Using Cellarium Software as a Creative Tool

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Summary

Learning colour basics and translating that knowledge is an accumulative task. In this paper, we intend to site a variety of experiences and theories which support this truth. Often our task as teachers in the field of art becomes overwhelmed in theories which do not serve to transmit an effervescence, or a sense of enlightenment, which drive a student to wish to learn or seek further. Fascinating results may be attained through the repetition of the creation process and the intuitive working process. It is with the software application, Cellarium, that the user has the opportunity to experiment and develop a variety of colour works to test these processes.

Introduction

In early October 2009 – after having delivered the scientific paper, *Cellarium: A Software Software Application for Creating and Learning Colour Through Basic Biological Processes* [1], at the AIC Colour Congress in Sydney, Australia – I realised the interest generated by this presentation. It is my intent that this software be used to aid many people in their particular area of work. In this paper, I shall outline why the Cellarium software is applicable to most users and how it may be applied to individual needs. The results achieved by working in the software have a grand range, from simple to very complex, depending upon how much time may be invested in the program. In addition, I intend to prove that creating with colour is an accumulative process and it is through a variety of experiences that one arrives at some understanding of this broad area.

Cellarium is one of four software prototypes [2,3,4] which I have defined and developed over the past four years, together with several university students in the computer science area. In each of these programs, colour plays an integral role. I believe that learning about colour has to do with making comparisons and acquiring experiences which, in turn, lead to results. My approach to this work has been an investigation based upon relationships and therefore, the development of the software has very much to do with weaving colour together with other themes. It has always been my goal to teach art as a process, with colour used as a very important design element. I have included colour theory and discussions of the colour notation systems as they apply to the particular lectures or as needed to define the larger process of software development. My experience has been that teaching pure concepts on colour theory

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and colour notation systems alone, does not serve to attract the interest of my students, but in fact causes the opposite. However, some of my students have, after a period of time taken strong interest in colour notation theories and have out of self interest, pursued a search for more specific information about these topics.

Philip Yenawine (of Visual Thinking Strategies, USA) has examined visual literacy through imagery. He says, 'There is no instruction in visual literacy either in schools or out, nor even recognition that learning to look, is like reading, a process of stages. There is no accepted system by which to teach it either, that is, strategies sequenced to address the needs and abilities of an individual at a given moment, strategies that eventually allow one to come to terms with complex images' [5]. The design of the interface of Cellarium has been simplified so one may concentrate on the elements needed to focus on the making of the imagery.

Use of Cellarium Software

All user groups may engage in the process of creating designs with Cellarium software. During the process of development, we approached a nearby grammar school and asked pupils between the ages of six and ten years to test our prototype. The results were gratifying as the children enjoyed the program. Their variations in design had exemplified combinations of parameters used and results, not yet seen before. One of the results from this experience can be seen in Figure 1. Here, we witness an incredibly vivid portrayal of colour done by a schoolchild in primary school.

Figure 1 Screenshot of Cellarium software in action: circles around microbes in slow speed

In the development of his *Handbook of the Color Sphere* in 1900, Albert Munsell spoke with Mr Pritchard of the Everett Grammar School in Boston, USA, stating that the handbook ws interesting and a necessity in education. Further, he said, 'I am under obligation to you for a new view of colour.' Munsell saw his handbook as a textbook which could influence teachers in their application of colour to pupils from the kindergarten level through to the high school levels. He believed the information should arouse the attention of the pupils and provide instruction, but then allow them to seek beyond and apply this information in their own way [6].

In the development of a curriculum for thinking visually, Abigail Housen together with colleagues, considered how one could transfer critical thinking skills to aesthetical understanding, in how one looks at art. She designed a programme for schools, now called Visual Thinking Strategies (see website link in ref.1), where a particular curriculum was

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applied in a longitudinal study of five years, to age groups beginning with second graders and fourth graders. In this period, it was concluded that these strategies cause children to think critically and enable them to transfer this to other contexts of thought. The results indicated that when children learn about the arts, this may allow them to think beyond the interpretation of images [7]. If one would show the image in Figure 2 to a group of school children, they could relate as the colours express movement and most children have witnessed fireworks, and as a consequence, they grasp this reality.

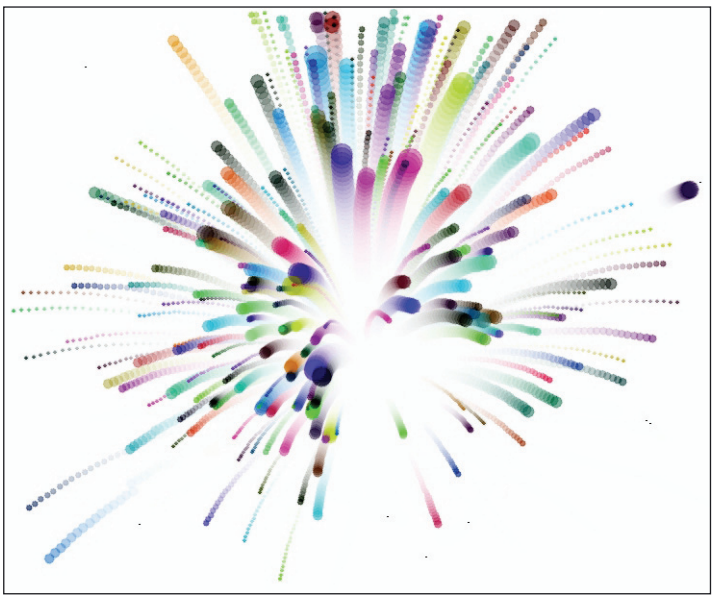

Figure 2 Screenshot of Cellarium software in action: combining slow fading with the scare away tool

Working in Cellarium gives the user the opportunity to experiment and produce countless designs which may be printed, hung on a two-dimensional surface and then evaluated.

Professor Emeritus, Laurence Rathsack, in his many lectures on formal principles of art said, 'Thinking about how a colour may look as an isolated entity is limiting. The particular colour requires a context in which to relate to the neighbouring colours. It is this actual experience of seeing a colour in a context which allows the viewer to make discernible judgements about colour characteristics' [8]. Prof. Rathsack was also a very successful drawing teacher referring to Alberto Giacometti and seeing and recording that which is seen in a larger way. In this way, delineation is achieved not through outline but by the layering of strokes which combine to form an edge or a line. One beautiful example of this, is a work done by one of the pupils in the primary school which we visited (Figure 3).

It is possible to develop veils of transparency with Cellarium. By producing layers of woven imagery, the user may work on top of this, attaining a kind of underpainting or greying effect, in which the intense colours appear more intense than usual. In developing his idea for his

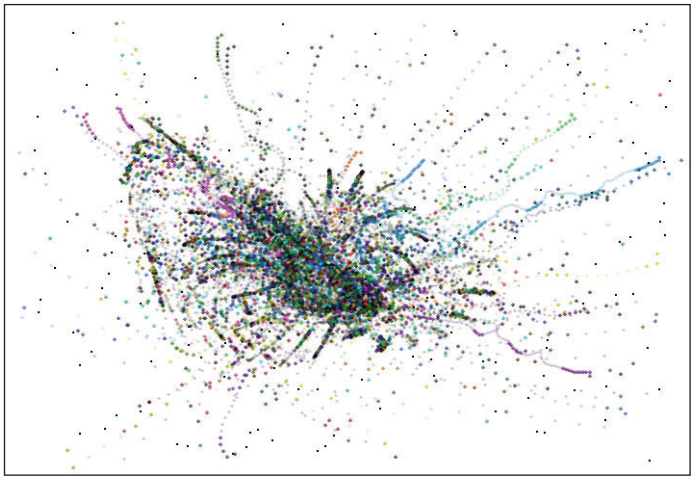

Figure 3 Screenshot of Cellarium software in action: small microbes pushed apart by the scare away tool

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colour sphere, Munsell stated, 'It is also necessary in this study to be able to contrast any colour or sequence of colours with neutral grey' [6]. In this way, the colours appear almost luminescent in quality. The particular image in Figure 4 shows a density which has to do with layering or developing an underpainting upon which other layers may be built.

As Rudolph Arnheim stated, 'In Cezanne's late watercolours, which avoid unmixed hues, the anchorless violets, greens and reddish yellows seem to move in a constant flux, with no rest anywhere except in the supreme balance of the picture as a whole' [9]. Particularly at the start of the program Cellarium, the cells appear to be individual entities moving about, beside and through one another. The appearance is very much like that of a Cezanne watercolour where the paint is applied as individual brushstrokes, set side by side, and given that the light in a computer emanates from behind or inside the monitor, the resulting colour is transparent in nature. Refer to the image in Figure 5 and, here too, Stefan Gottschalk has achieved a semblance of transparency as Cezanne attained in his watercolours.

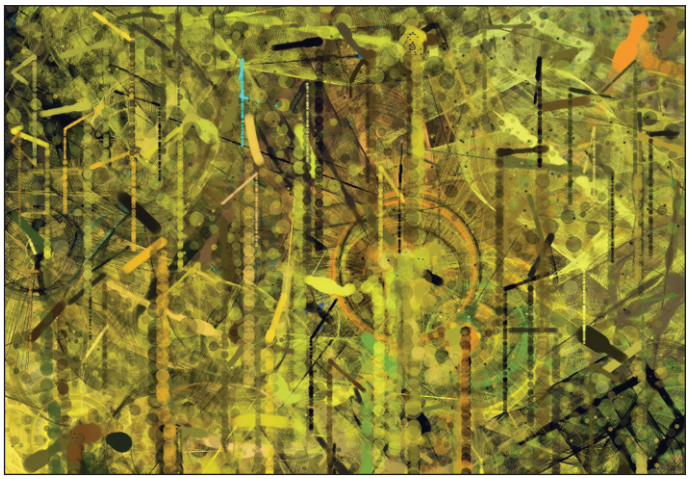
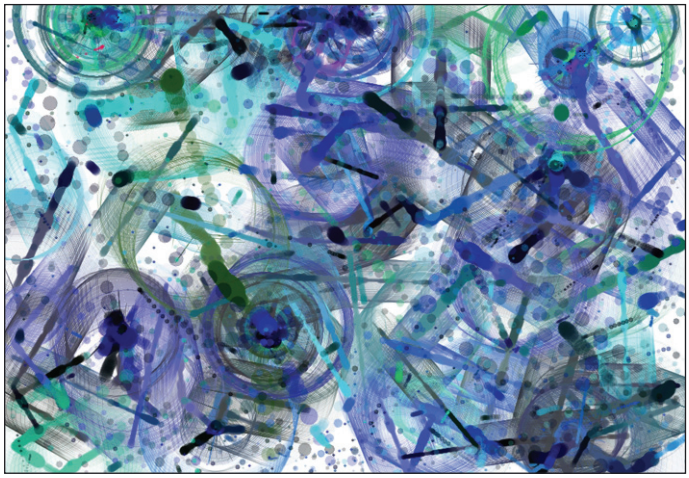


Figure 4 Screenshot of Cellarium software in action: mixed techniques, analogous contrast

Figure 5 Screenshot of Cellarium software in action: mixed techniques, analogous contrast



Motivations Behind the Creation of the Software

The motivations behind the creation of Cellarium are diverse. One experiences colour in an uncontrolled manner or may choose to intervene and work in a controlled way, using the control panel with its various parameters to manoeuvre within the simulated world of colourful cells and shapes. The user may observe endless opportunities. By using Cellarium, one may seek new colour combinations for whatever interests may be particular to the user (Figure 6).

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Roy R Behrens has stated clearly, 'In terms of using visual aesthetic design, the key to using colour is in the fact that it can be changed or modified. By understanding this, it is entirely possible to make intelligent and inventive uses of colour within visual works of art, with little or no understanding of colour notation systems such as those of Wilhelm Ostwald or Albert H Munsell, although systems of this sort can be immensely helpful. To put it simply, the modifications of colours appear to be similar, and to make similar colours appear to be different. Colour, like everything else in life, depends upon the process of sorting. When different colours are made to look similar, the unity of the work of art is increased. When similar colours are made to look different, variety in the work of art is increased. Artists can avoid monotony (extreme similarity) or chaos (extreme difference) by achieving the aesthetic requirement of unity with variety within a work of visual art' [10].

If one considers the incredible complexity of textile design, then one realises that choices in colour may seem unusual. Refer to the abstract image which has a two-dimensional quality much like a woven pattern (Figure 7). Having said that, how one particular colour works in a given situation, may be proven differently in the next one. As is evident in this passage taken out of the text in Rudolph Arnheim's chapter on colour, he comments, "The interrelation of colours is strongly modified by other pictorial factors. Both Ostwald and Munsell recognised the influence of size and suggested that large surfaces should have subdued colours whereas highly saturated colours should be only used in small patches. But it seems that even this one additional factor would so complicate the proposed rules of harmony as to render them practically useless. And there are many other relevant factors which cannot be controlled by quantitative measurement as comfortably as size. For example, Wilhelm Ostwald, commenting

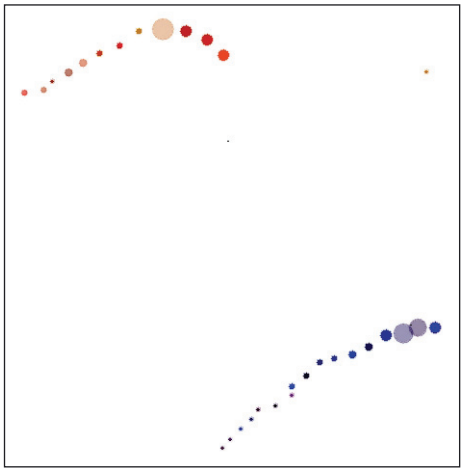

Figure 6 Screenshot of Cellarium software in action: two different groups of microbes on the white canvas

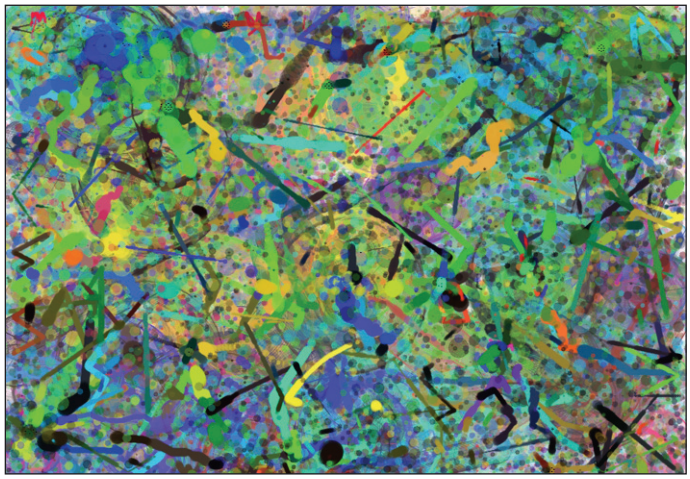

Figure 7 Screenshot of Cellarium software in action: mixed techniques, multiple layers

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in 1919 on a rule which held that saturated colours should be presented only in small bits, asserted that large-sized surfaces of pure vermillion, as found in Pompeii, are crude, 'and all the blindly superstitious belief in the artistic superiority of the 'ancient' has been unable to keep attempts at the repetition of such atrocities alive.' In reading this today, we may recall a painting by Matisse in which six thousand square inches of canvas are covered almost completely and quite satisfactorily with a strong red, and we note that the painting was done in 1911" [9].

When teaching colour theory, I tell my students, that it is not enough to talk about the characteristics of a particular colour. To decide on the look of a colour based upon one's memory is totally inaccurate. A colour must lie there before you and, only then, may one discern relationships about its usage and effect. When a colour is placed next to another colour or within a field of yet a second colour, comparisons may be made. [2]

Ideally, one could go into any learning situation and take both the Munsell Colour Globe as well as the Cellarium software with them as teaching aids. Essentially the ideas inherent in Munsell's work are timeless. It was in 1899 that he discussed the possible uses of his Revolving Spherical Colour Chart. He conceived it in terms of the following features: (a) having educational relevance, so as to present facts and the relationships of colour; (b) as a means to record, preserve or reproduce any colour effect; (c) as a functional device used to display hues in any sequence; and (d) and as an instrument which could produce colour arrangements. The variants applied to this particular Colour Chart included that, firstly, the colours and values merge imperceptibly, that secondly, three or more colours are spaced regularly in circuit and that two or more values be spaced regularly from white to black, that thirdly, variations of light would determine a different outcome; (midday light, night light and artificial light), and that, fourthly, the form be designed with children in mind, so that it be simplified for all viewers to understand [6] (see Figure 3).

Julie Barrett has been an elementary school teacher but more recently has affected the thinking of educators and facility planners on the national level in America. She comments that, 'Colour is part of our vision, our language, our art and our folklore.' And furthermore, 'the collective research over the past decade suggests that children today are developing awesome capabilities in their right cerebral hemispheres at the expense of the left-hemisphere skills. Apparently, children have been immersed in visual imagery, such as television and video and are therefore, quite adept at using the neural systems that carry this kind of information. On the other hand, they have become weak in skills that demand left-hemisphere strengths, such as the ability to translate a narrative from a book into a visual image in the mind' [11].

At some point, our children will tire of the flat computer screen and will turn to other means of learning or seeking information. I believe it is for us to anticipate this future change and develop new opportunities for learning such as in the software program, Cellarium.

Conclusion

It is our interest to promote colour through the use of this software. The application of the software is universal, for all age groups, user abilities and interests, particular to user needs. Cellarium software is not only an interesting medium in which to work, but also a pleasure in which to build new colour nuances for every kind of colour application. Witness the makings of a Cellarium Colour Design by watching the video we have prepared (see the YouTube link given in the references) [1].

Our approach to this work has been an investigation based upon relationships and, therefore,

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the development of the software has very much to do with weaving colour together with other themes. As teachers, we view our goal to guide students in a process, with colour used as a very important design element. Both colour theory and discussions of the colour notation systems are integrated as they apply in the larger understanding of the process of making and reading works of art. Creating with colour is an accumulative process which should be realised in the periphery as well as in a direct approach. It is in the mistakes or unexpected happenings where often success takes place.

Albert Munsell in 1900 believed that information should arouse the attention of the pupils and provide instruction, but then allow them to seek beyond and apply this information in their own way. Exactly what this colour theorist expressed over one hundred years ago, still holds true today. That is, our interest should be to fascinate those learning about colour and to influence them to want to create. Let the software application Cellarium be a means by which one may begin to work and express in the wonderful world of colour.

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