

## COLOUR CASTS AND THEIR REMOVAL

I was asked to provide some notes on the subject so I started a little gentle research. Now this is one problem I don't think I have suffered from, as far as I know, and my knowledge of colour cast removal was a bit thin.

Starting with a definition, a Colour Cast is:

*'The predominance of a particular colour which affects the whole image in a negative way'*

While looking for information on the subject I came across an article on **White Balance** by **Ron Bigelow** (web site [www.ronbigelow.com](http://www.ronbigelow.com)) which made me reflect on and question my opening comment ('I haven't suffered colour cast problems'). It also tied in nicely with my own assumption that white balance was the elephant in this particular room.

My initial practice was to use **custom white balance** using an 'Expodisc'. After a short period I used the easier **auto white balance**, got reasonable results and have stayed with it since. I have very occasionally tweaked the colour temperature in the Raw converter but other than that I have never really questioned the efficacy of the auto setting.

As a result, I was going to make the rather sweeping statement that I believed the main source of colour casts was generally using the wrong preset white balance or perhaps a less than effective auto white balance setting. In which case the problem could be readily corrected by adjusting the colour temperature (and maybe also the tint) in the Raw converter ..... providing one was shooting Raw.

I was also going to say that, regardless of how a less-than-pleasing colour had been achieved, the colour temperature and tint controls can be used to achieve **a result that pleases and satisfies you**, however you arrived at that point.

In general I still believe the above points are reasonably valid but, after Ron's excellent article, rather simplistic. The main points I found informative are:

### **1. Light, its colour temperature and the brain.**

Light may be defined in terms of its temperature in degrees Kelvin. 'Normal' daylight has a temperature around 6,500 degrees Kelvin. 'Warmer' light, later in the day, is lower in temperature and colder light is higher.

When taking a photograph in particular light conditions (perhaps at daybreak or sunset) it is the quality of the light (its temperature) and the way it illuminates the subject that is all important.

The brain automatically adjusts our interpretation of what we are looking at and the light under which it is viewed. However a camera has to be provided with information about the colour temperature of the light if it is to accurately represent images as we see them. Of course the adjustment the brain makes

to the way an image appears under different lighting conditions is not absolute. It will compensate well for the appearance of objects under different artificial lighting conditions but we are very aware of the quality of light at, say, sunset and the way it illuminates the landscape.

If we are to achieve an accurate representation of the image taken, as we remember it, the colour temperature of the light must be accurately communicated to the camera. The ways we can do this and the related factors are discussed below.

## 2. Auto White Balance

The camera does its best to determine the colour of the light and make adjustments. However, the method used requires that the light being measured meets certain assumptions. If these are not met then the results may fall short.

Auto white balance may not be a good choice if:

1. Absolute colour accuracy is required.
2. There is a preponderance of one colour in the scene: This situation can fool the auto white balance function into assuming the light has a lot of that colour and an incorrect colour temperature calculated. This can result in a colour cast. A scene with a lot of lush grass or a field of bright poppies might be examples where this problem could occur.
3. If a sunset is photographed, for example. Auto white balance would attempt to correct the warmth of the evening light. This could produce an image with less saturated colours or colours that were different from those you saw.

*In a case like this it might be better to use a preset 'daylight' setting for the white balance. Next time you take such a photograph try using both auto and a preset to see the difference.*

### **Auto white balance strengths and weaknesses:**

**Strengths:** Fast and easy to use. Reasonable colour accuracy under many conditions.

**Weaknesses:** Doesn't provide maximum colour accuracy. Can be fooled by a preponderance of one colour. Poor choice if the colour of the light is an essential part of the image.

**A good choice:** Where the light changes over time and speed is an issue (e.g., action photography).

### 3. Preset White Balance

By selecting one of the preset white balance options you assign and fix the colour temperature. Modern cameras have a range of preset white balance options. For instance: sunny outdoors, cloudy, shady, tungsten, fluorescent, and flash.

Preset white balance works well when absolute colour accuracy is not required and when the light source reasonably matches a preset white balance option. An advantage of a preset is that it is not fooled by a lot of one colour in a scene. Also, it is a logical choice when automatic adjustments of the temperature of the light are **not** required, as in the case of a sunset referred to earlier.

Preset white balance will not be a good choice if the light source does not match a preset white balance options. In these cases, another white balance method should be used.

#### **Preset white balance strengths and weaknesses:**

**Strengths:** Fast and easy to use. Reasonable colour accuracy when the light source matches the preset option used. Not fooled by a lot of one colour in the scene. Can be used when an automatic adjustment to the temperature of the light is **not** wanted.

**Weaknesses:** Doesn't provide maximum colour accuracy. Can't be used when the light source doesn't match a preset white balance option.

**Works Best:** When the light source is a reasonable match for one of the presets. When there is a lot of one colour in the scene or you do not want the camera to make automatic adjustment to the colour of the light.

### 4. Custom White Balance

Instead of making assumptions about the colour temperature of light (auto white balance) or fixing the colour temperature at a given value (preset white balance), custom white balance uses the camera to measure the colour of the light hitting the sensor. The method used depends upon the camera but typically involves photographing a neutral grey or white object. There are other options such as using an 'Expodisc' (an optical disc that screws on the lens and gives a direct white balance setting).

Two options exist when photographing a grey object: In the first, follow the procedures for the specific camera to establish the white balance for future shots. The grey image is analysed to determine the colour temperature of the light and to set the white balance. The camera then applies this custom white balance to following images **which come out of the camera with the white**

**balance already set.** In the second option, the image of the gray object is simply saved and used during post processing to set the white balance. This is particularly convenient with raw images as raw converters make it this an easy process. The other advantage is that it is very quick and convenient when in the field, particularly with rapidly changing light conditions.

The real advantage of the custom white balance is that it accurately records the colour of objects as they would appear **if they were photographed in neutral coloured light**. Also, custom white balance is more accurate than either auto, or preset, white balance; it is therefore the best option when colour accuracy is required or the colours in the image need to appear as they would under neutral light.

In a situation where lighting conditions are particularly difficult to judge, one option might be to use auto white balance but also shoot a grey card for setting a custom white balance in the raw converter if the auto white balance didn't produce an acceptable result.

The fact that custom white balance accurately records the colour of objects as they would appear if photographed in neutral coloured light, can also be a disadvantage. A richly coloured sunset, beautiful because of the warm colour of the light, would suffer if the custom white balance removed much of the colour and resulted in a de-saturated image. This would be the exact opposite of what you would want.

### **Custom white balance strengths and weaknesses**

**Strengths:** Very accurately determines the colour temperature of the light and accurately sets the white balance.

**Weaknesses:** Poor choice when the colour of the light is an integral part of the image. More time and effort needed than auto, or, preset white balance.

**Works Best:** For scenes that require accurate colours as they would appear if photographed in neutral light.

## **5. Manual White Balance**

There are some situations when the lighting conditions are such that none of the white balance setting options described above will yield the result you want. However, providing you shoot in raw, there is an easy solution, **adjust the temperature in the raw converter** which is almost where we started! If it

doesn't look right, change the colour temperature (and maybe the tint) until it does.

Manual white balance has its own problems though. You have to set the white balance from memory which may lead to inaccuracies, especially when large numbers of images are taken. In addition, it takes more time than the other techniques.

### **Manual white balance strengths and weaknesses**

**Strengths:** Can be used when the other white balance options fail

**Weaknesses:** Time consuming and can lead to inaccuracies

**Works Best:** For scenes with mixed or complicated light sources.

The strengths and weaknesses of the above options are included below as a table in a summary that may be printed and used as a reference.

#### Auto white balance strengths and weaknesses:

<b>Strengths:</b>	Fast and easy to use. Reasonable colour accuracy under many conditions.
<b>Weaknesses:</b>	Doesn't provide maximum colour accuracy. Can be fooled by a preponderance of one colour. Poor choice if the colour of the light is an essential part of the image.
<b>Good</b>	Where the light changes over time and speed is an issue (e.g., action photography).

#### Preset white balance strengths and weaknesses:

<b>Strengths:</b>	Fast and easy to use. Reasonable colour accuracy when the light source matches the preset option used. Not fooled by a lot of one colour in the scene. Can be used when an automatic adjustment to the temperature of the light is <b>not</b> wanted.
<b>Weaknesses:</b>	Doesn't provide maximum colour accuracy. Can't be used when the light source doesn't match a preset white balance option.
<b>Good</b>	When the light source is a reasonable match for one of the presets. When there is a lot of one colour in the scene or you do not want the camera to make automatic adjustment to the colour of the light.

#### Custom white balance strengths and weaknesses

<b>Strengths:</b>	Accurately determines the colour temperature of the light and accurately sets the white balance.
<b>Weaknesses:</b>	Poor choice when the colour of the light is an integral part of the image. More time and effort needed than auto, or, preset white balance.
<b>Good</b>	For scenes that require accurate colours <b>as they would appear if photographed in neutral light</b>

#### Manual white balance strengths and weaknesses

<b>Strengths:</b>	Can be used when the other white balance options fail
<b>Weaknesses:</b>	Time consuming and can lead to inaccuracies.
<b>Good</b>	For scenes with mixed or complicated light sources.

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