

How to reproduce an oil painting with compelling and realistic printed colours (Part 2)

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This document (part 2 or 3) will detail step by step how a digitised image of an original oil painting becomes a much sought after picture after some simple and careful adjustments using the eH2006 software. One should avoid spending lots of money and time on a picture that could last between 50 to 200 years and which is less expressive and is down graded visually from the original painting as the artist had intended.

eH2006 software has advanced imaging processing features which are not available in Adobe Photoshop CS. This means that your investment will be enhanced by these advanced imaging processing features. For best comparison of “before” and “after”, open up two windows for this document/page.

Purpose of this practical demonstration: -

1. eH2006 software is an extremely useful imaging tool to **effect exceptional reproduction of printed colours from the original colours, just as the artist had intended**
2. The Giclée reproduced print is protects your investment in time and money and will be treasured in anyone’s art collection as it is **visually more compelling and realistic.**

Note that the eH2006 software (screen dumps shown below are in the Chinese language text) will be translated into English in a new version of the software in mid 2007. The International English version is anticipated to be generally available worldwide in mid 2007.

This is one of Mr. Shi’s (famous artist in China) outstanding oil paintings (Golden Autumn in October) which is available for sale from “Print Fine Art”). The following is the picture of raw digital data acquired using a digitising system.



Fig 1 Raw digitised image of the oil painting :“Golden Autumn in October”

The first task is to let eH2006 software automatically adjusts the black and white fields. As the sampling rate of eH2006 achieves the million pixel class, the analysis of this big image is therefore more accurate. This picture’s raw data size is about 120 million pixels. In this batch of sampling, practice shows that the eH2006 analysed the black fields to an accuracy of more than 90%. Put this in another way the final draft of the above painting has 90% of the black fields analysed by the eH2006 software automatically. The white fields

more or less use the white field editor's function. Therefore many brightest areas of the digitised image are often not pure white in colour. The following picture shows the result of the automatic analysis of the black and white fields:-

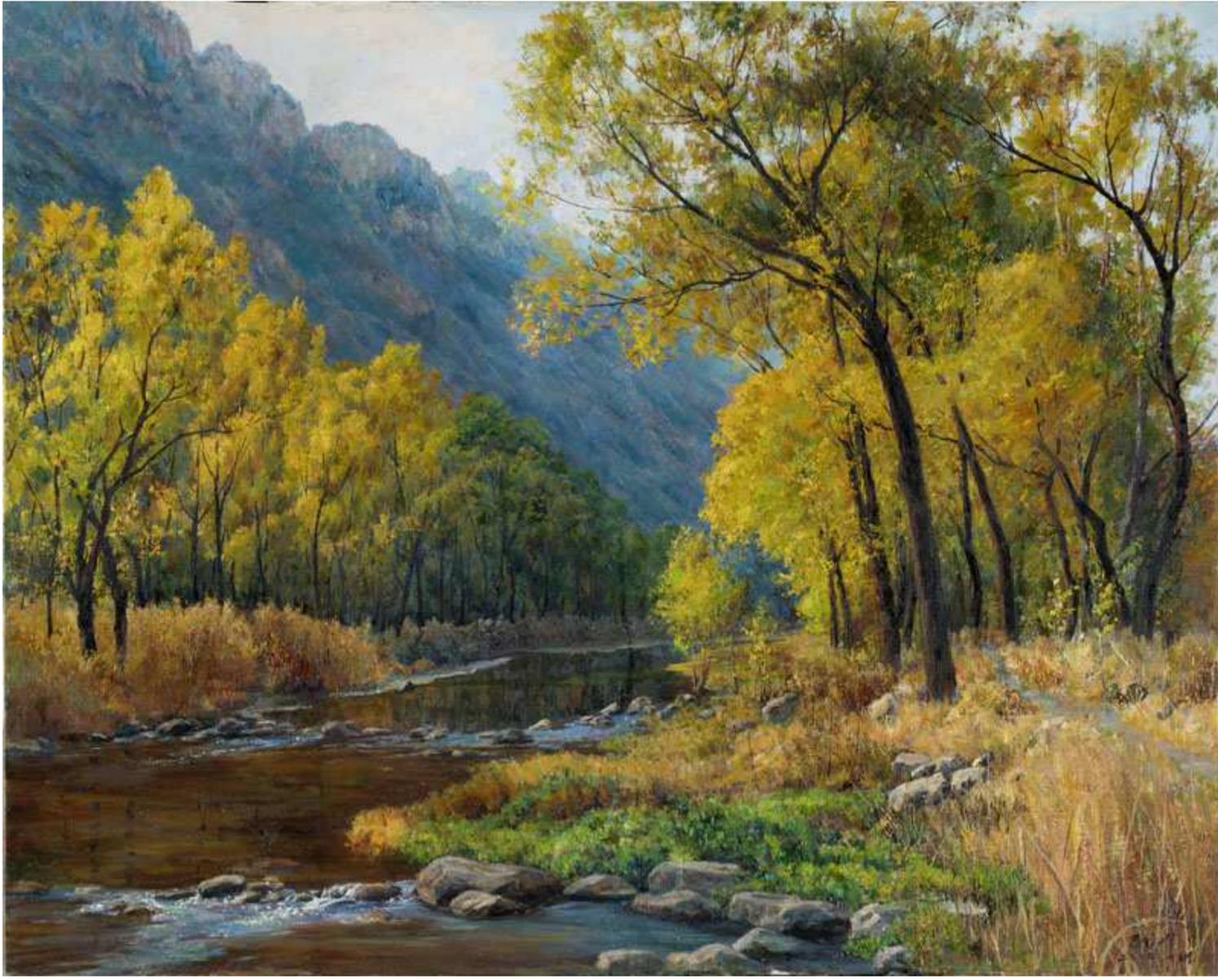


Fig 2 After automatic adjustment of black and white fields

Visually the image is excellent but the printed picture is a disappointment when compared with the original painting. The blue colour of the distant mountain is too intense; orange in the water is too red. On the original painting the leaves in the vicinity were painted with almost pure yellow pigments. Visually the colour saturation is high; brightness is high, which show the relative depths of view in the original painting. As you can see from the second image (Fig 2) the printed image is dull yellow colour which is neither colourful nor bright enough. If we enhance the green, reduce red and the blue colour, increase the contrast, can the yellow colour get prominent? But this method will cause the green to be too bright, overly prominent, therefore it is best to restrict the adjustment to orange/yellow. This is the capability of the RGB gamma curves, without this function it would be impossible to achieve the best visual effect.

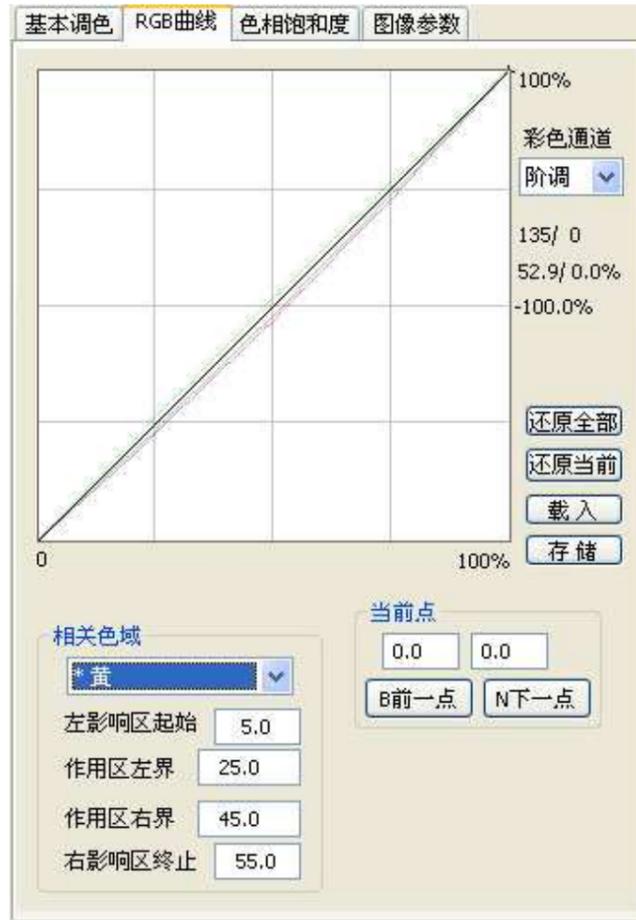


Fig 3, increase the brightness of the orange yellow, adjust green, increase contrast and saturation

A small adjustment to the gamma will produce significant effect. The following shows the adjustment to the black and white fields for a part of the picture:-

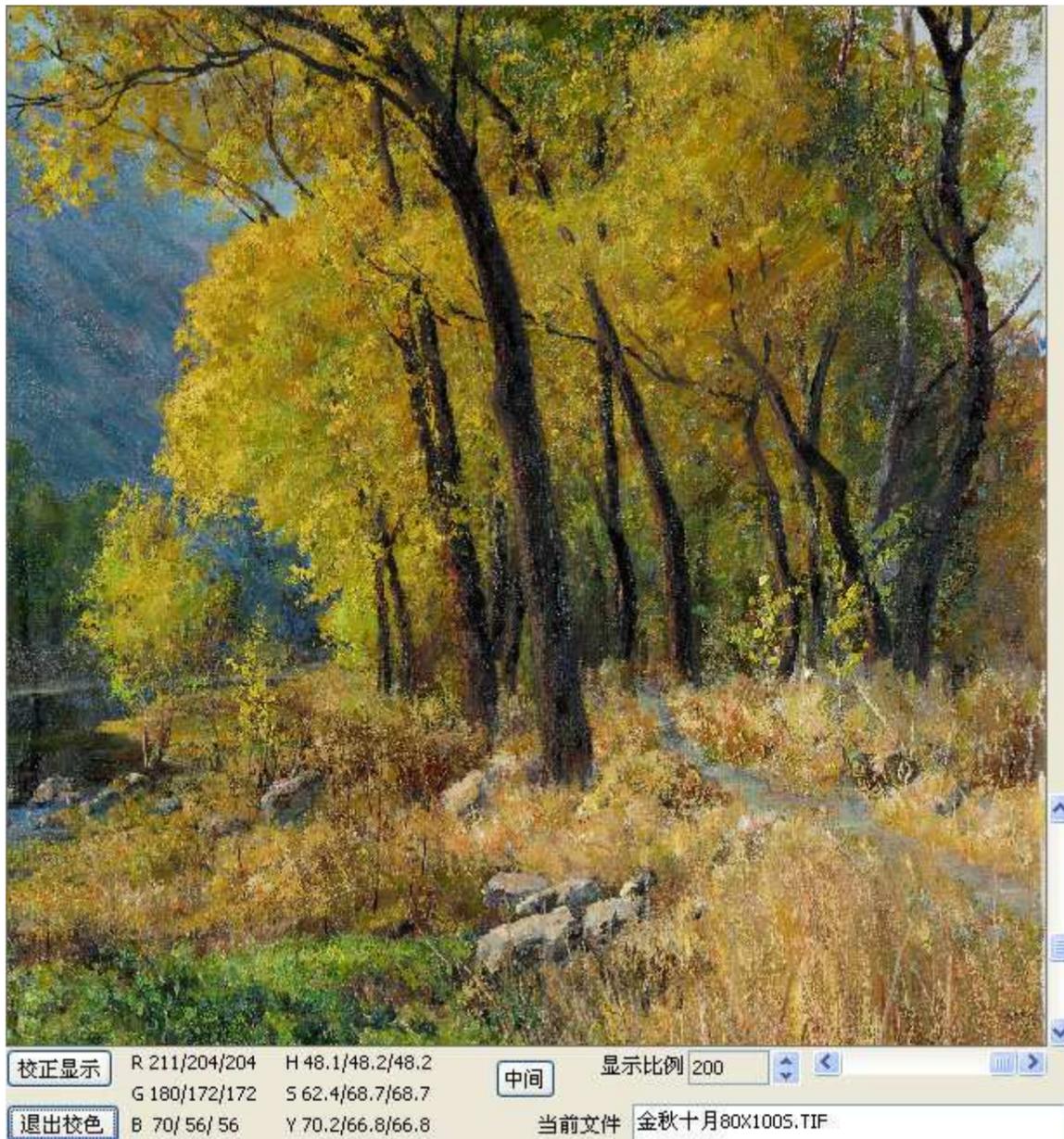


Fig 4 After adjusting the black and white fields

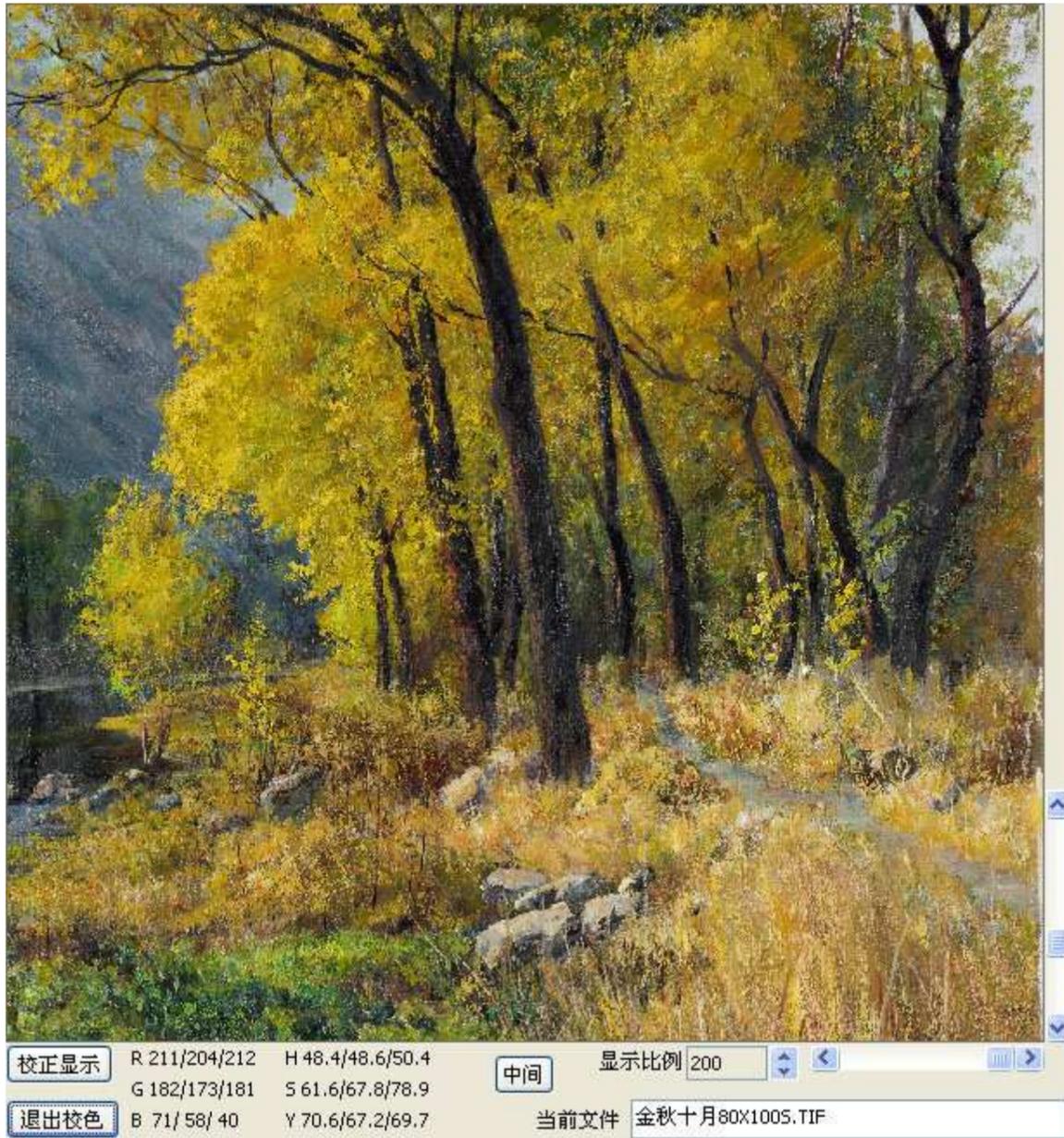


Fig 5 After adjusting the orange areas

We can see that after adjustments of the gamma curves, the yellow colour comes out. Looking at the data below each of the two images (Fig, 4 and 5, numbers shown as RGB, HSY), on the same spot, the colour hue, the degree of saturation and the brightness have been changed. In fact after the first adjustment of the orange gamma curve, the artist of the painting felt that the yellow green shows too much green which is not the proper colour for autumn. Therefore figure 5 above includes an adjustment to the green gamma.

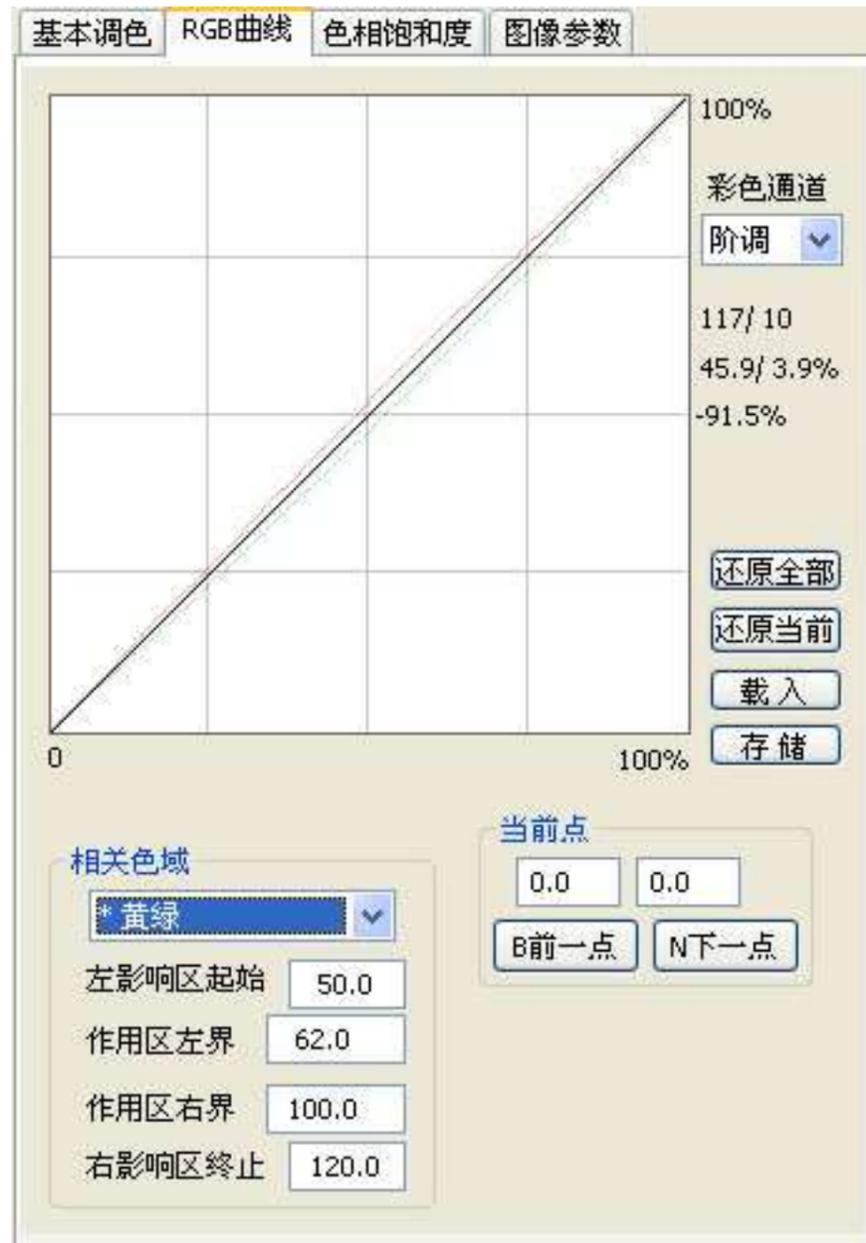


Fig 6, adjust the yellow green gamma, preventing bright yellow green colour from emerging

We can see, yellow green gamma adjustment is the opposite of the orange gamma adjustment. In order to achieve a warmer colour, since the green brightness is high and the red brightness is low, it is necessary to reduce the brightness of the green and to increase the brightness of the red. The result is to reduce the overall brightness thus increasing the colours of autumn.

We need to make further gamma adjustments. The colours of the mountains in the distant are too rich and too intense thus distorting the depths of view. Therefore we need to select the blue gamma adjustment (Fig 7), enhance the red and the green, reduce the degree of saturation, increase the brightness, reduce the contrast, thus making the exposed mountain rock a little warmer and distant which is how they should be. (Just imagine the Autumnal sun bearing on the rocks with warmth from the colours all around.)

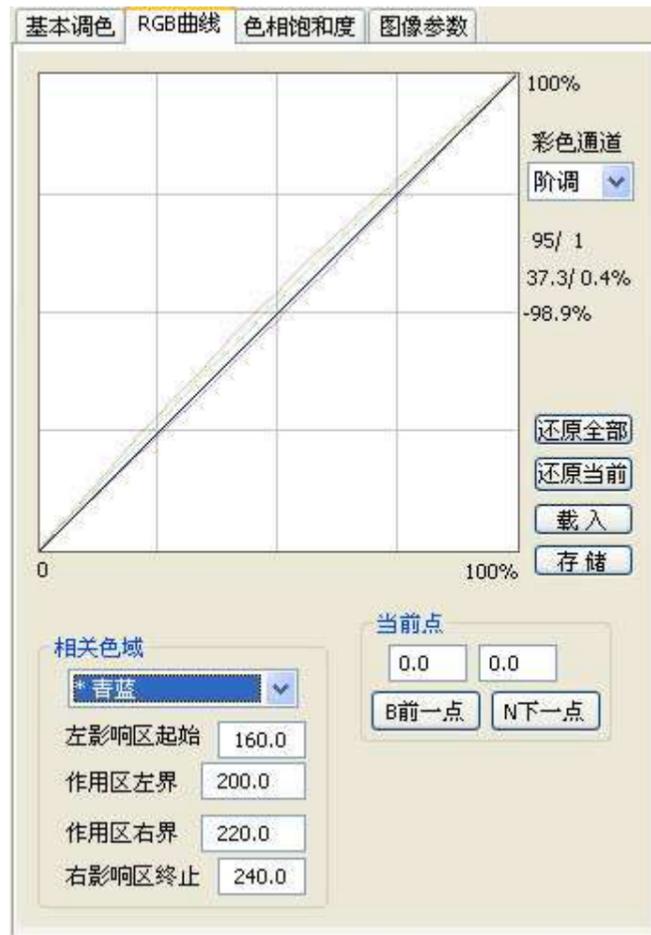


Fig 7 : adjusting the blue gamma

Actually Figure 5 above had included some degrees of saturation adjustments. As the yellow tone is already appropriate, further use of the gamma to adjust the saturation, firstly, may worsen the tone, secondly, may increase the saturation of the dark areas making the grass stems dull yellow causing colour deviation from the yellow drawn on the original painting. Therefore we use the relative brightness colour saturation function to process it further as shown below (Fig 8).

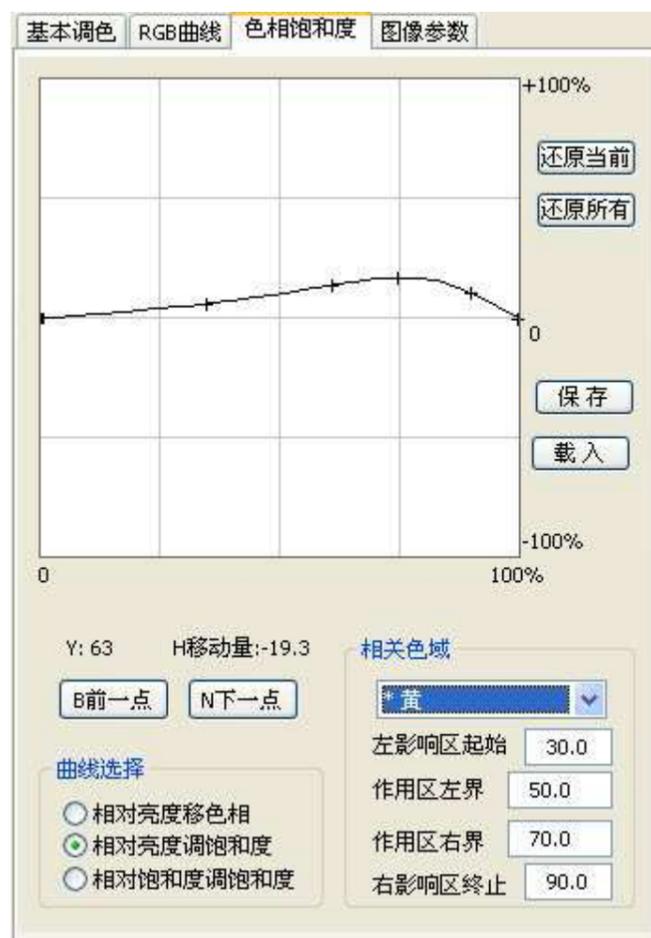


Fig 8, increase the saturation of the bright area of the yellow leaf

Similarly the colours of the mountains in the distance are still too intense, especially the bright areas. Therefore it is necessary to process this in a different adjustment – big decrease of saturation in the bright areas as shown in Fig 9.



Fig 9 reduce the saturation of the blue gamut in the bright areas

The adjustment of this picture does not use the functions of colour hue change, as we can see, the adjustments of the gamma curves achieve the desired colour change. Moreover gamma adjustment is related to the colour saturation, all things begin equal, the lower the saturation the less effect gamma adjustment has; when the colour is grey it has no effect. Therefore this type of adjustment does not affect the balance of grey. Gamma adjustment has less impact on the colours of an image; its processing is also much quicker. The follow picture shows the final result after all the adjustments.



Fig 10 the final result

Many people will conclude often that the wrong bias of the colours of a printed picture is due to the printing system. Actually the printing system that we supply (Hewlett Packard) can already accurately reproduce the RGB colour definitions. The problem of wrong colours is with the colour distortion caused by the systems used in digitisation. The above raw digitised image (Fig 1) shows that our image acquisition system is over sensitive to blue, moreover it makes the 30-60 degree orange yellow hue too red and too dark. Many monitors show 40 degree hue too green which has the opposite effect, therefore visually on the computer monitor the colour hues looked appropriate. The problem only surfaces after the image is printed. For the above picture two degrees of yellow hue deviation changes the visual appearance of the picture dramatically thus altering the original character of the oil painting. In the market today most popular colour management systems have such inevitable small deviation. Therefore for best results in both image processing and for a copy of the final fine art product, use this iterative method:-

- 1. Use eH2006 software to adjust the colour,**
- 2. print the picture,**
- 3. compare the original work with the printed copy under sun light**
- 4. use eH2006 again to adjust the colours again... .. , repeat the process again,**
- 5. this is the only way to faithfully reproduce the original using printing, in this way your investment in money and time will be protected for a picture that could last between 50 to 200 years and which is more expressive and reflective of the original artists powerful imagination.**

The pictures on this website have used the above 1 to 4 steps quality assured process as well as the processes described in Part 1 and Part 3 of this White Paper.