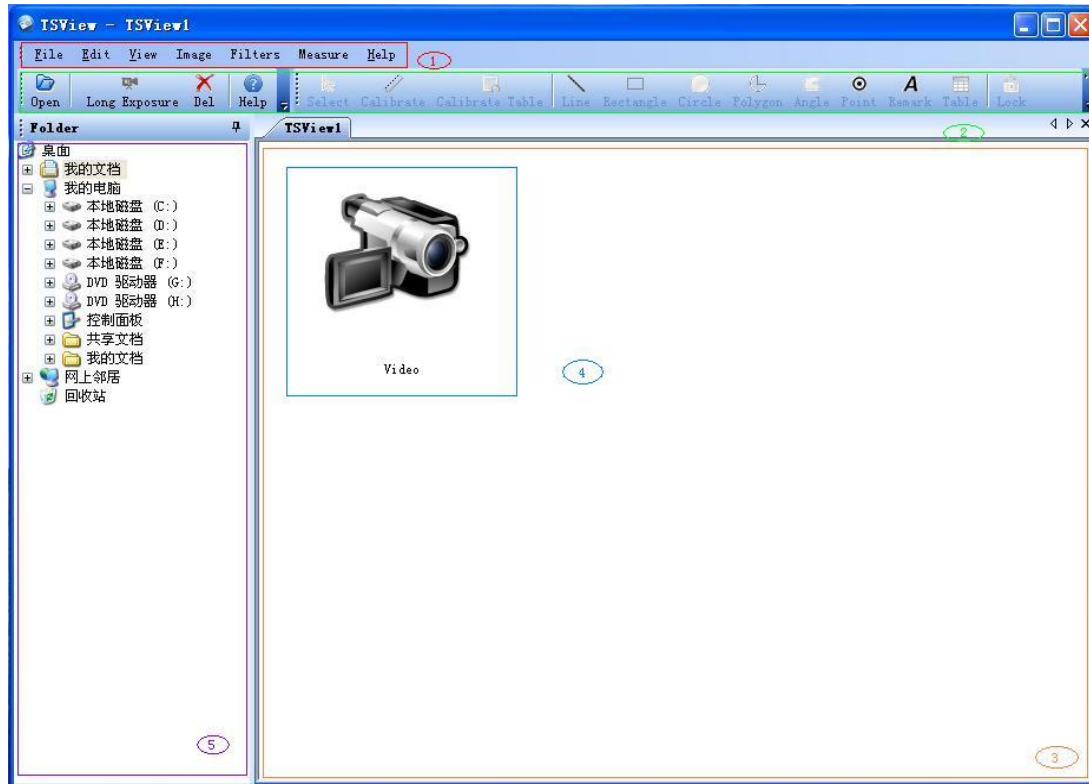
2.1. Introduction to OCView's Main

Diagram 1 Introduction to OCView's Main

1) Menu bar, corresponding to the toolbar

2) Toolbar, corresponding to the menu bar, and a click on a certain shortcut button may realize the corresponding menu function.

3) View window, for image editing.

4) Video switch button, a double-click on the "Video" icon will cause the video playing window to pop up.

5) Folder bar, for viewing images in the view window.

2.2. OCView's Photography Interface

A double-click on the video switch button will trigger OCV's digital image gathering interface, which is shown as follows, and users may use shortcut button F11 to expose or hide the toolbar.

Diagram 2 OCView's Digital Image Gathering Interface

2.3. **OCView's Image Processing Interface**

Under OCV's photography interface, click on the button "Open" of the toolbar or that on the dropdown list under the button "File" of the menu bar to import an image from a specified source. Then select a desired item out of the tool boxes Standard, Measure, Image and Status Bar contained under the dropdown list of the button "View" of the menu bar.
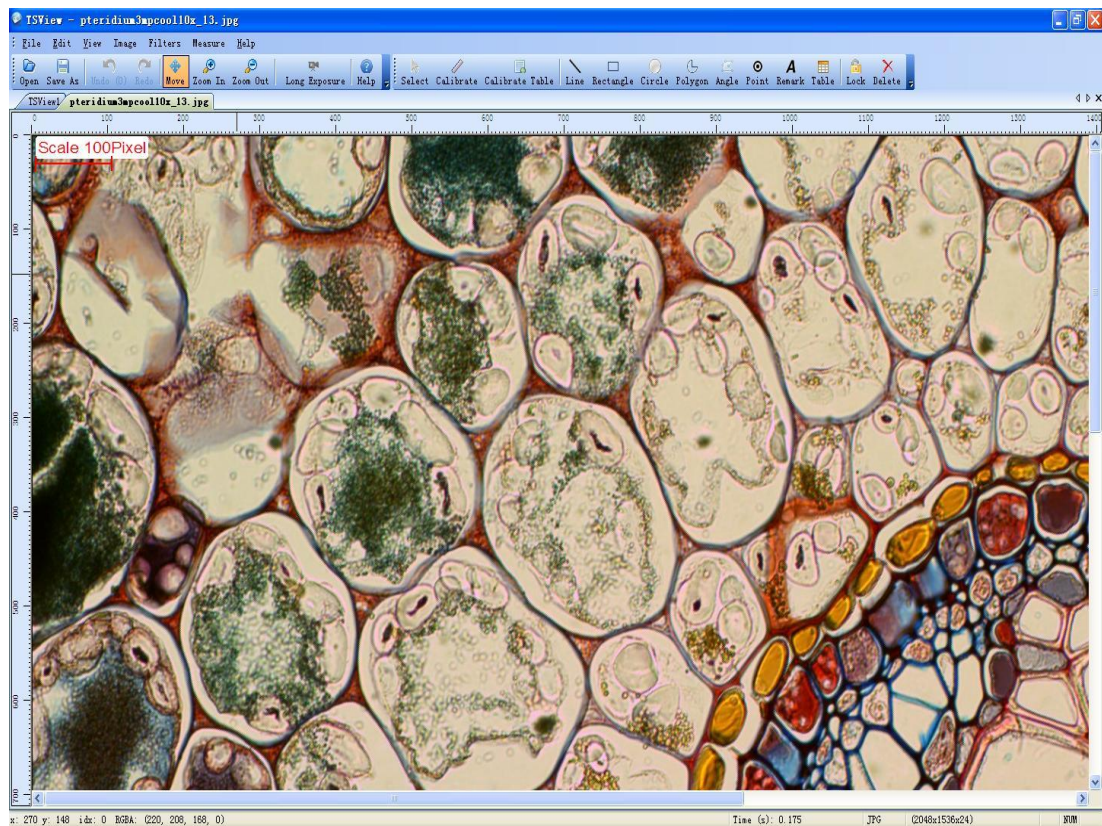
The result is shown below:
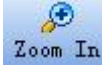
Diagram 3 OCView's Image Processing Interface

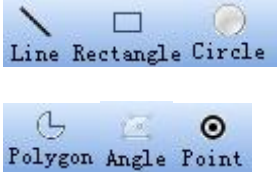## 2.4. Reference and Explanation for the Buttons and Menus

Toolbar Button	Corresponding Menu	Function
Open	File→Open	To open an image
Save As	File→Save As	To save an modified image
Undo (1)	Edit→Undo	To undo the previous steps of image processing
Redo	Edit-Redo	To redo the previously-undone steps of image processing

	Edit→Move	To move the display position of the image
	View→Zoom In	To zoom in the image to be viewed
	View→Zoom Out	To zoom out the image to be viewed
	Help→Help	To exhibit the relevant content of "Help" text.
	Measure→Line, Rectangle, Circle, Polygon, etc.	To select a desired measuring tool to measure the image being viewed.
	Edit→Measure Table	To display all the measurement-relating information of the current image.
	Edit→Lock	To hold the current measuring mode.
	Edit→Delete	To delete the measuring figure

3. OCView's Functions

3.1. OCView's Photography Function

Under the photography interface of OCView, users can identify the type of the camera from which the picture is imported, the basic settings of the camera at the time of photographing and the post-photographing image preview

3.1.1. Start the Camera

Double click the "Video" icon in the viewing area.

Video   The video playing window will then pop up.

If the camera is connected to the computer and an applicable drive is detected, it will start playing video automatically.

Diagram 4 OCView's Video Playing Interface

If the camera is not connected to the computer or no drive is found although the aforesaid connection is established, the following window will pop up.

Diagram 5 OCView's No Camera Interface

At this point, please make sure whether the drive has been correctly installed or whether the camera's USB spigot has been properly conjoined with the computer.

3.1.2. Camera's Photography Setting

【**Function** 】

After the camera or lens has been successfully connected to the computer, start photographing or videotaping and then designate the save path of the images to be saved.

【**Premise**】

The camera or lens connected to the computer can be detected by OCV and can provide normal performance.

【**Operating Instructions**】

◎ **Photographing**

·Click on to start photographing, and then acquire the images.

·Click on the downward triangle in the right corner of and the dropdown window "Config" will pop up, click on the item "Config" to trigger the dialogue box "Config Property of Save" and follow the setting procedures shown below:

   (1) Click on the tab "Snap", the photography setting window shown below will appear:

Diagram 6 Photography Setting

(2) Name the image to be saved

A. ☑Use Time-stamped , this option decides whether the image to be saved will be named with the current time of the system; checking this option will approve the said naming method; if not, users will be required to manually enter the name of the image to be saved in the blank dialogue box on the right of the file name.

B. Use . bmp ⌄ to set the extension of the image to be saved (such as Image1.bmp, Image 1.jpg), options are available in this dropdown list.

(3) When the setting is finished, click the button OK to save the settings.

3.1.3. Videotaping

Click following the sequence of "Snap" on the toolbar-> menu "Config" -> dialogue box "Config Property of Save", and then designate the save path through tab "Video".

Diagram 7 Videotaping Setting

A click on the button "OK" will turn into , a click on which will start the videotaping, or stop the videotaping if the videotaping is on.

Re-accessing the setting interface and clicking on the tab "Snap" will switch it back to the photography setting interface.

3.1.4. Setting of Videotaped Images

◎ **Exposure Time Setting**

Click on the exposure button on the toolbar of the video playing window or on the setting button (in the tab "Main") to set the exposure time.
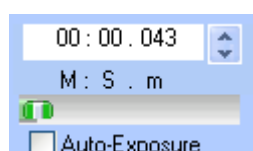
◎ **Automatic White Balance**

Click on the Auto WB button in the video playing window to set the white balance.

◎ **Area White Balance**

After the target area is selected, click on the Area WB button in the video playing window to set the white balance.

◎ **Camera Resolution Setting**

Select the desired video resolution via the dropdown window of the video playing window.
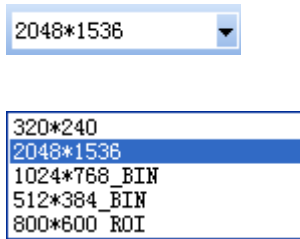

Diagram 8 Camera Resolution Setting

◎ **Setting of Photographed Images**

When it comes to the setting of photographed images, click on the setting button first, then continue the setting in the two tabs "Image" and "Parameters" of the dialogue box "Digital Camera Setting" .
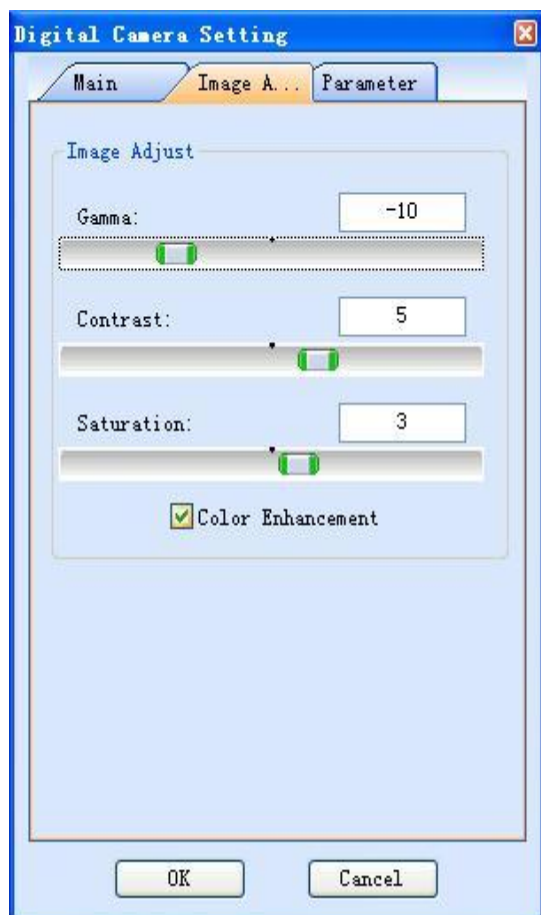
Diagram 9 OCView's Photographed Images   Diagram 10 OCView's Parameters Setting
Setting Interface   Interface for Photographed Images
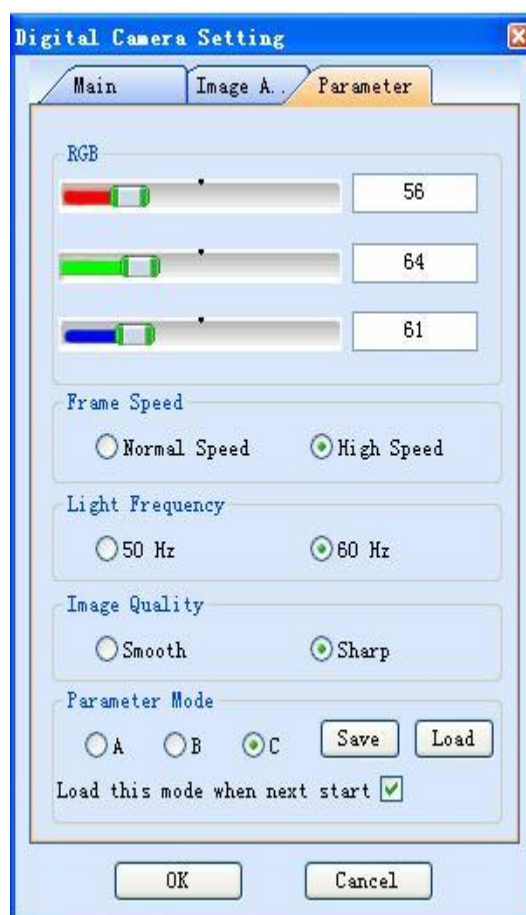
3.2. OCView's Image Processing Function

This function applies to the processing of acquired images, including without limitation cropping, lightness and color adjustment of acquired images.

3.2.1. OCView's Tools

OCV's tools include "Move" and "Zoom".

Toolbar Button	Corresponding Menu	Function
Move	Edit→Move	To move the image that has been zoomed in.
Zoom In Zoom Out	View→Zoom In (Out)	Zoom in or zoom out the image to be viewed.

3.2.1.1. Move Tool

【**Function** 】

If the image is beyond the display area of OCV after zoomed or for its original size, user may use the move tool **Move** (in the dropdown menu under button "Edit" of the toolbar or menu bar) to move the image in four directions to take a full view of it.
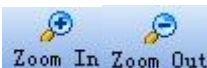
3.2.1.2. Zoom Tools

【**Function** 】

Zoom the image to be viewed.

【**Operating Instruction**】

1. Click on the buttons **Zoom In Zoom Out** to select the zoom tool.

2. Move the mouse on the image and press the mouse left key to zoom the image being viewed.

3.2.2. OCView's Image Processing

This function is for the processing of acquired image, including: adjusting the reversal degree, inclination degree and color of the image.

3.2.2.1. Reversal of Image

The reversal of image includes mirror, reversal, left reversal, right reversal, rotation and inclination.

Button on the Right Toolbar	Corresponding Menu	Function
↔	Image Processing→Horizontal Mirror	To mirror the image being viewed
↕	Image Processing→Reversal	To horizontally reverse the image for 180 degrees.
↻	Image Process→Rotation	To rotate the image for a certain angle.

3.2.2.1.1. Horizontal Mirror

【**Function** 】

A click on the button "Mirror" will enable users to mirror the image being viewed.

【**Operating Instruction**】

1. The image shown below is the pre-mirroring one.
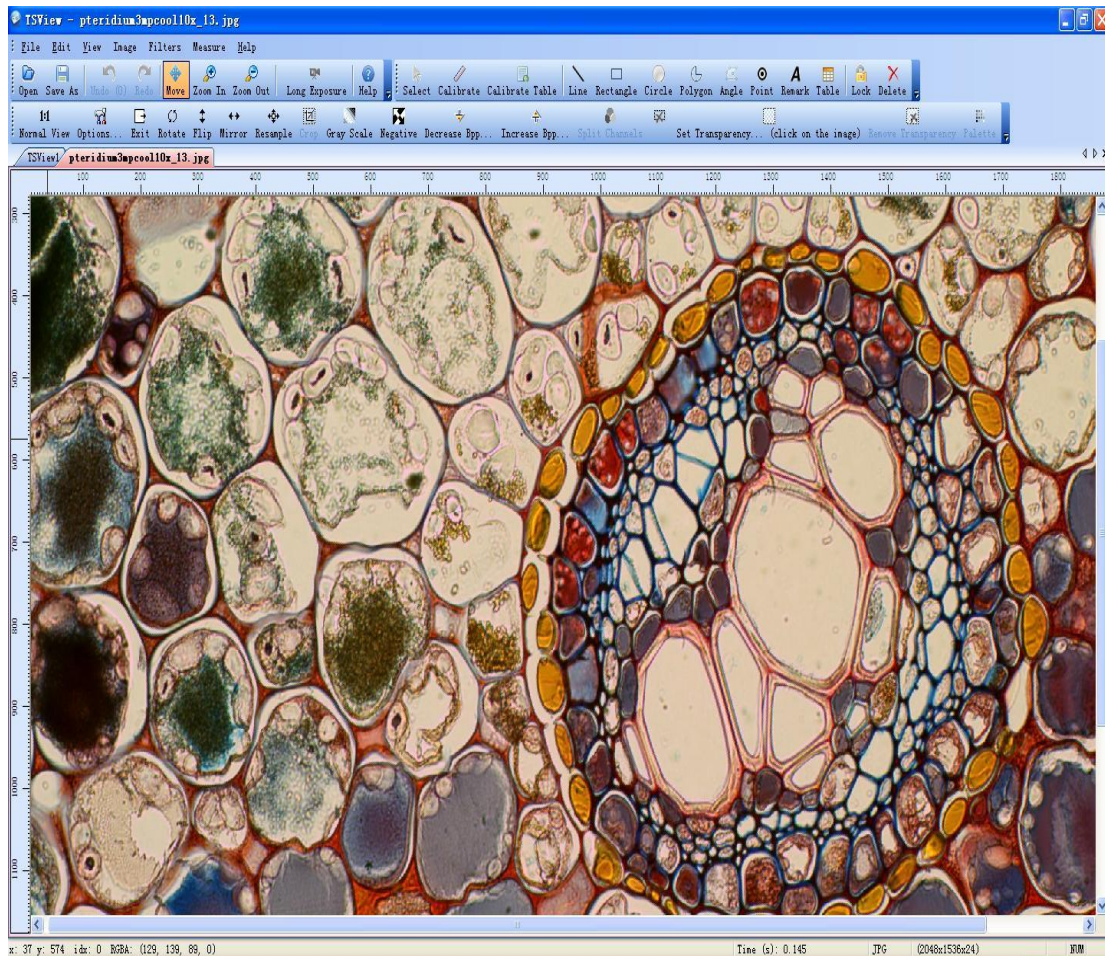
Diagram 4 Pre-Mirroring Image

2. Click on the button ↔ on the right toolbar, the image will be mirrored, as shown below
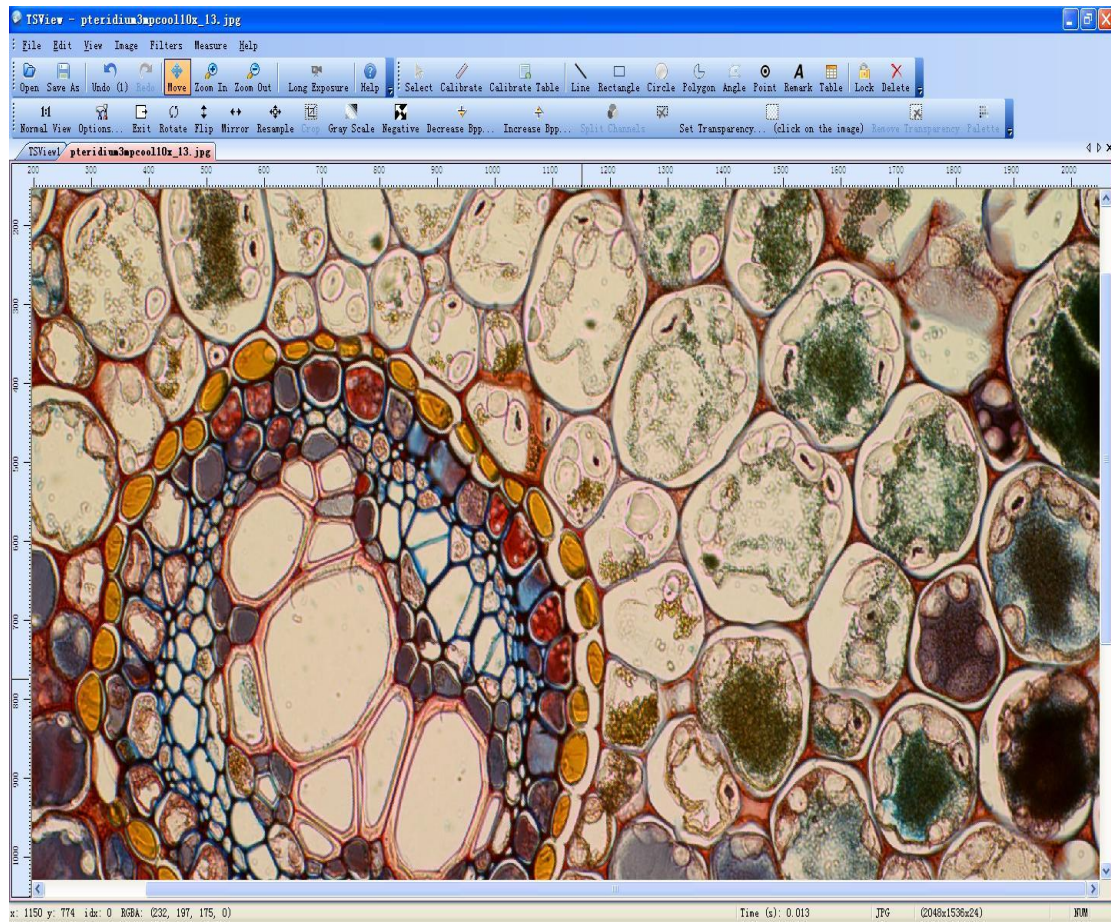
Diagram 5 Post-Mirroring Image

3.2.2.1.2. Reversal

After reversed, the image titled Diagram 5 will become the one shown below
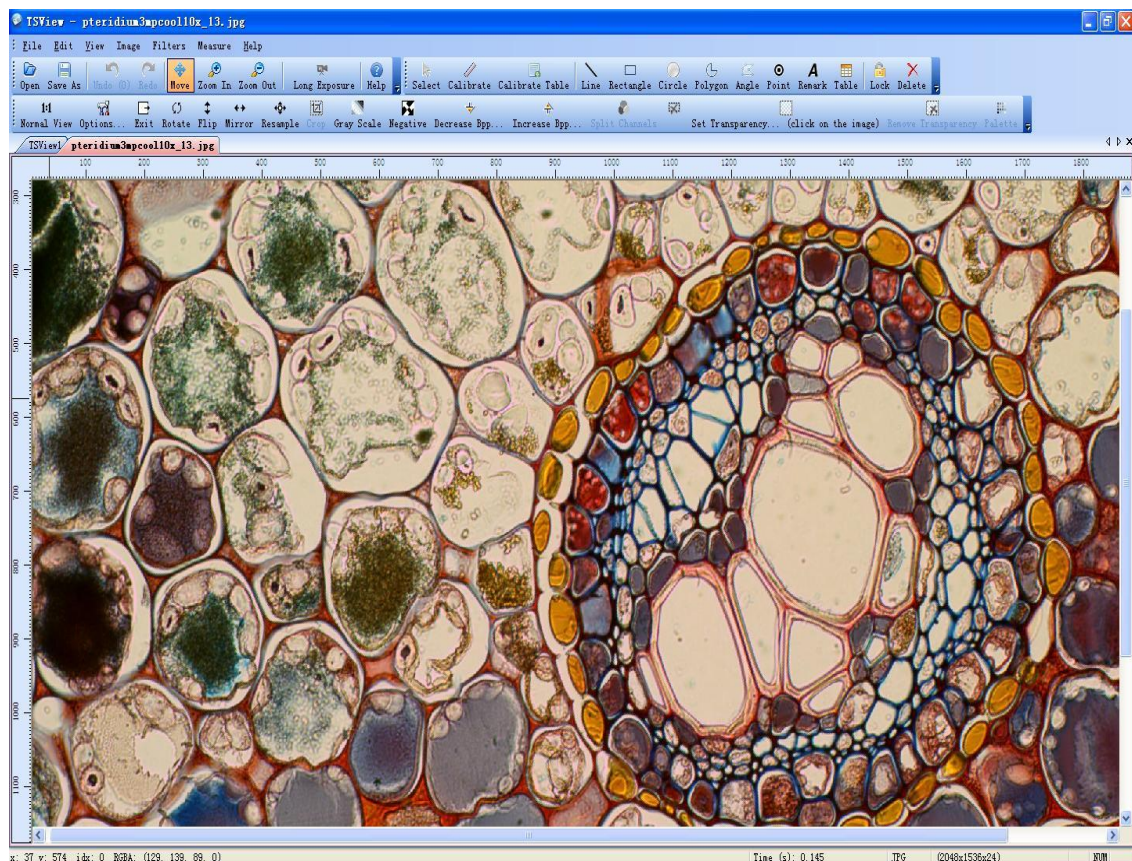
Diagram 6 Post-Reversal Image

3.2.2.1.3. Rotation

【**Function** 】

Click on the button "Rotate" [icon] and set a certain rotation angle through the rotation setting window subsequently popping up to rotate the current image.

【**Operating Instruction**】

1. A click on the button "Rotate" [icon] will command OCV to pop up the rotation setting window shown below

Diagram 20 Image Rotation Angle Setting Window

  Rotation angle setting

  Left rotation for 90 degrees.

  Right rotation for 90 degrees.

3.2.2.2. Image Transparency

This function is designed for image transparency, after which, the image is still ready for removal, split, stripping and other operations.

3.2.2.2.1. Great from lightness

【**Function** 】

It's for the image transparency.

【**Operating Instruction**】

1. Click following the sequence of "Image→Alpha Channel→ Great from lightness", then users may transparentize the image being shown in the image processing interface.

2. If users needs to adjust the image transparency manually, just click following the sequence of   "Image→Alpha Channel→Opacity", then the image transparency may be set through the setting window "Opacity"(as shown below).
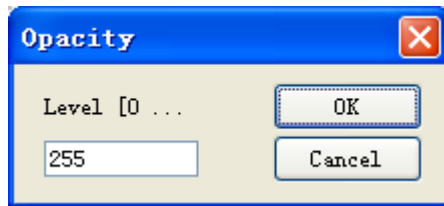
Diagram 21 Opacity Setting Window

·Note: The opacity setting window also applies to those images that have been treated by the function "Great from lightness" for a modification on image transparency for the second time.

3. After treated by the function "Great from lightness", the image will become the one shown below
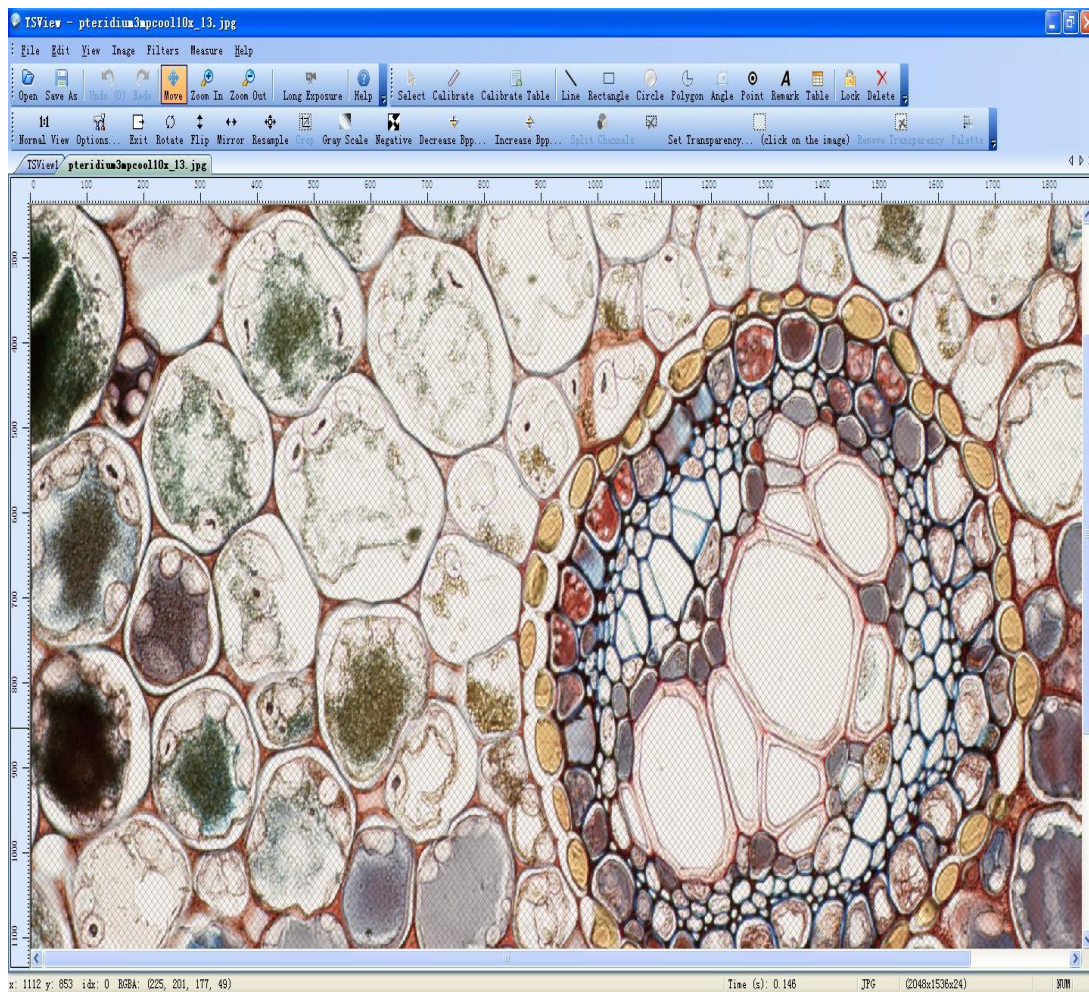
Diagram 22 Image Transparentized by the Function "Great from lightness"

3.2.2.2.2. Remove

【**Function** 】

    This function is for removing the transparency effect existing on the current image.

【**Premise**】

    The current image has been transparentized.

【**Operating Instruction**】

    Click following the sequence of "Image→Alpha Channel→Remove" to remove the transparency effect existing on the current image and restore it to its original state.

3.2.2.2.3. Split

【**Function** 】

It's for creating a new black-and-white image out of the current image which has been transparentized.

【**Premise**】

The current image has been transparentized.

【**Operating Instruction**】

1. Click following the sequence of "Image→Alpha Channel→ Great from lightness" to transparentize the current image.

2. Click following the sequence of "Image→Alpha Channel→Split", and then OCV will automatically generate a new black-and-white image, which is shown below

Diagram 23 Image Generated by Split

3.2.2.2.4. Strip

【**Function** 】

This function can strip the image that has been transparentized and then generate a new stripped image.

【**Premise**】

The current image has been transparentized.

【**Operating Instruction**】

1. Click following the sequence of "Image→Alpha Channel→ Great from lightness" to transparentize the current image.

2. Click following the sequence of "Image→Alpha Channel→Strip", then OCV will automatically generate a new stripped image, which is shown below
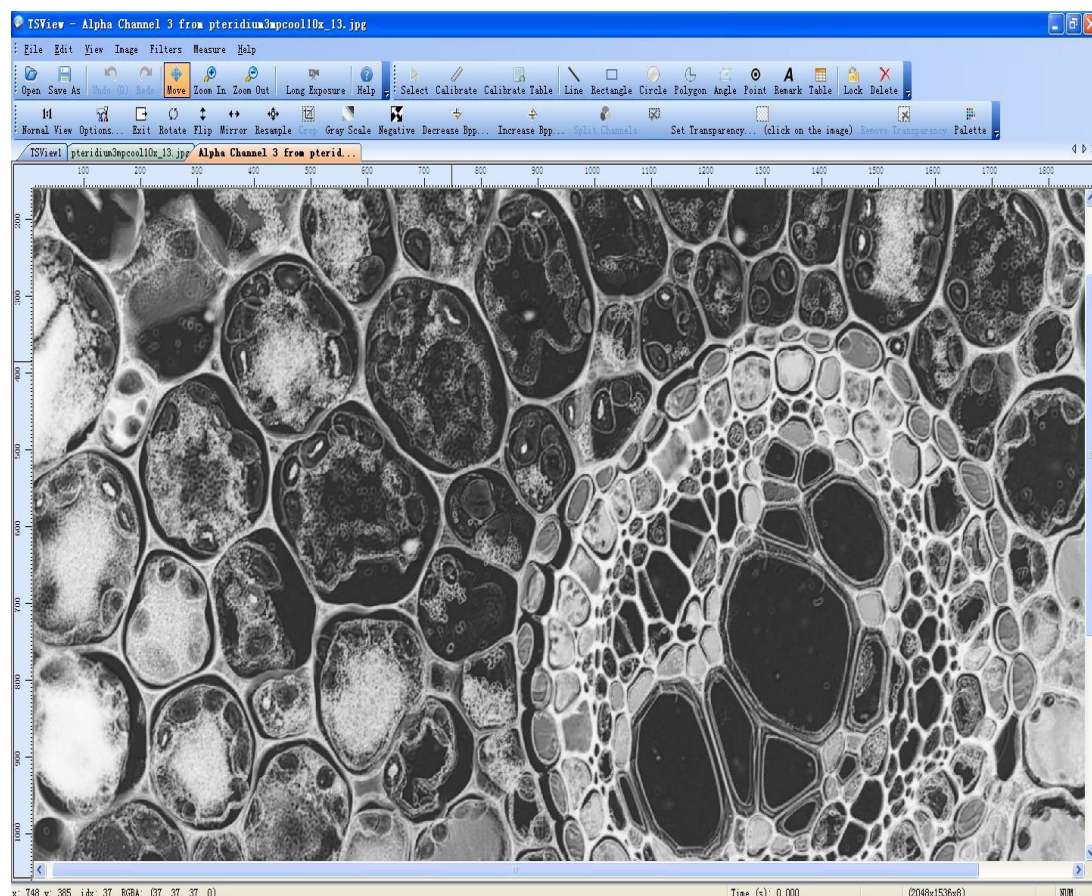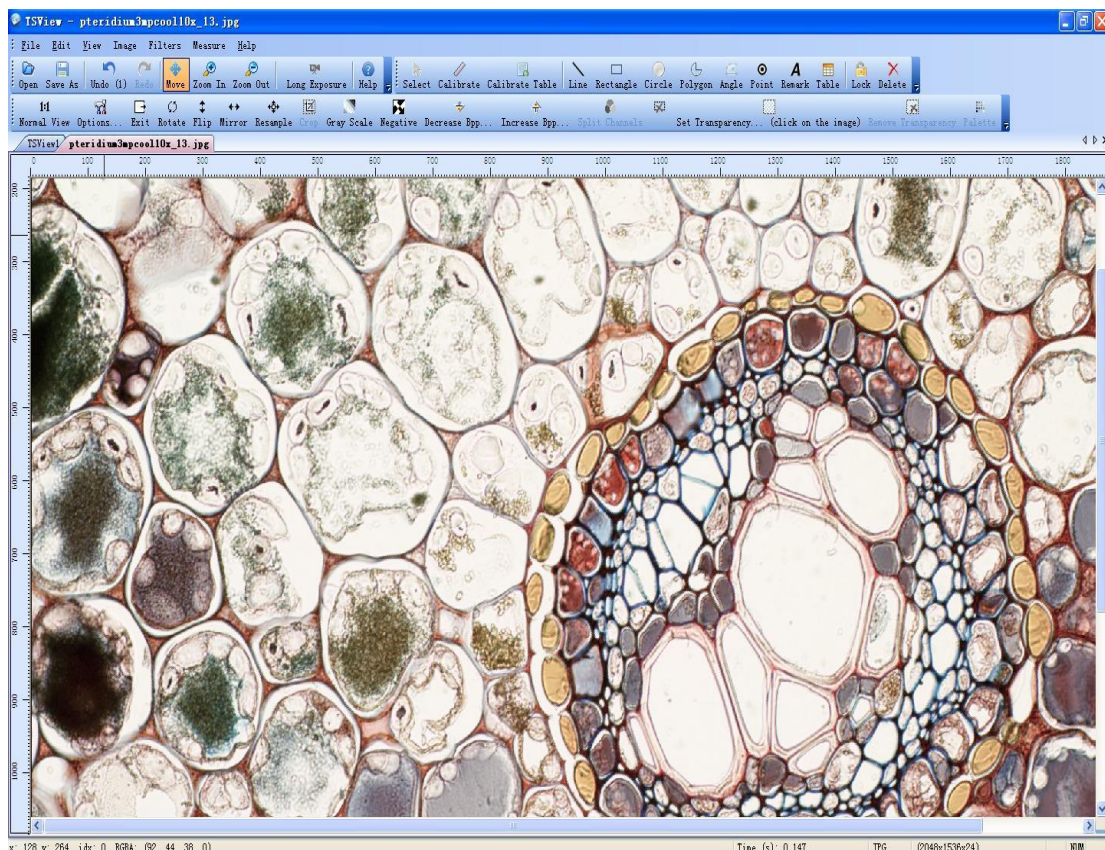

Diagram 24 Post-Stripping Image

3.2.2.3. Color of Image

This function is used to treat the color of images, including grayscale and dither.

3.2.2.3.1. Grayscale

【**Function**】

It applies to giving grayscale treatment to the image being opened.

【**Operating Instruction**】

Click following the sequence of "Image→Gray Scale", then OCV will automatically initiate the grayscale treatment, and the result is shown as follows
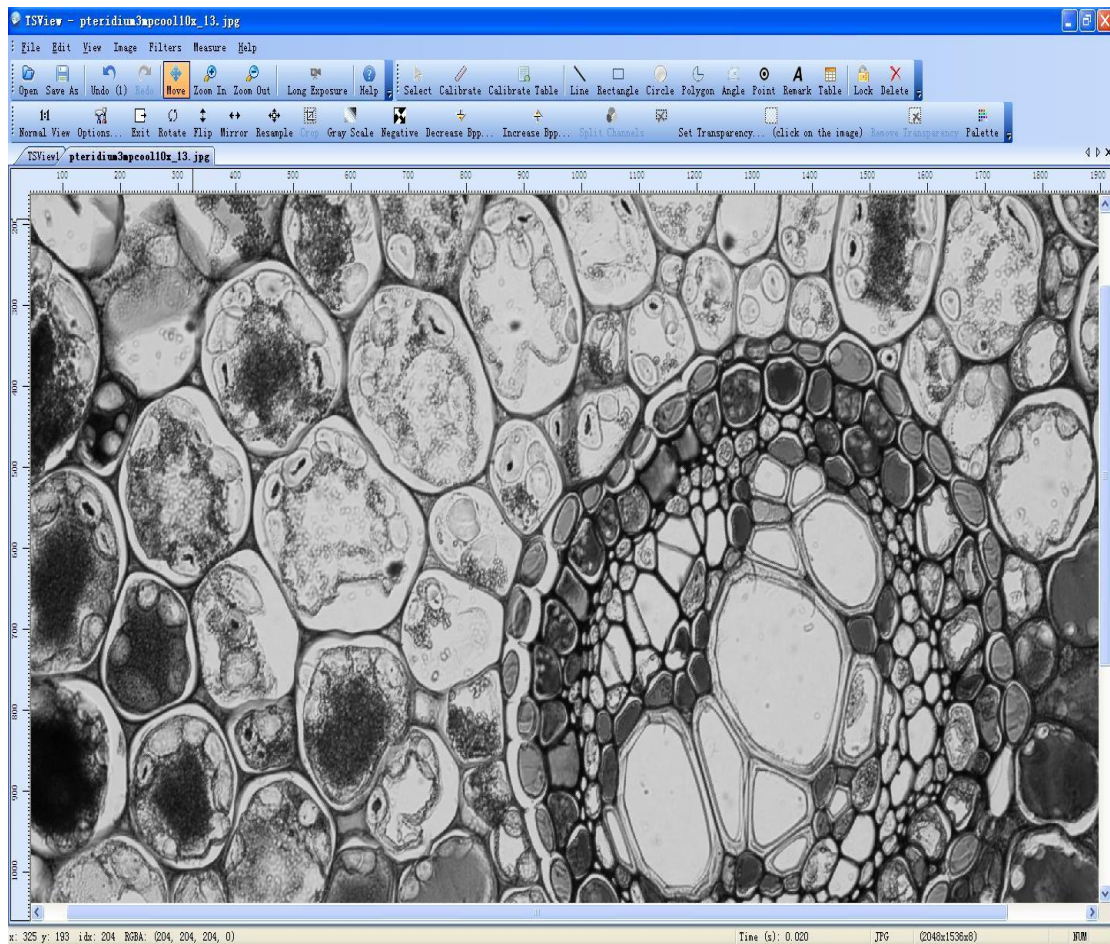
Diagram 25 Image Given with Grayscale Treatment

3.2.2.3.2. Dither

【**Function**】

It's used to give dither treatment to the image being opened.

【**Operating Instruction**】

1. Click following the sequence of "Image→Dither", then OCV will automatically cause the dither setting window to pop up as shown below
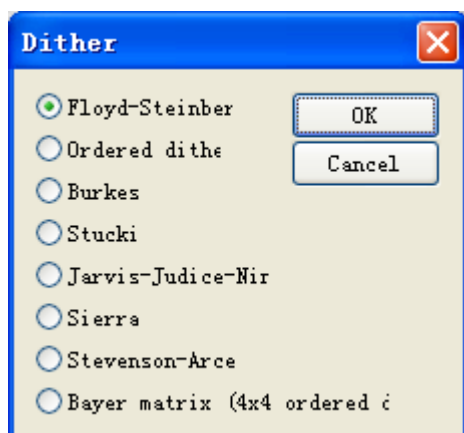
Diagram 26 Dither Effect Setting Window

2. In the said window, after selecting the desired dither treatment effect, click the button "OK" to return to the image processing interface, OCV will then automatically initiate the dither treatment; the image shown below is a result of

selecting the option " Ordered dithe "

Diagram 27 Image Given with User-defined Dither Treatment

3.2.3. OCView's Filters

Image adjustments may be realized by applying filters, including the lightening and darkening of image, the increase in contrast and the application of Linear filter, Non-linear filter and Deform filter.

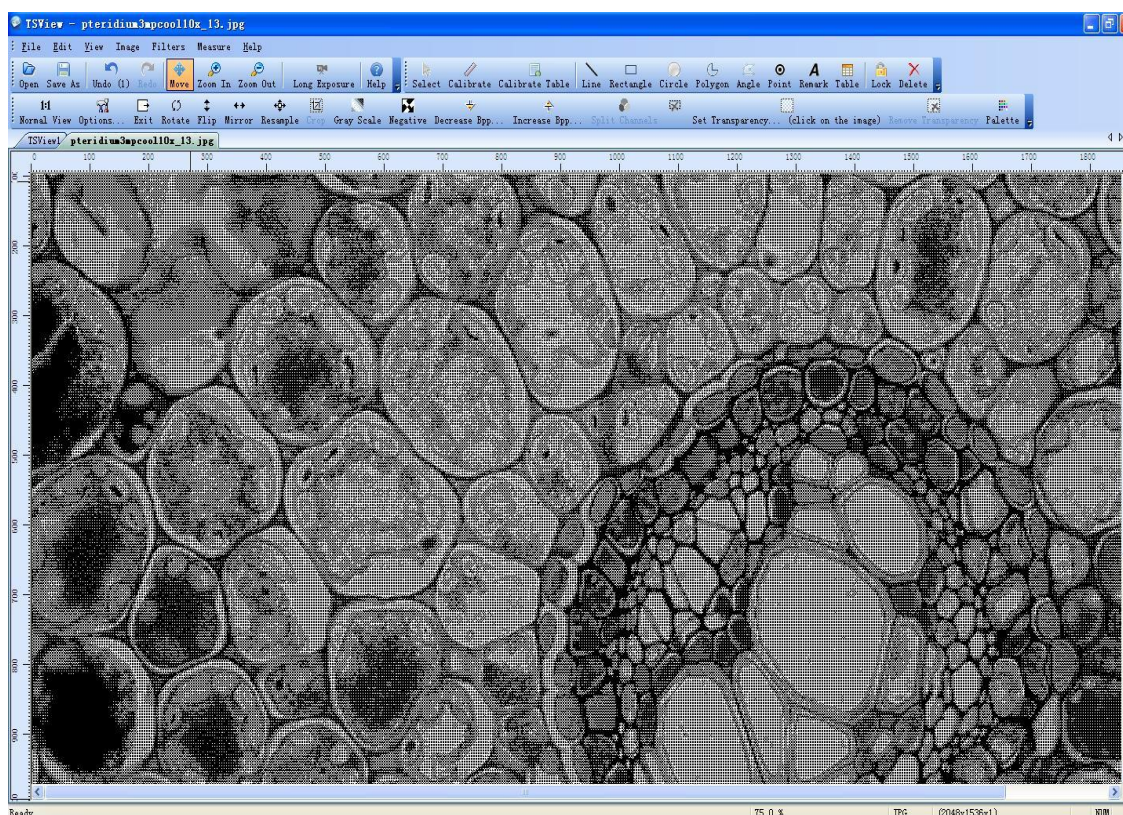| Corresponding Menu	Function
Filters→Repair	To set the repair parameters to repair the image
Filters→Linear→Sharpen	To sharpen the image
Filters→Linear→Blur	To blue the image
Filters→Linear→Light/Contrast/Gamma	To allow users to manually adjust the lightness and darkness of the image
Filters→Linear→Light/Contrast/Gamma	To allow users to manually adjust the contrast of the image

3.2.3.1. Threshold

【**Function**】

To convert a gray or color image into a high-contrast black-and-white image.

【**Operating Instruction**】

1. Click following the sequence of "Filters→Threshold", then OCV will cause the threshold setting window to pop up as shown below
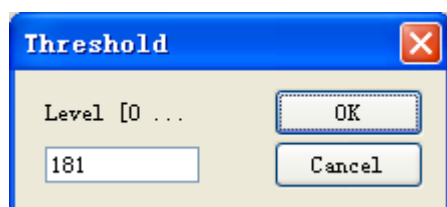
Diagram 32 Threshold Setting Window

2. Set the threshold at "118" in the dialogue box of threshold setting window.

3. Upon the click on the button "OK", OCV will automatically starting the conversion of the current image according to the set threshold, and the result is shown below.

(All the pixels brighter than the threshold "118" are converted into white, while those darker than the threshold are converted into black)

Diagram 33 Image Converted with the Threshold "118"

3.2.3.2. Colorize

【**Function**】

It's mainly used to adjust the values in connection with the RGB color and HSL space and to calculate the specific RGB value of an image.

【**Operating Instruction**】

1. Click following the sequence of "Filters→Colorize", then OCV will cause the colorization setting window to pop up as shown below
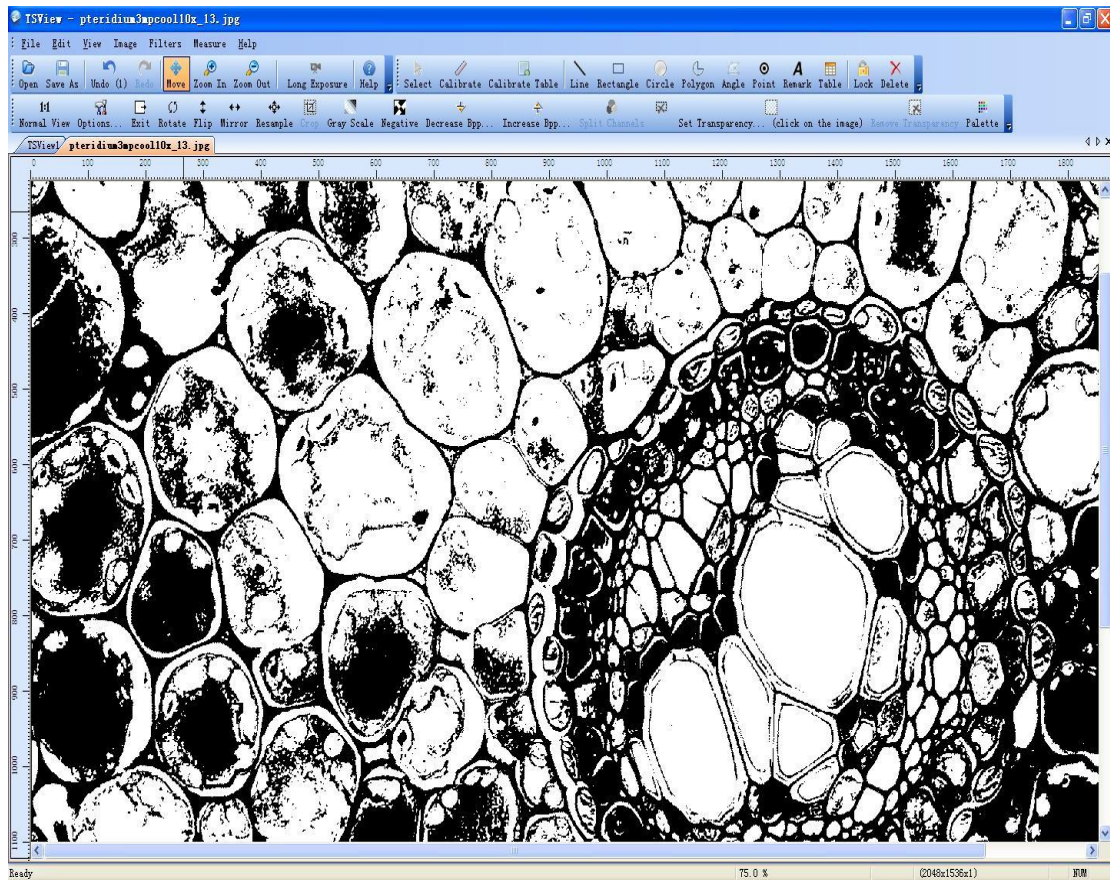
Diagram 42 Colorization Setting Window

2. Select HSL or RGB color mode in the colorization setting window. If HSL mode is chosen, users may vary the hue, saturation and blend; if RGB mode is chosen, users may vary the values of red, green and blue.

3. When the setting is finished, click on the button "OK", and then OCV will automatically initiate the image adjustment.

3.2.3.3. User-defined Lightening/Contrast/Gamma

【**Function**】

Users may define the lightness, darkness, contrast, gamma correction value and other parameters of the current image at will.

【**Operating Instruction**】

1. Click following the sequence of "Filters→Light/Contrast/Gamma", OCV will then cause the lightness setting window to appear as shown below

Diagram 34 Lightness Setting Window

2. Set the lightness value in the lightness setting window (the default lightness value of OCV is "0", which is increased to "50" now for a more obvious lightening effect)

3. Click on the button "OK" to return to the image processing interface, OCV will then automatically start the image lightening, whose result is shown below.

Diagram 35 Image with a Lightness of 50

> 4. Set the contrast value at "50" in the contrast setting window (OCV's default contrast value is "0").

Diagram 36 Contrast Setting Window

   5. Click on the button "OK" to return to the image processing interface, OCV will then automatically start the adjustment, with the result as shown below
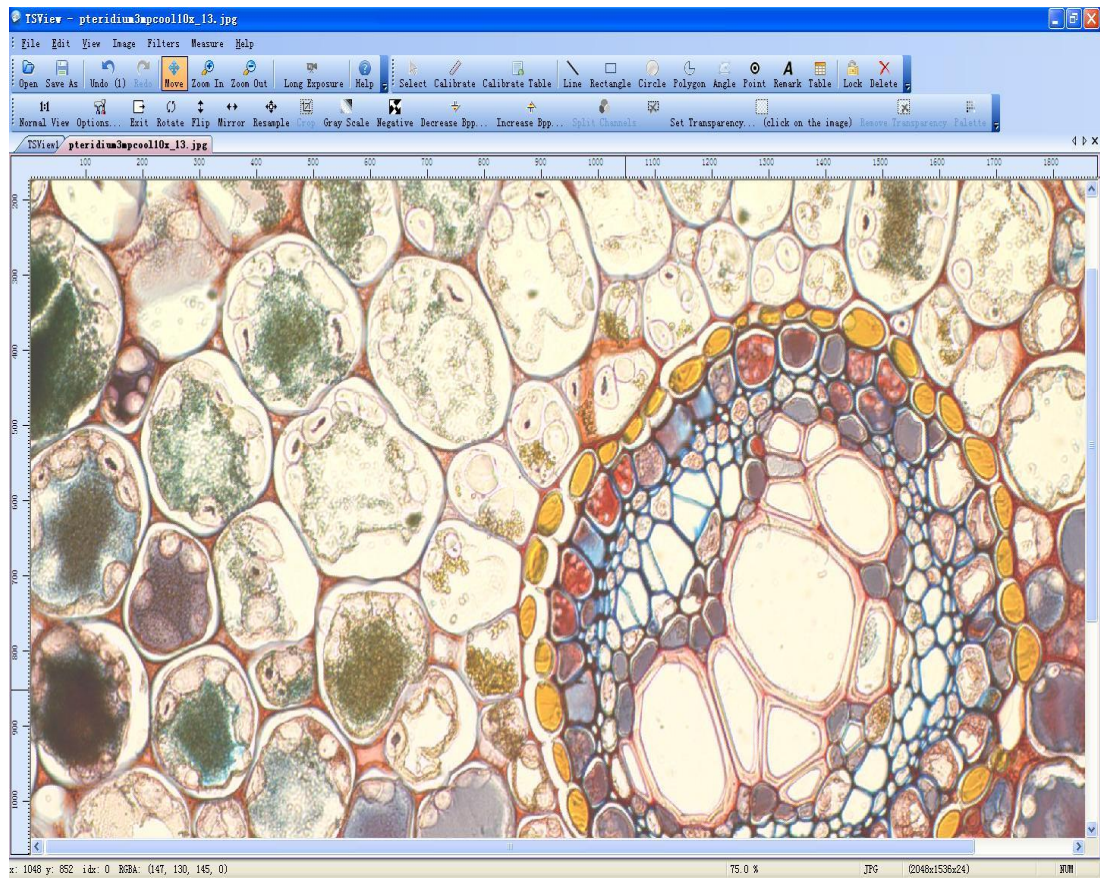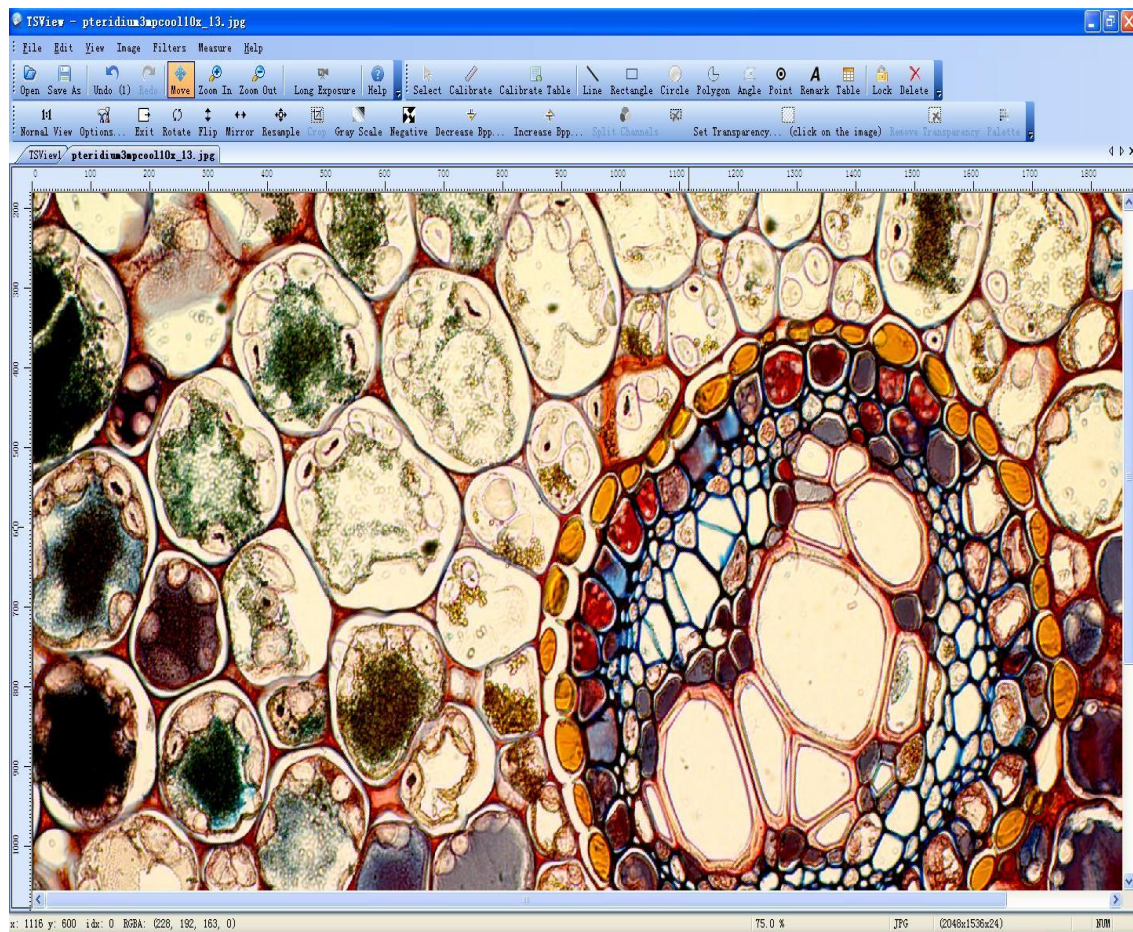
Diagram 37 Image with a Contrast of "50"

6. Draw the icon along the bar "Gamma" of the setting window to preview different image display effects acquired with different gamma values.
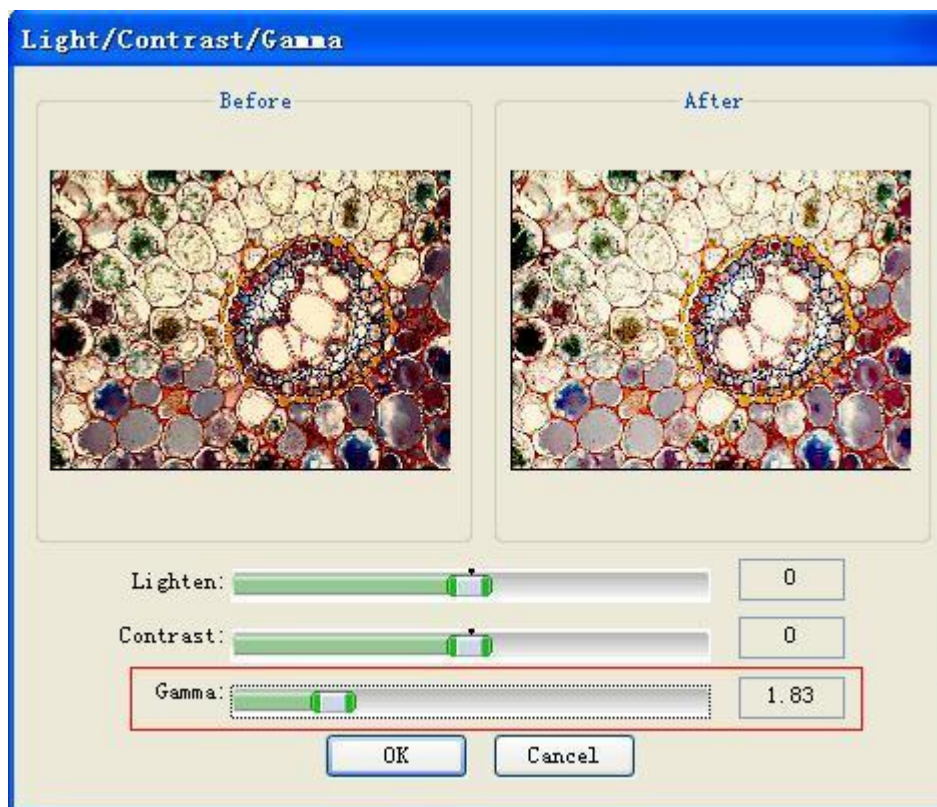
Diagram 41 Gamma Setting Window

7. When the setting is finished, click on the button "OK", OCV will then automatically start the image adjustment.

3.2.3.4. Linear

User may apply tools including "Blur", "Soften", "Gaussian Blur", "Sharpen", "Edge" and "Emboss" to the treatment of image.

·Blur　　　　　　It smoothes the image by weakening the color contrast between neighboring pixels with a slight effect, so as to softly soften any obvious edge or prominent shape.

·Soften　　　　　It softens a smooth edge or an area excessively sharp or of an excessively high contrast through producing a blur effect thereon

·Gaussian Blur　It generates an obliterate thick blur effect on the image by adjusting the color values of pixels and controlling the blur extent according to the curves of Gaussian Algorithm.

·Sharpen　　　　It sharpens the image through increasing the contrast between neighboring pixels.

·Edge　　　　　It underlines the edges of an image to make the boundary line prominent.

·Emboss   It generates embossment and dent of various extents by drawing the outline of an image and decreasing the color values of the neighboring area.

3.2.3.4.1. Blur

【**Function**】

It uses blur filter to blur the image.

【**Operating Instruction**】

Click following the sequence of "Filters→Linear→Blur" on the menu bar, then OCV will automatically start to blur the current image.

3.2.3.4.2. Soften

【**Function**】

It uses softening filter to soften the image.

【**Operating Instruction**】

Click following the sequence of "Filters→Linear→Soften" on the menu bar, then OCV will automatically start to soften the current image.

3.2.3.4.3. Gaussian Blur

【**Function**】

It applies Gaussian blur filter to treat the image with Gaussian blur effect.

【**Operating Instruction**】

Click following the sequence of "Filters→Linear→Gaussian 3*3 (Gaussian 5*5)" on the menu bar, then OCV will automatically start to treat the current image with Gaussian blur effect.

3.2.3.4.4. Sharpen

【**Function**】

It applies sharpening filter to sharpen the image.

【**Operating Instruction**】

Click following the sequence of "Filters→Linear→Sharpen" on the menu bar, then OCV will automatically start to sharpen the current image.

3.2.3.4.5. Edge

【**Function**】

It applies edging filter to edge the image.

【**Operating Instruction**】

Click following the sequence of "Filters→Linear→Edge" on the menu bar, then OCV will automatically start to edge the current image.

3.2.3.4.6. Emboss

【**Function**】

It uses embossment filter to emboss the image.

【**Operating Instruction**】

Click following the sequence of "Filters→Linear→Emboss", then OCV will automatically start to emboss the current image.

3.2.3.5. Non-linear

Users may apply filters including "Noise", "Medium Value", "Erode", "Swell", "Contour line", "Edge" and "Undulate" to the image. Please refer to "3.2.3.8.Linear" for the application of such non-linear filters.

·Noise　　　　　The application of this tool will create some random interfering particles on the image, namely the assorted colors.

·Medium Value　It can adjust and make medium the intensity of each pixel in the image.

·Erode　　　　　It can produce an erosive effect on the image's colors.

·Swell　　　　　It can swell the image.

·Contour Line　It can draw fine lines along the edges of different colors in the image and identify the contour lines of each color channel.

·Edge　　　　　It can make prominent the edge of the image to underline the boundary line.

·Undulate　　　It can create undulation effect to the image.

3.2.3.6. Deform filter

User may apply filters including "Contract", "Expand Aperture Row", "Spiral", "Tubbulate" and "Overlap" to deform the image. Please refer to "3.2.3.8.Linear" for the application of the aforesaid filters.

·Contract   It contracts the image around the image's center to produce a contract effect.

·Expand Aperture Row It embosses forward the center of the image to expand the aperture row.

·Spiral   It causes the image to have a distortion effect that peaks at the image's center and decreases as it reaches the edge to spiral the image.

·Tubbulate   It deforms the image as it were in a tubbulate item.

·Overlap   It deforms the image as it were a pile of overlapping images.

3.2.3.7. Pseudo Colors

【**Function**】

It applies the filter "Pseudo Colors" to the image.

【**Operating Instruction**】

Click following the sequence of "Filters→Pseudo Colors", then OCV will automatically initiate the relevant treatment on the current image.

3.2.3.8. Split

【**Function**】

It splits the color image on the basis of the different colors, hues, saturations, Lums and XYZ spaces. The "split of RGB" will be taken as an example here to explain this function.

·RGB   RGB color mode is a color standard prevailing in the industry and represents the channels of Red, Green and Blue.

·HSL   HSL color mode is a color standard prevailing in the industry and represents Hue, Saturation and Lum.

·YUV   YUV is a color coding method adopted by European TV system, these three characters, Y,U and V don't form an English combined word, instead, Y represents Lum, UV represents color difference.

·YIQ   YIQ color space generally prevails in the TV system of North America, Y represents the grayscale value of the image, I and Q respectively represent the color and saturation.

·XYZ   XYZ is a "Split" method that's based on the region-growing approach of XYZ space.

·CMYK   CMYK is a color standard adopted by the printing industry, C,M, Y and K respectively represent Cyan, Magenta, Yellow and Black.

【**Operating Instruction**】

1. Click following the sequence of "Filters→Split→Split to RGB", then OCV will spit the image into Red channel, Green Channel and Blue channel according to different RGB colors in the current image, the results will be displayed in the image processing interface, users may click on the tabs to view the post-split image.

2. The result of split is shown below
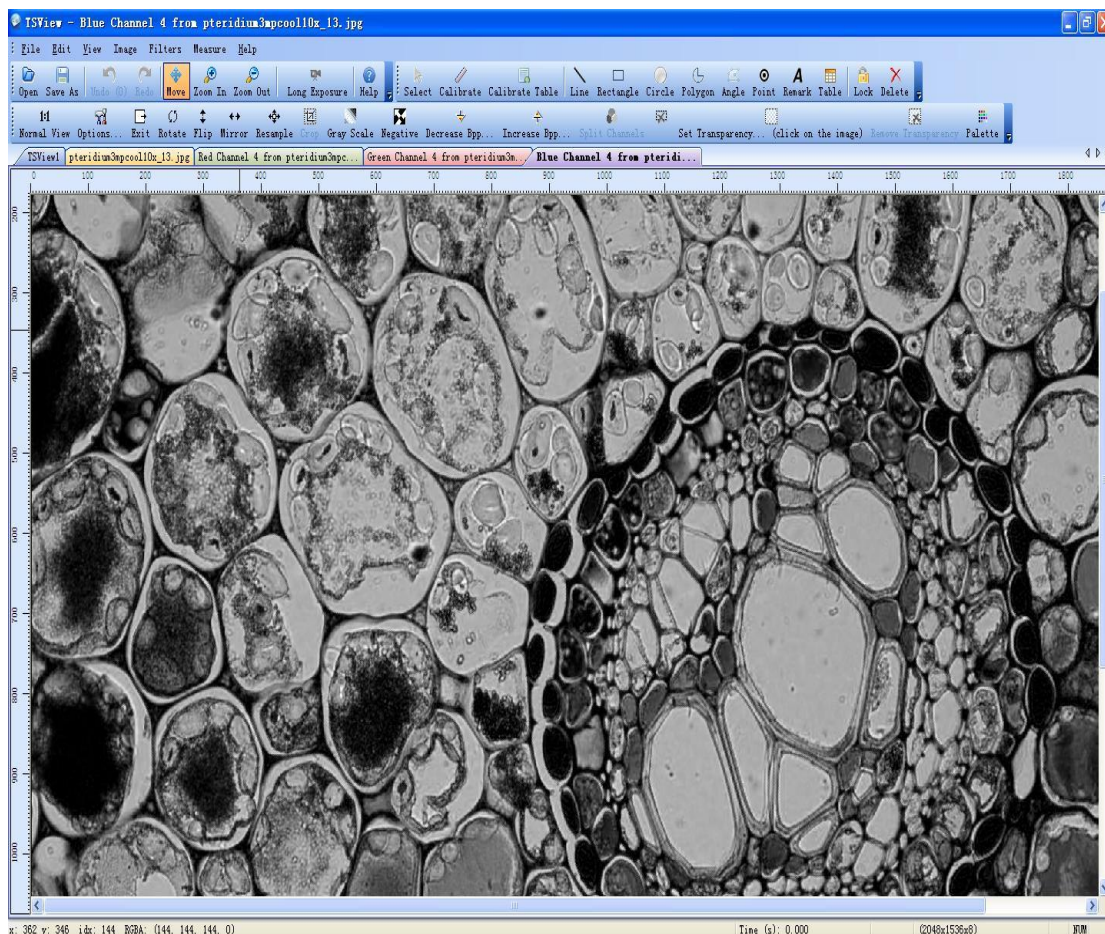
Diagram 38 Result of RGB Split

3.2.3.9. Combine the Images

【**Function**】

It combines different images photographed by a black-and-white lens with the R filter, G filter and B filter to form color images.

【**Premise**】

Two or more images must be opened in the environment of OCV.

【**Operating Instruction**】

1. Click following the sequence of "Filters→Combine", then OCV will cause the image combination window to pop up as shown below
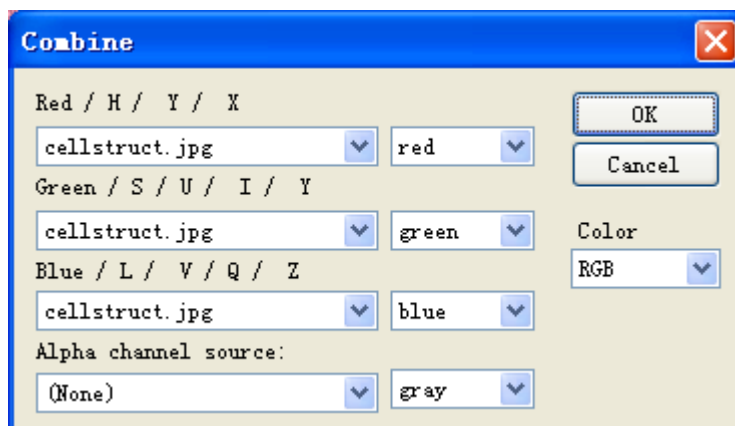

Diagram 44 Image Combination Window

2. Pick the desired color space for the images to be combined out pf the dropdown list of item "Color" in the image combination window, then choose the channel to be used for combination and decide whether to use Alpha channel.

3. When the setting is finished, click on the button "OK", then OCV will initiate the image combination.

3.2.3.10. FFT (Fast Fourier Transformation)

【**Function**】

It can apply FFT to the part satisfying certain conditions in the current image.

·Fourier Transformation   It can represent a function that satisfies certain conditions with a trigonometric function (sine and/or

cosine function) or the linear combination of their integral.

【**Operating Instruction**】

1. Click following the sequence of "Filters→FFT", then OCV will cause the FFT setting window to pop up as shown below.
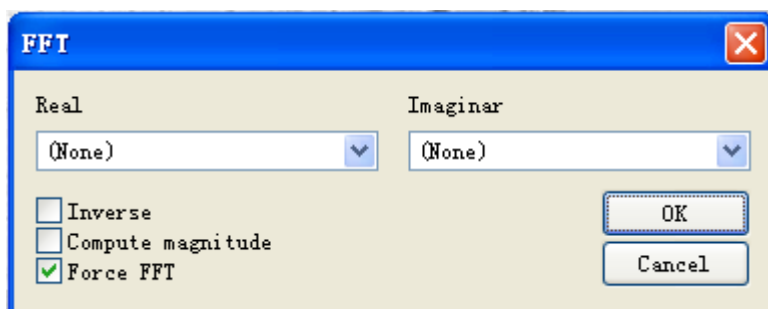

Diagram 39 FFT Setting Window

2. Set the transformation parameters in the window above

· Real: Select the image to be transformed in the dropdown option list.

·Imaginar: Select the image towards which the transformation is oriented in the dropdown option list.

·Inverse: Checking this option represents the approval to the inversing during the transformation.

·Compute magnitude: Checking this option represents the approval to the calculating of absolute value during the transformation.

·Force FFT: Checking this option represents the approval to the occurrence of Force FFT during the transformation.

3. When the setting is completed, click on the button "OK", OCV will then automatically initiate the transformation.

3.2.3.11.Repair

【**Function**】

It repairs the color image according to the different colors, hues, saturation, lums and XYZ spaces.

【**Operating Instruction**】

1. Click following the sequence of "Filters→Repair", OCV will cause the repair setting window to pop up as shown below.
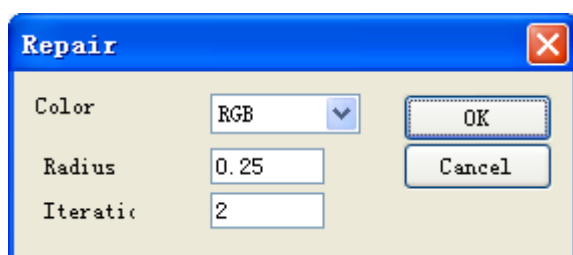

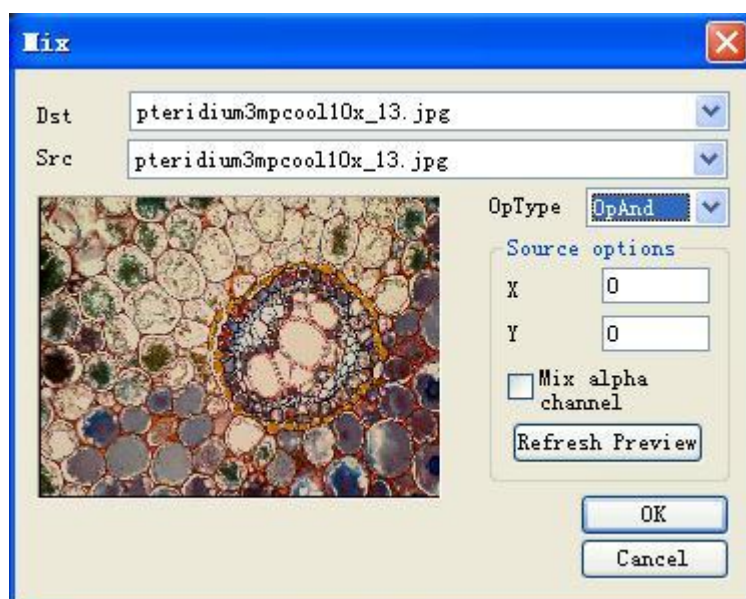Diagram 40 Repair Setting Window

2. Set the color, radius, iteration of the image after repaired.

·Color: Select the colors to be changed to in the dropdown option list, such as RGB or HSL.

·Radius: Set the radius to be changed to manually.

·Iteration: Set the iteration to be repaired to manually.

3. When the setting is completed, click on the button "OK", OCV will then automatically initiate the image repair.

3.2.3.12.Image Mix

【Function】

It can mix multiple images into a new one.

· Note: Different from image combination, image mix doesn't involve the image's color space and requires no setting of RGB, HSL and other channels.

【Premise】

Two or more images must be opened in the environment of OCV.

【Operating Instruction】

1. Click following the sequence of "Filters→Mix", OCV will cause the image mix setting window to pop up as shown below.

Diagram 43 Image Mix Setting Window

2. Designate the target image and original image in the above setting window, set the mix mode and the values of X and Y, then click on the button "Refresh Preview" to preview the post-mix effect of the image in the preview area on the left.

3. When the setting is completed, click on the button "OK", OCV will then automatically initiate the image mix.

3.2.4. OCView's Measurement Function

It can measure the image being opened and display the results in the "Measure Table"; the measurement covers the distance between counts and between two points, the angle formed by two intersecting lines and the area of the designated area.

3.2.4.1. Calibrate

【**Function**】

Calibration is carried out to confirm the pixel value in a unit length under the current microscope.

【**Operating Instruction**】

1. Open the micrometer image photographed by the current microscope.

2. Click following the sequence of "Measure→Calibrate", and the measurement of the full-screen image is shown as follows
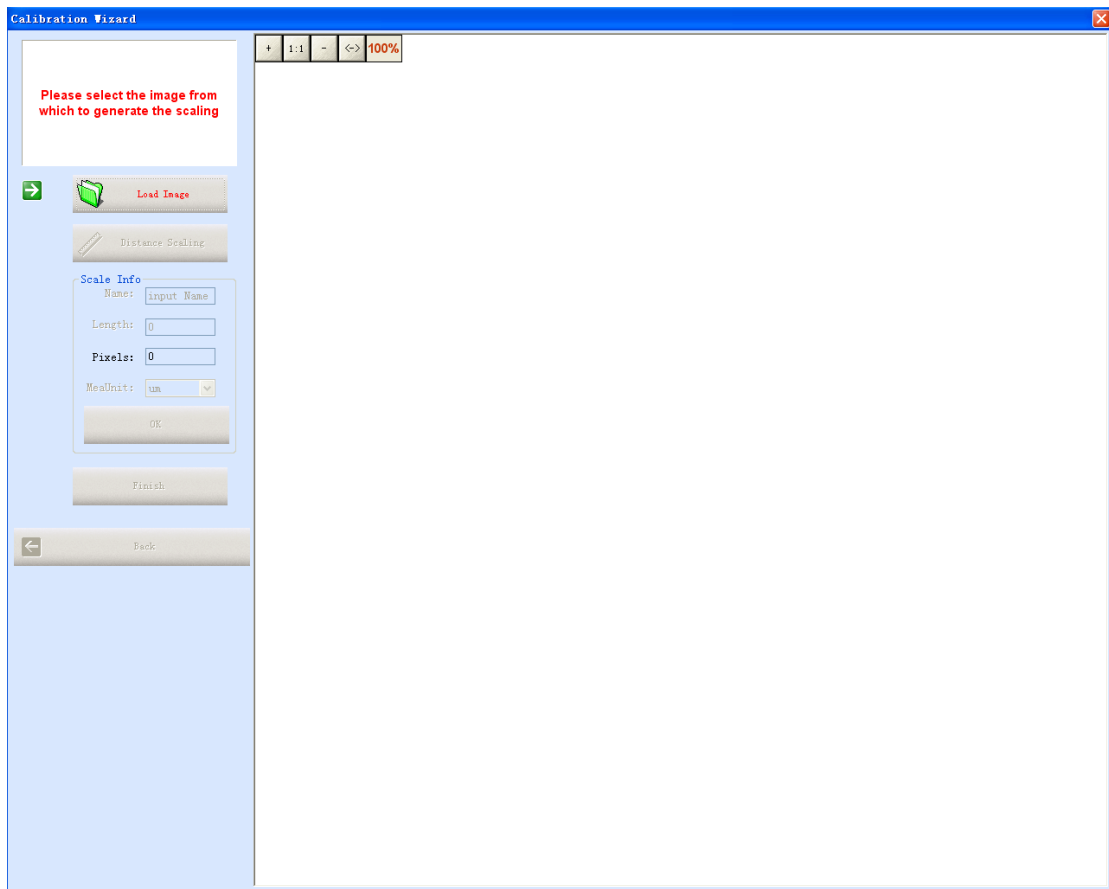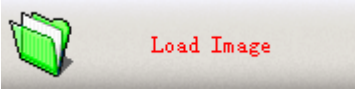
Diagram 45 Image Measurement Setting Window

3. Click on the icon to load the image.

4. Move the mouse to the image, where the cursor will be in the shape of a small cross, then draw a line as shown below
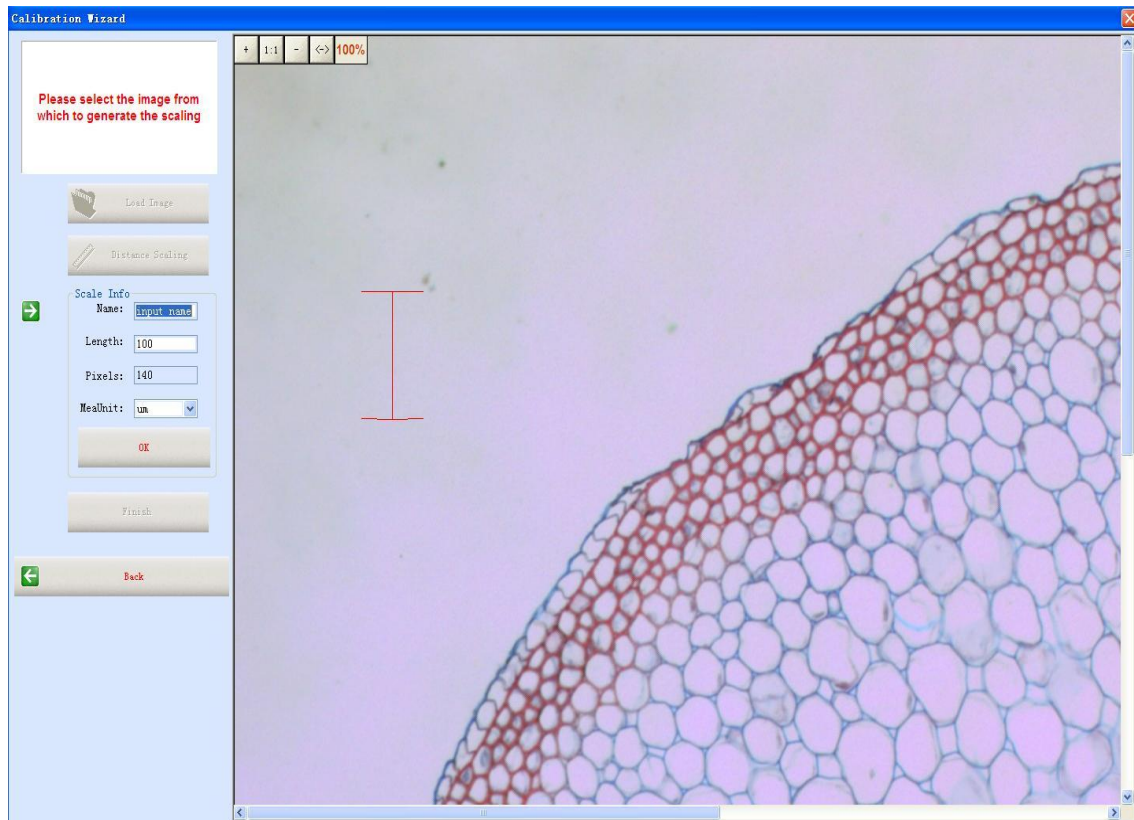
Diagram 46 Image Measurement Setting Window

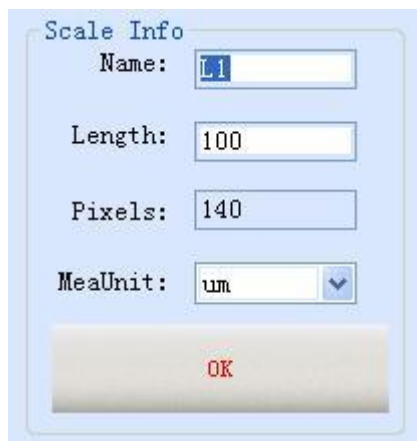Vary the calibration distance of the image in the left column as shown below

Diagram 47 Calibration Adding Setting Window

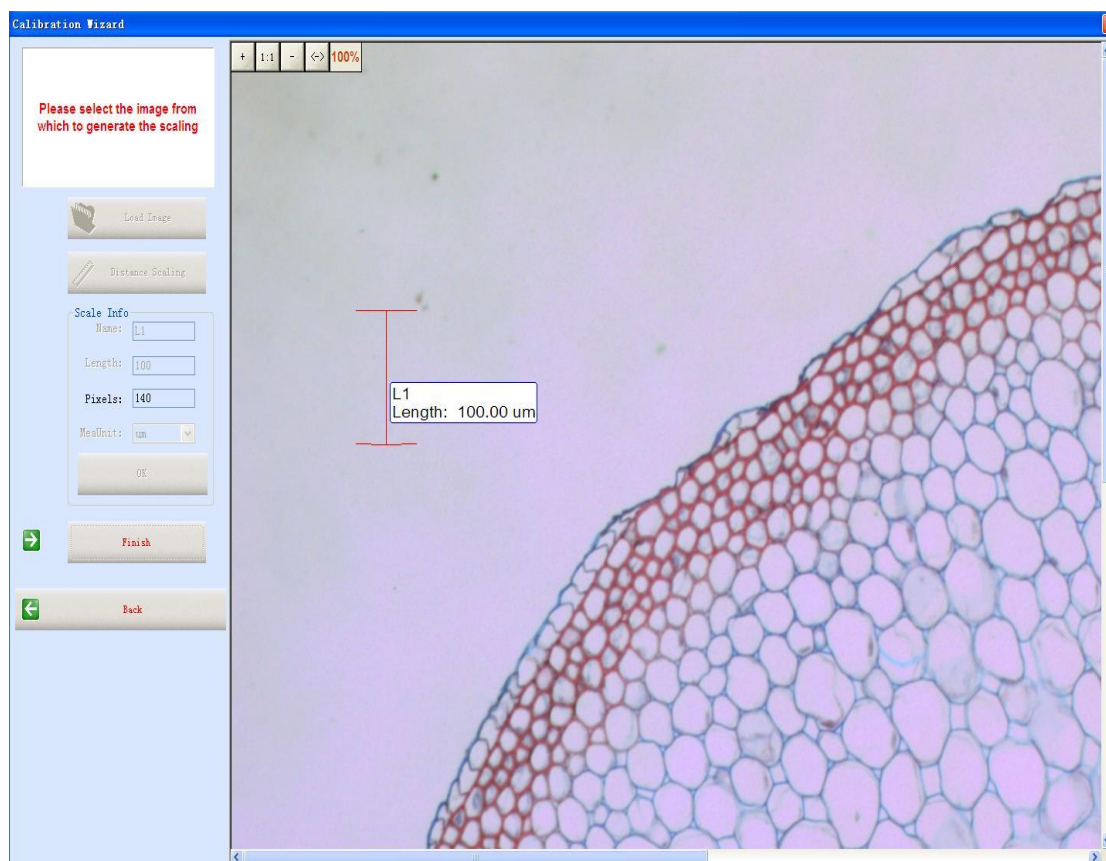5. Click on the button "OK" to exit from the calibration adding window and confirm the calibration results.

Diagram 48 Image Measurement Effect Setting Window

3.2.4.2. Calibrate Table

【**Function**】

1. For the viewing and varying of the calibration results

2. For the varying by users on the existing calibration results

3. For the adding and deleting of calibration results by users in the "Calibrate Table"

【**Operating Instruction**】

◎**View Calibration Result**

1. Click following the sequence of "Measure→Calibrate Table", OCV will then cause the calibrate table window to pop up.

2., A click on the name of a calibration result under the item `Name:` (such as `L1`)
in the left blank of the calibrate table will cause the corresponding result to appear on the right column as shown below
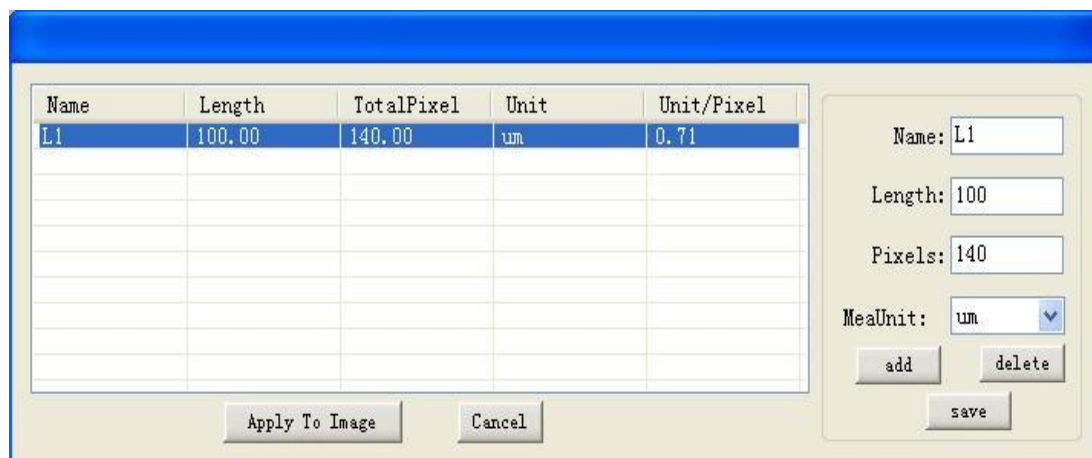
Diagram 7 Operation Window of Calibrate Table

◎**Vary Calibration Result**

1. Click on the calibration result to be varied in the calibrate window.

2. Vary the data including "Name", "Length", "Pixels", "MeaUnit" and unit of the said calibration result in the right column.

3. When the varying is finished, click on the button "save" to save the varying.

◎**Add Calibration Result**

1. Click on the button "add" in the calibrate table window, then add a new calibration result titled "UnNamed" to the left blank as shown below
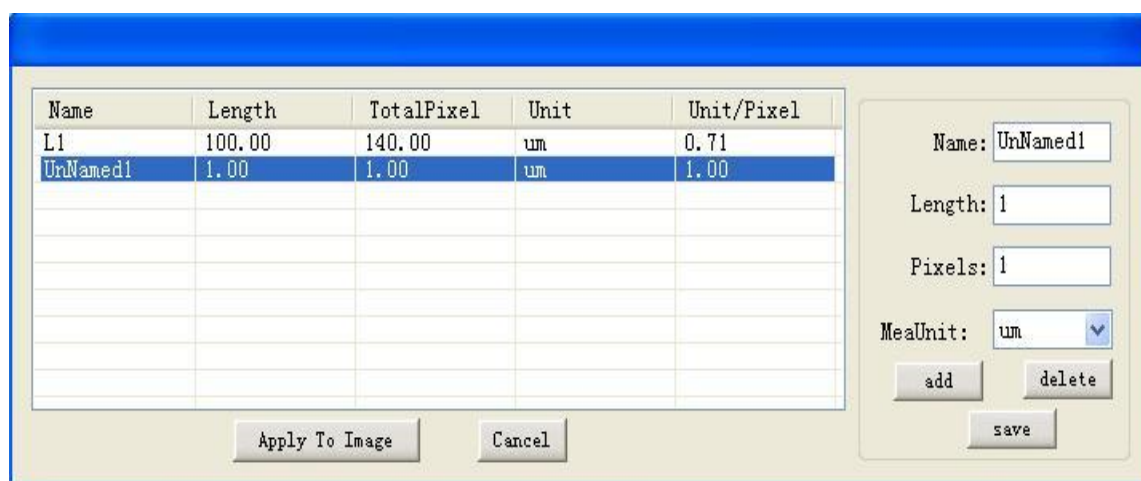
Diagram 8 Additional Calibration Result

2. Click on the additional calibration result under the item ⬛Name⬛ , then rename it as "L2" and change its "Pixels" to "101" in the right column; after the varying is saved, the additional result becomes what's shown below
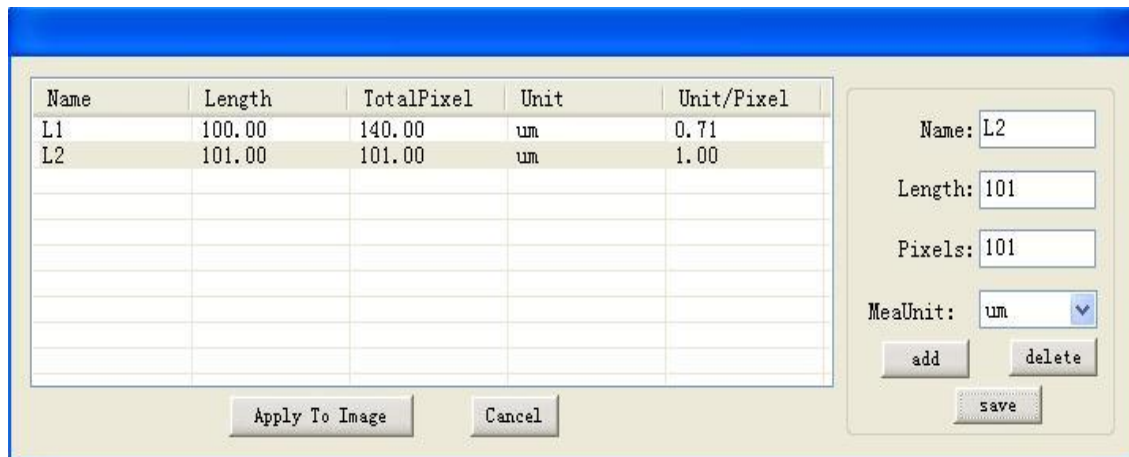
Diagram 9 Additional Calibration Result after Varied

◎Delete Calibration Result

1. Click on the calibration result to be deleted in the calibrate table window.

2. Click on the button "delete", then the deleting of the designated result is finished.

3.2.4.3. Measurement Tool

They are for the measurement of the distance between two points, the angle formed by two intersecting lines and the area of the designated area in the current image

Toolbar Button	Corresponding Menu	Function
	Measure→Select	To select and move the calibration result displayed on the current image and to vary the boarder thickness of such result
	Measure→Line	To measure the distance between two random points in the current image
	Measure→Rectangle	To measure the height and width of the designated area as well as the pixels and perimeter of such area (measuring unit: pixel)
	Measure→Circle	To measure the radius of the designated circular area as well as the pixels and perimeter of such area (measuring unit: pixel)

	Measure→Polygon	To measure the pixels and perimeter of the designated polygonal area (measuring unit: pixel)
	Measure→Angle	To calculate the angle formed by two intersecting lines in the current image
	Measure→Point	To mark points in the image for measurement
	Measure→Remark	To add remarks in the image
	Edit→Backward	To revoke the results of the last 20 measurement operations displayed on the current image
	Edit→Forward	To restore the results of the last 20 measurement operations displayed on the current image

3.2.4.3.1. Line

【**Function**】

It's used to calculate the distance between two random points in the current image, and when the calibrate table is chosen, its unit shall be consistent with that of the calibrate table.

【**Operating Instruction**】

1. Click on the button of the toolbar or click following the sequence of "Measure→Line" on the menu bar.

2. Move the mouse onto the image, press the mouse's left key and drag the mouse to a proper position, then press the mouse's left key again to release the measurement tool "Line".

3. As shown below, the length of cells indicated in the image is the result measured by the measurement tool "Line".
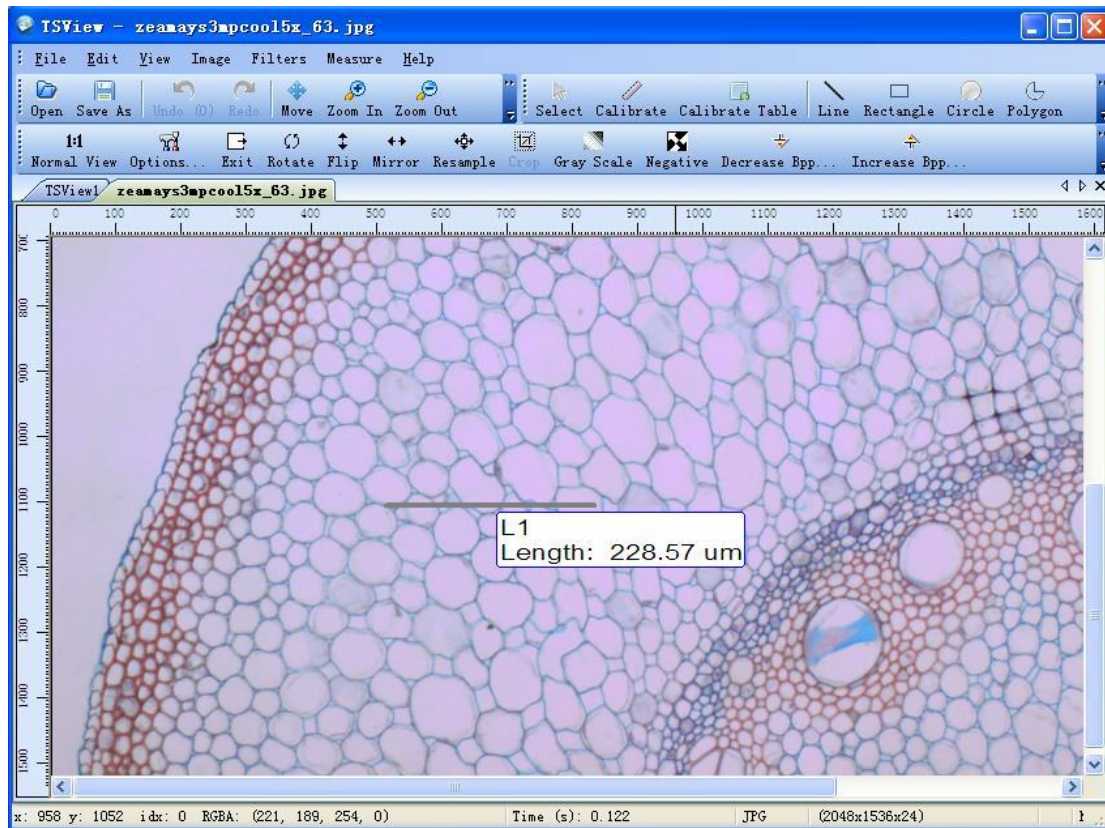
Diagram 5210 Result Measured by "Line"

3.2.4.3.2. Rectangle

【Function】

It's used to measure the height and width of the designated rectangular area as well as the pixels and perimeter of such area, and the measuring unit is pixel.

【Operating Instruction】

1. Click on the button ▢ of the toolbar or click following the sequence of "Measure→Rectangle" on the menu bar.

2. Move the mouse onto the image, press the mouse's left key and drag the mouse to a proper position, then press the mouse's left key again to release the measurement tool "Rectangle".

3. As shown below, the measurement result in connection with the designated area is achieved by the measurement tool "Rectangle".
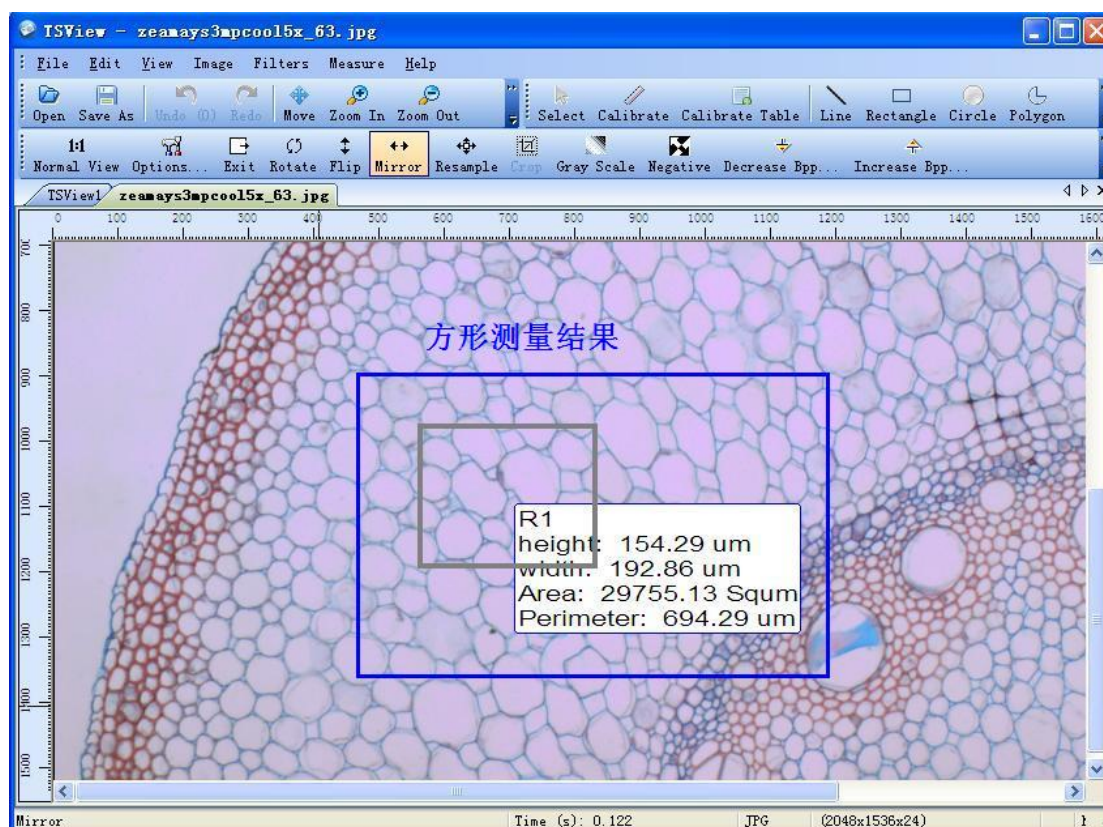
Diagram 53 Result Measured by "Rectangle"

· Note: please refer to the instruction given above for the application of other measurement tools such as "Circle", "Polygon", "Angle" and "Point".

3.2.4.3.3. Select

【**Function**】

It's used to select and move the calibration result displayed on the current image and to vary the boarder thickness of such result.

【**Operating Instruction**】

1. Click on the button ⬆ of the toolbar or click following the sequence of "Measure→Select" on the menu bar.

2. Move the mouse onto the already-existing content of the measurement result concluded by the "Rectangle" in the image or onto the boarder of the "Rectangle", at this point the mouse will be in the shape of a palm.

3. When the mouse is on the boarder of the "Rectangle" or the said measurement result, a press on the mouse's left key will enable the movement of the said measurement result to any position of the image.

·Note: when users move the boarder, the content of the said measurement result

will move along; but the boarder will remain still when the said content moves.

4. Double click on the boarder or the said content, OCV will then cause the properties window to pop up as shown below
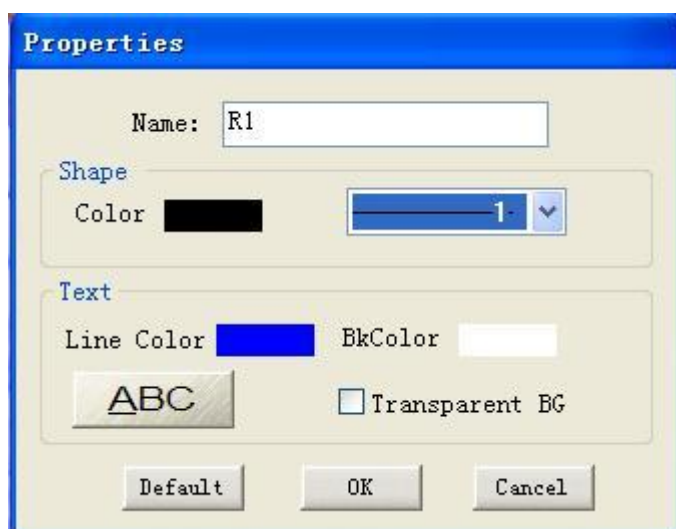

Diagram 54 Properties of the Result Measured by "Rectangle"

5. In the properties window, users may rename the result measured by the "Rectangle" and the boarder thickness of the "Rectangle". For example, as shown below, the measurement result has been renamed as "Result Measured by the Rectangle" and the boarder thickness of the "Rectangle" has been changed to "4".
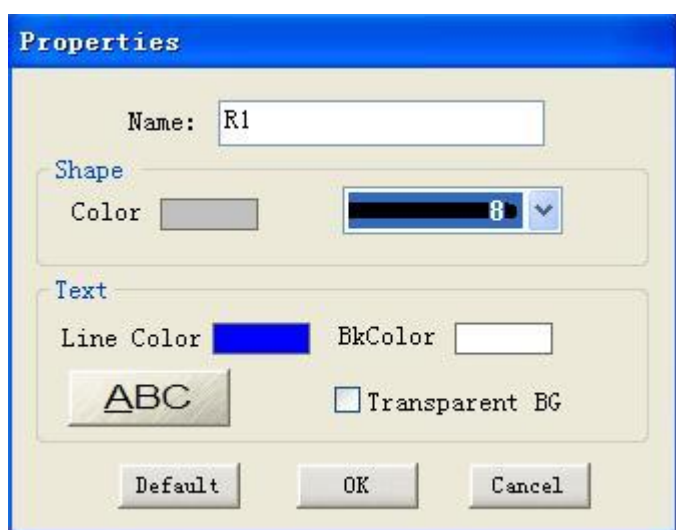
Diagram 55 Properties of the Result Measured by "Rectangle" after Varied

6. Click on the button "OK" to return to the image processing interface. As

shown below, the name of the measurement result has been changed from "R1" to "Result Measured by the Rectangle"; the boarder thickness of the "Rectangle" has been increased.

·Note: the boarder thickness of all measurement tools shall fall between "1"and "4"without hitting the both ends.
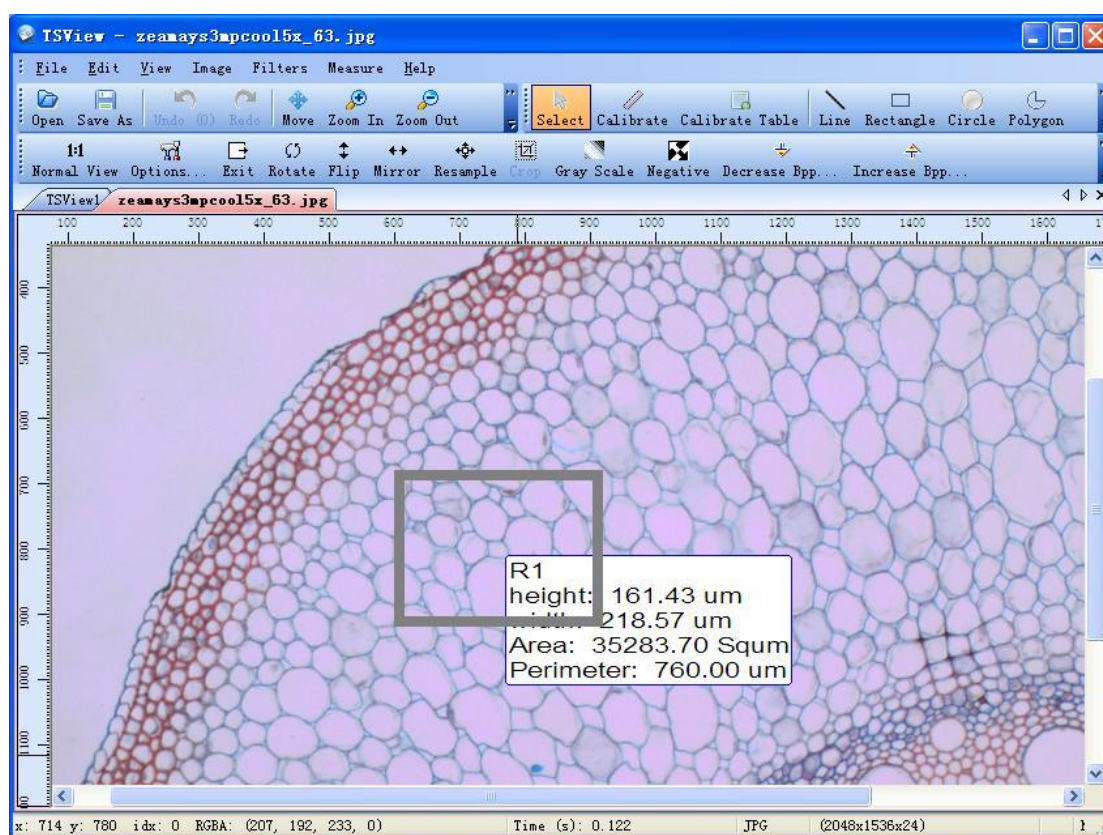

Diagram 56 Result Measured by the "Rectangle" after Varied in Properties

3.2.4.3.4. Remark

【**Function**】

It's used to add marks and remarks to the image for viewing image information.

【**Operating Instruction**】

1. Click on the button **A** of the toolbar or click following the sequence of "Measure→Remark" on the menu bar.

2. Move the mouse onto the position where the remarks is needed in the image, press the mouse's left key, OCV will then cause the remarks editing window to pop up as shown below
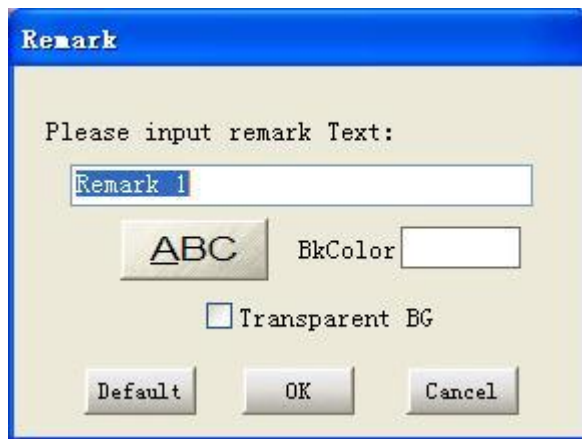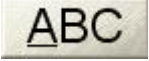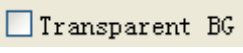
Diagram 57 Remarks Editing Window

3. In the window above, users can edit the name of remarks to appear on the image, change the typeface through , change the color through and make the background of the remarks transparent or not through .
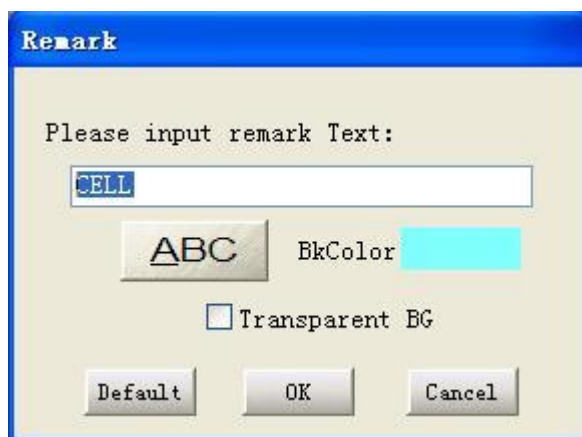

Diagram 58 Post-editing Remarks

4. Click on the button "OK" to add the post-editing remarks to the image; The follow image demonstrates the status where a remarks is successfully added to the image.
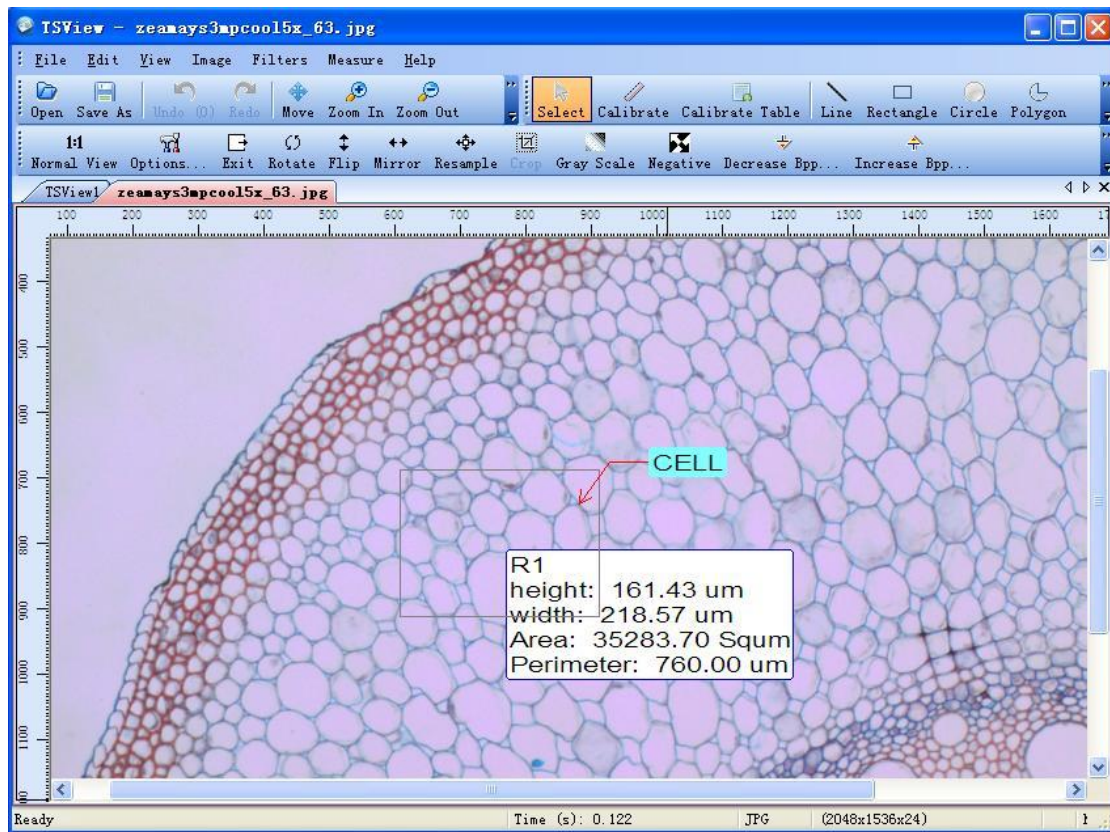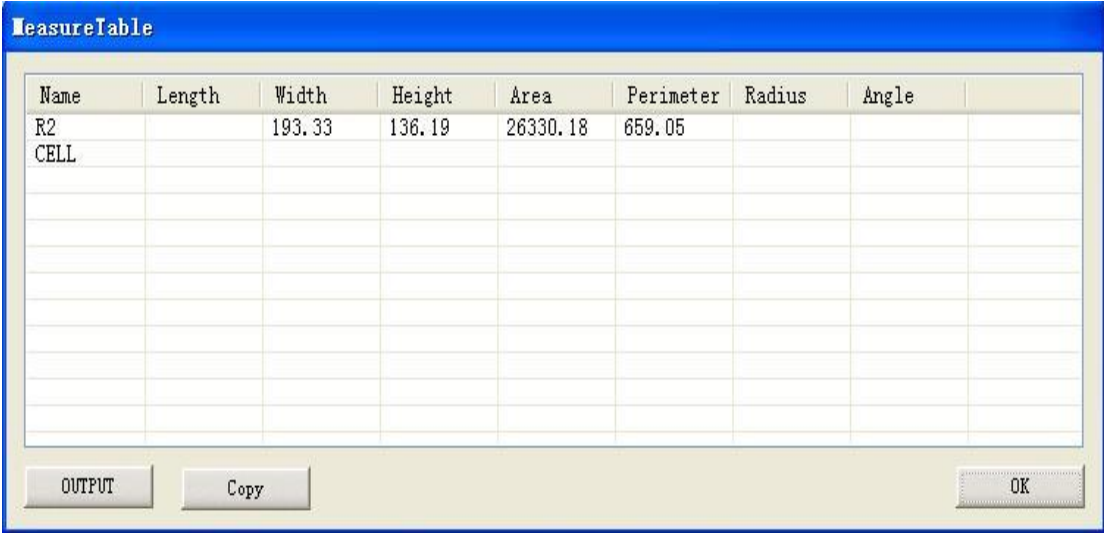
Diagram 59 Remarks' Effect Setting Window

3.2.4.4. Measure Table

【Function】

It's for viewing the information in connection with measurement and remarks already existing in the current image.

【Operating Instruction】

1. Click following the sequence of "Measure→Measure Table" on the menu bar, then OCV will cause the measurement data window to pop up as shown below

Name	Length	Width	Height	Area	Perimeter	Radius	Angle	
R2		193.33	136.19	26330.18	659.05			
CELL								

Diagram 11 Measurement Data Window

2. The content of measurement and the information of remarks already existing in the current image will be displayed in the window above.

3. If there's a need to save the measurement data, click on the button OUTPUT in the lower left corner, OCV will then automatically save the content of the "Measure Table" into the file titled "MeasureInfo.txt" under OCV.