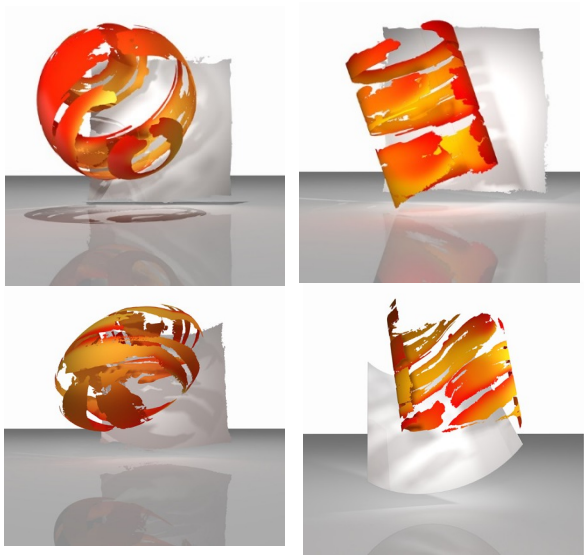
The Journey,

Tony Shaw 2015 to 2016

A Practical Investigation into the Development of Pattern and Texture for use in 3D Models. 2015 to 2016.



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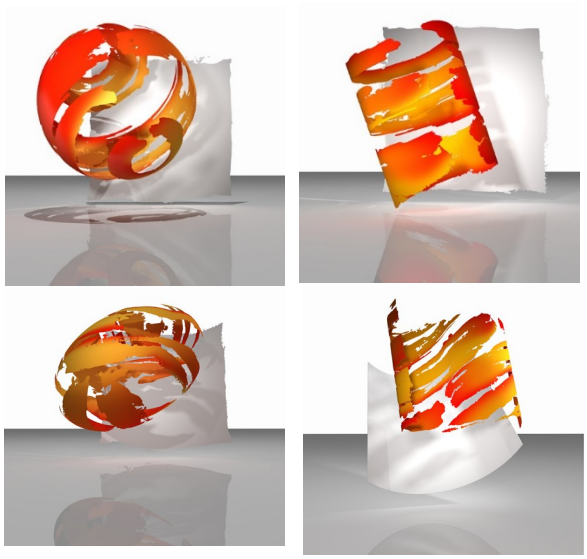

A Research Proposal:

The Research question

How can the development of Textures and Material Maps in computer generated models help to enhance professional practice? How will this development further enhance the teaching and learning on the BA (Hons) Production Design for Stage and Screen Programme and the development of other digital model making programmes at The Northern School of Art?

The Journey

A Practical Investigation into the Development of Pattern and Texture for Use in 3D Models

Tony Shaw: September 2015 to August 2016

Contents

Research Proposal

A practical investigation into the development of pattern and texture for use in 3D models.

The Research Question

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Introduction

The development of 3D digital models used in my own practice is something, which I personally wish to develop. Never the less this would support undergraduate study on the Production Design for Stage and Screen programme greatly. This digital work is an area, that our industry partners tell us that they are focused on, and the development of teaching on the programme in this area must continue to explore this area.

Aims

1 to develop the practical skills associated with industry standard software predominantly Autodesk's 3ds max and Photoshop.

2 to develop imagery for inclusion in exhibitions and galleries to enhance my own professional practice.

3 to build up a knowledge base to be able to disseminate knowledge to both undergraduates at The Northern School of Art and other programme staff.

Objectives

1 Document a practical exploration and development of the software through background reading, online tutorials and hands on practical research.

2 Evaluate the imagery produced to further develop this learning to produce freelance work and images for exhibition.

3 Develop an understanding of the processes explored through the first two objectives. This will lead to the development of teaching aids to use with undergraduates and perhaps other staff in the college.

4 Develop proposal for a possible 3D model making and effects programme at The Northern School of Art. Would not only enhance study but would help develop a unique selling point for the programme. So an area of development that I want to explore is the production of pattern and textures to enhance the surface of digital models. I have started to explore this through my own professional practice and really want to learn more.

A Detailed Proposal

The development of digital models is a growth industry that is usually associated with games design. Nevertheless, it is extensively used in TV and Film, advertising and illustration. The process includes the development of 'maps' using a modifier in the material editor known as Unwrap UVW. This allows the object to be unfolded into flat pieces and these flat maps to be placed on a template that wraps these 'maps' around an object. These maps can be produced using Photoshop, Illustrator or traditional media that are saved as digital files such as a jpg. For instance, the development of a mix of traditional and digital media to create maps can be explored.

Part 1 A Case Study: Unilever Comfort Add by Advertising Agency Ogilvy

As an example of how this technology is used I include here as example I include the characters developed for the Unilever Comfort fabric conditioner advertisement. These comfort characters developed for TV advertising by production company The Mill uses digital models onto which the fabric effects are 'mapped' The characters were developed for advertising agency Ogilvy by special effects company The Mill. http://www.themill.com/work.

The following is an article from the Mill's website outlining some of the production issues.

Agency: Ogilvy Producer: Sally Miller

Production Company: The Mill Director: Douglas & Jonathan Executive Producer: Alex Webster.

Producer: Duncan Gaman/Laura Brooks/ Denise Abrahams

Editing Company: The Mil Post-Production / VFX

Post-Production / VFX Company: The Mill Executive Producer: Alex Webster

VFX Producer: Laura Brooks

2D Lead Artists: Ben Perrot

3D Lead Artists: Rodrigo Torres, Magalie Barbe, Antonio Carranza

2D Artists: Rich Payne

Mill Producer Duncan Gaman explains,
"The Jumbo Washing Wonderland commercial was a really exciting project for our team as the brief was the most technically challenging Comfort ad we have done to date. Ogilvy gave us the brief, 'Bring the Outdoorsy Freshness inside', which was to be realised in CG. The challenge for us was to try and find a way of realistically simulating a huge green towelling piece of fabric that the Comfort Family could pull out from the inside of a washing machine which then transforms into a lush green grass meadow of sunflowers and rolling green hills."

The Mill's technical director Amaan Akraan's adds:
"It really came down to a data management, number crunching memory issue. We had to give a cloth-world look to the green towelling and have each blade of grass towel deform correctly to the moving landscape and sway realistically in the outdoor breeze."

I have no idea how the production team at The Mill produced the characters for this add as all agencies keep the production pipeline a bit of a secret. Primary research suggests that using 3ds max, the software which we are developing with

undergraduates, reflective maps, texture maps and transparency maps are connected to materials in the material editor to create these effects.

Above: The comfort characters developed for TV advertising by production company The Mill using digital models onto which the fabric effects are 'mapped'

The characters were developed for advertising agency Ogilvy by special effects company The Mill.

Part 2 Initial Research work using textures and maps on a 3D model as part of MA study 2014 2015.

However it is one thing knowing how to use software to create digital models, it is another to be able to pass this information on to others through teaching and learning. The development of practical skills will be the first step in creating learning resources for undergraduates. I produced similar work years ago whilst developing learning in Photoshop and propose a similar body of work here to use with undergraduates.

Through study on The MA Digital Art and Design at Teesside University I developed some skills in mapping materials to models created in 3ds max and include this initial learning, which took place, in an appendix which is attached to this proposal.

See appendix I (Mapping Drawings to simple spherical objects: Winter Trees Illustration 2015) Page 13

Primarily this work would support my own professional practice and in time it is hoped that an exhibition of work could be staged. The initial learning would be recorded in a bound volume, which would outline the learning which is taking place here and Blurb is to be used to present this work. As learning takes place the opportunity to develop teaching aids, which will enhance the student learning of 3D software on the programme will become evident.

Useful website http://christianpearce.blogspot.co.uk/

The Conclusion

I feel that the area of digital model making in Production Design is such a growth area that there is a strong possibility of developing a sister programme to the Production Design for Stage and Screen provision which looks at digital model making alongside traditional model making. Such programmes exist in Bournemouth, Glasgow and Dublin but nothing in the North East of England.

AUB Bournemouth
BA (Hons) Model Making http://aub.ac.uk/courses/ba/ba-modelmaking/

IADT Dun Laoghaire, Dublin,
Three Dimensional Design, & Model Making.

(Appendix i) Mapping Drawings to Simple Spherical Objects: Winter Trees Illustration 2015.

As an exercise in using the learning, which has taken place over the past few years it was decided to produce illustrations purely for the next exhibition at the Palace Hub Gallery in Redcar. These would be based on a theme of Winter Trees and came from a series of photographs of trees and tree branches in winter. The stark black branches taken against an almost white background or sky gave a pattern which could be developed in Above: Initial sketch for Winter Trees Illustration, which was an exercise in mapping materials to a simple sphere in 3ds max. Here the initial photographs were scanned into Photoshop and blown up to the desired size. The white backgrounds were selected and then the inverse was selected to just highlight the

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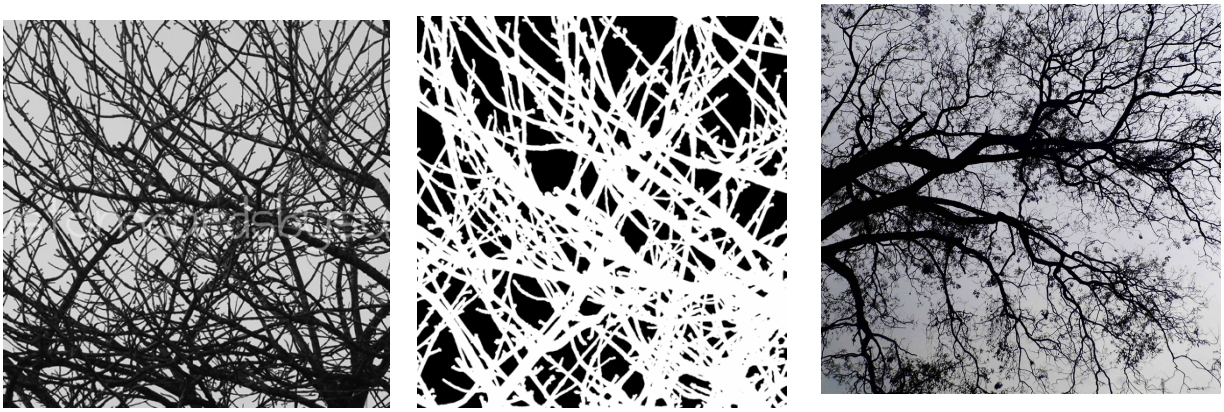
various black branches in the image. Photoshop was used to produce initially a series of illustrations which on their own would provide decorative images. Through producing work for the gallery over the last year the aim has been to develop some images, which could be used in the design of greetings cards. This is proving more commercial as visitors to the gallery are more prone to buy small unframed images or greetings cards rather than the large framed images produced for exhibition. Through the learning taking place here the exploration of large scale high quality renderings in 3ds max has always been a primary concern. This exercise again gave the opportunity to produce large high quality images and the initial Photoshop images were about half a meter square high resolution images 300 dpi.

Initial Photographs

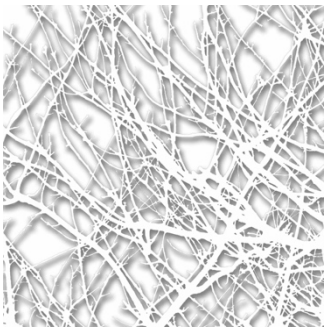
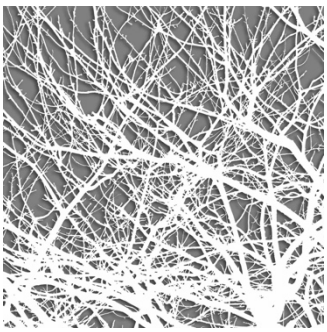
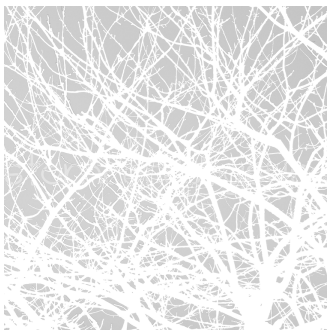
It was intended to produce the initial photographs but tests using suitable images from other sources such as books and the internet worked fine. There was never the opportunity to retake these photographs in time although the intention is to re do this work later.



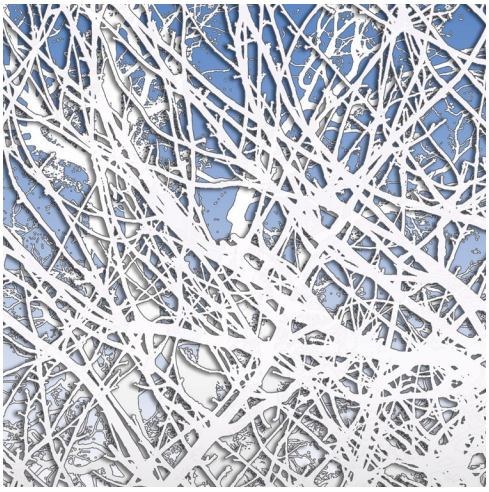
Above: Initial Photographs for Winter Trees.

These are Initial Photoshop tests to produce a simple black and white image to use as a transparency map on the spherical object in the scene. The black areas would appear as holes cut into the white sphere.

These images were explored in detail and the intention was to import the basic images into 3ds max as textures and to work on them further. However, the effect that the shadow produced in Photoshop was just what was wanted.

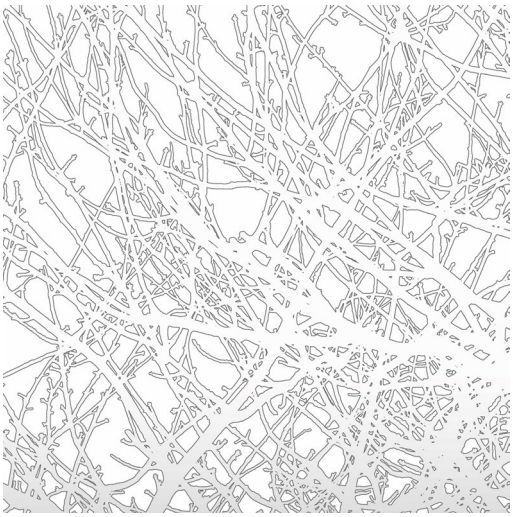
Above: Finished Photoshop images for use as maps in 3ds max models
Below: Finished Winter Trees 4 and 5 to be output as 500mm by 500mm pieces for exhibition. This image has a resolution of 300dpi.

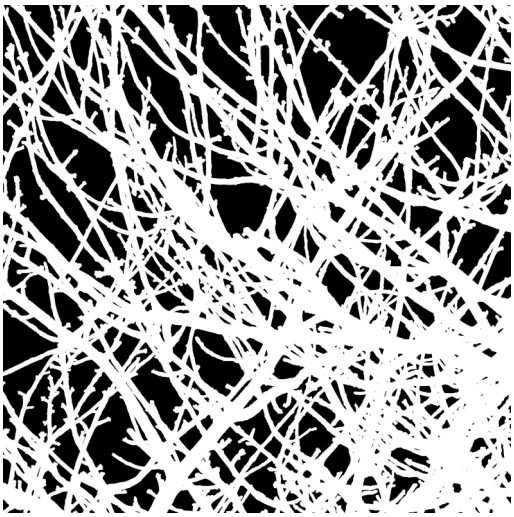



Production of Winter Trees

Initial sketch ideas were developed for an illustration using the learning explored through earlier work. Wrapping text round a sphere had led to the idea that the tree branch illustrations could also be wrapped around a sphere. Using the Unwrap

UVW modifier in 3ds max proved very complex and so simple mapping onto a sphere was used with the maps developed in Photoshop.

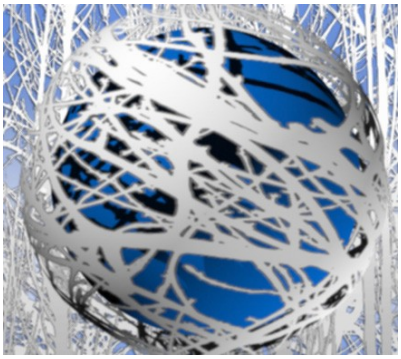




Maps were produced for the spherical ball. Top Right is the transparency map, everything which is black will be transparent on the object

Top Left is the visual map which is to be mapped to the surface of the sphere. Initially it was decided to try and use the Unwrap UVW modifier on the sphere but this is too complex and is not really necessary.

Test Renders



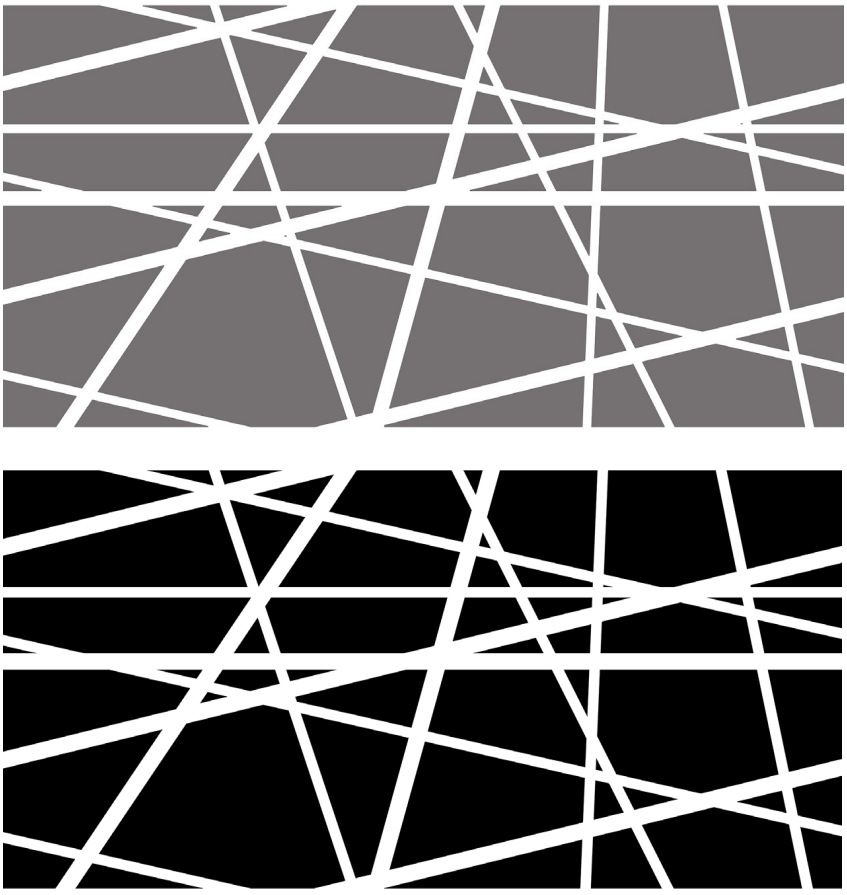
The image left shows the first low resolution test render with the initial background and the maps which were created shown on the facing page. It was decided here that this background was too visually complicated and a second simple background was needed so that the complexity of the sphere was more prominent.

Left: Second initial tests looking at developing the

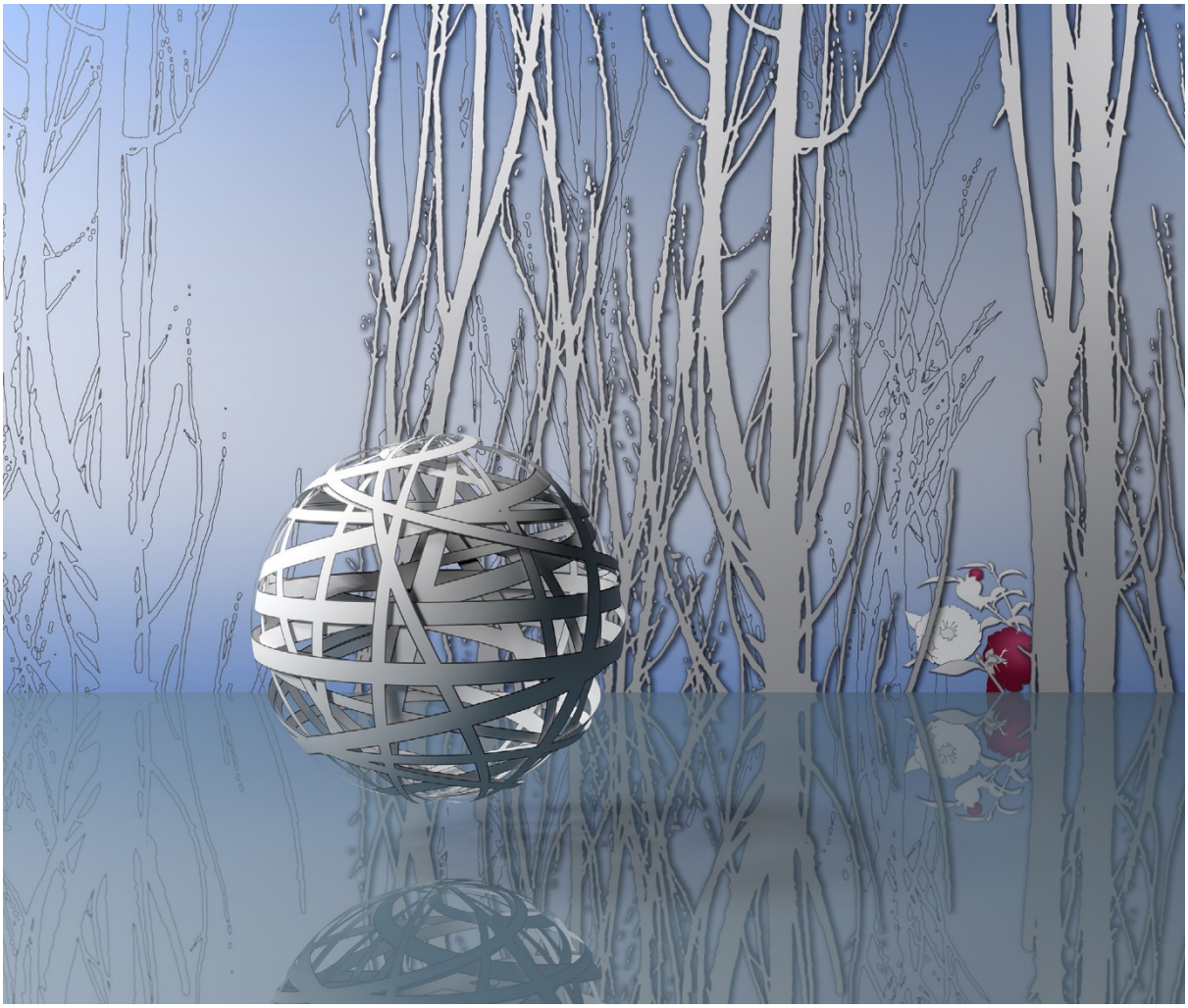
original illustrations/images but with a simplified background. This background was simply mapped into the environment.

Simplifying the Sphere

Artwork was created to use as texture maps, which were designed to allow the bands to continue around the sphere. The original maps were very complex and caused issues where the illustration joined. Here again a transparency mask was created above: which would give the illusion that this was cut away and would allow the development of layer on layer a bit like a ball of string. Two separate texture maps were created and mapped onto two spheres one inside the other. A third sphere was created inside this and this was given a reflective chrome material. From this a series of test renders were created. On reflection the initial test gives the idea that the sphere is transparent as it reflects the environment around it, which is not the effect desired.



Above: Two maps were created to try and simplify the textures on the sphere. Top shows the graphic layer. Bottom is the transparency mask. Everything black will appear as a cut away.



Above: The final image Winter Trees. In an attempt to improve this image a reflective floor was added to the final image and the simple lighting explored a little.

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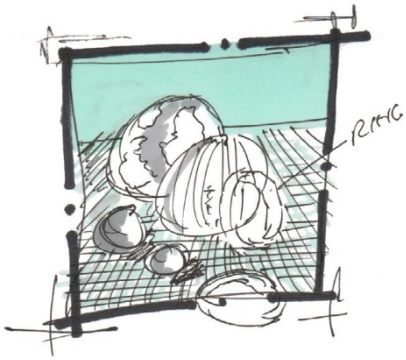
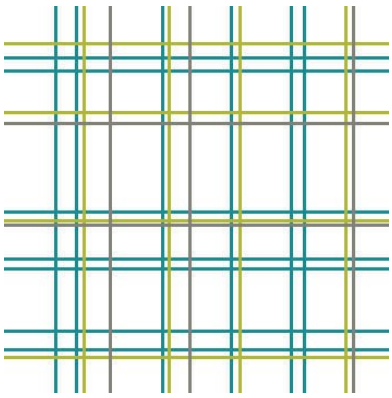


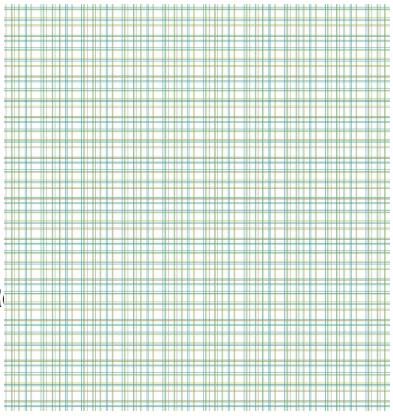
Part One
Initial Tests using Photoshop to Map Materials to Simple Objects.

Introduction



As a prelude to study it was decided to produce a series of images which would have the working title of A Journey. This would re visit some of the learning which has taken place on my MA and would allow the development of some high-quality lighting and shadow. The introduction of reflective metals in the images would allow a great deal of realism and for this to work correctly a real-world environment has to be created. This is achieved by encasing the scene in a sphere, including the cameras and the lights. Then by mapping an image to the inside of the sphere this will reflect in the reflective metals placed in the scene.

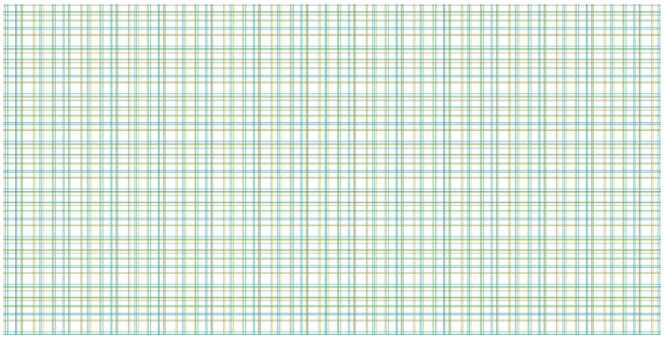
Firstly, a pattern was initiated in Photoshop which was about 20mm square. This is saved under the Edit Menu - Define Pattern. It can then be later loaded into a document as a repeat pattern by using the Fill



Command and setting the intent to Pattern. Illustration ii shows the pattern generated using Photoshop. This is saved as a jpg file and re sized for use in 3dx max. The ratio of the maps used in 3ds max to map accurately on to a sphere is 2 along the length to 1 along the height 2 to 1 and this information is gained from the numerous maps available as free down loads from the Internet.

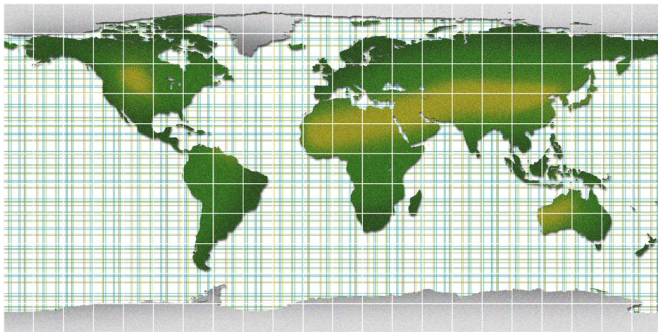
Initial Images

The Ring and Sphere image on the following page simply included a sphere onto which the material could be mapped, but to make it more interesting a ring, like a wedding ring was added. This gold ring was modelled from a short tube object which was converted to an editable mesh and expanded in the middle to give it a slight elliptical profile. A modifier called ‘turbo smooth’ is used to round off the edges and make it look more like a wedding ring. Here the lighting was set to create soft well defined shadows and the ‘ray traced shadows’ option was selected in the shadows parameter roll out view. This if used with the NVidia mental ray renderer will give the best results for a quality render. The objects are placed on a white table which curves up at the back to create a white photographic back drop. This scene is captured using a standard camera with a 50mm lens.



1 The original pattern made up from simple line drawings in Photoshop.

2: The pattern repeated using Photoshop’s pattern generator from the fill command.

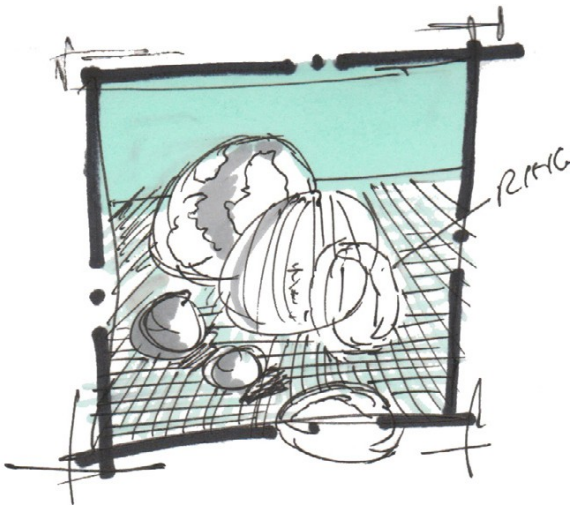


3: The three maps generated for the initial images including the clouds for inclusion in the environment sphere.

Top Left: The initial render for Image One. Top Right: A ring is modelled and added to the scene

Right: The detail of the wedding ring showing the quality of detail of the pattern reflected in the object

Above: The final high resolution image,
Below: Initial Sketch for Sphere object



Further Images

A further image was created by adding a second sphere with the map of the world that was created using Photoshop. Two further spheres were added, and these were given standard materials gold and chrome which would reflect the environment and the objects around them. The two original spheres were given an additional refract/reflect map at a very low percentage (10%). This gave the objects a slightly reflective surface again to make the scene seem more real.

As mentioned in the introduction the scene is now placed inside a sphere, which will be used to project the environment of a cloudy sky on to. Note that the sphere which will create the environment has to have a shell modifier added to the modifier stack to create an interior wall which the image can be mapped on to otherwise it does not work. This will show up in the reflections of the ring and the two metal spheres. Initial test renders seemed fine but on closer inspection of the fine detail in the high resolution render these reflections were unacceptable. The clouds were at 90 degrees to the scene and a seam or join created when the image is mapped onto the inside of the sphere used as the environment showed in the render. This was easily remedied by rotating the sphere until the seam did not show.

Th

Top: The first high quality render of Image Two shows that the clouds were mapped the wrong way onto the environment sphere.

Right: The first high quality render for Image Two. The clouds are wrong, but it is difficult to see at this size.
Left Bottom: This was rectified in the final render.

Notes on Final Gather

Final gather is the way the renderer works with light and the colour of light relating to objects. As light in a scene bounces off objects it reflects the colours of these particular objects on to other objects. In the final scene the blue of the sky, which makes up the material mapped onto the inside of the environment sphere reflects on the white table. This giving the scene an overall blue tint. Final gather also affects the lighting. As light bounces around the scene, instead of been absorbed by the objects, light is reflected and so further illuminates the scene in such a way that the lights settings must be turned down if final render settings are high.

Above Left: The rendered scene with Final Gather turned off. The scene is darker than anticipated due to the lack of light bouncing between objects.

Above Right: This was the final scene with Final Gather set at a high setting. NOTE the scene is quite blue due to the amount of blue light reflected from the environment.

Above: Final Image Two, final render. It was decided to turn final gather off as this would give a richer more illustrative quality to the image and reflections were more exciting

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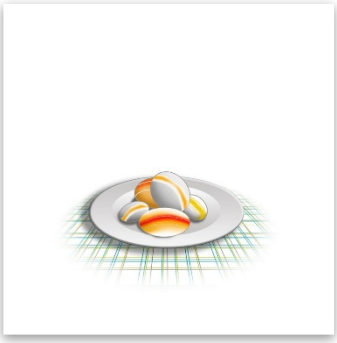
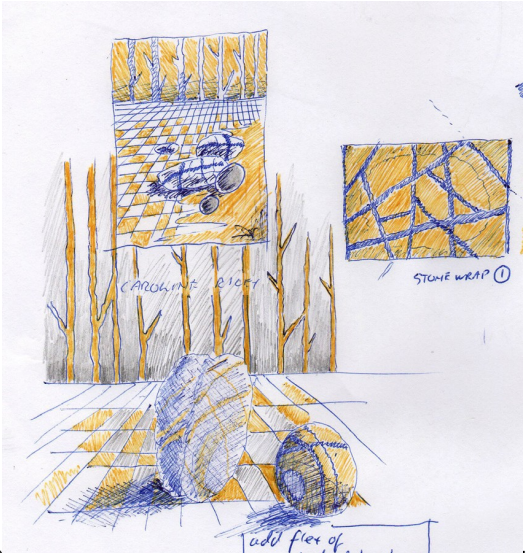


Part Two: Pebble Illustration, and the development of Precise Maps for The Unwrap UVW Modifier.

Part Two Pebble Illustration, and the development of precise maps for Unwrap UVW
As an exercise and to create pieces for exhibition a series of concept images were produced as rough sketches. The development here was to create organic shapes from standard primitives such as a sphere or an oil tank. Then a map would be applied to simulate the strata in the rock running through the pebbles. The maps



would be drawn in Photoshop and would mimic the blue and yellow lines in the original sketch.

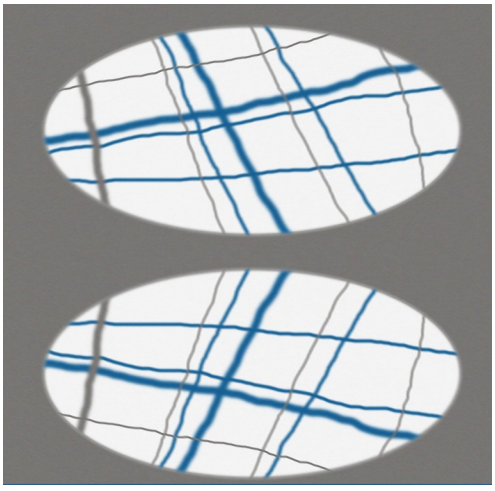
Above Left: Final concept sketch for Pebble Illustration.

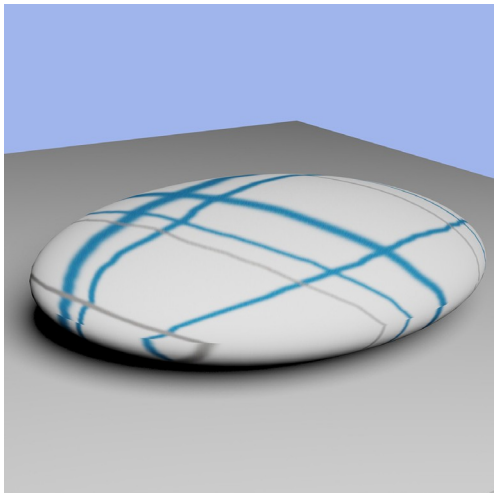
Above Right: Initial sketches and ideas for Pebble Illustration.

The difficulty here would be getting them to match up as the lines circle the object. Initially an object resembling a pebble was created from a sphere which was squashed, elongated and then further modelled by converting it to an editable mesh. The individual vertices were pushed and pulled whilst using soft selection to give a shape rather like a pebble. Research showed how maps can be developed by just selecting the top layer of the object using the tools in the Unwrap UVW modifier.

A First Test Object

This first test object was broken ip into two specific maps a top and a bottom mask and a UVW template created and imported into Photoshop. Here two elliptical illustrations of the top and bottom of the object were created and then imported back into 3ds max. This was not as successful at anticipated as the maps were impossible to match up.

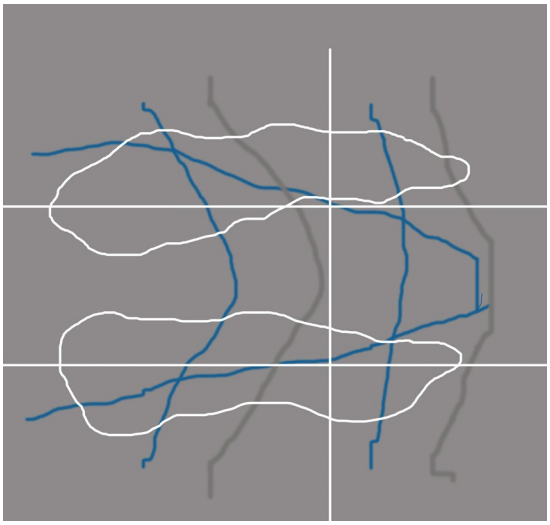


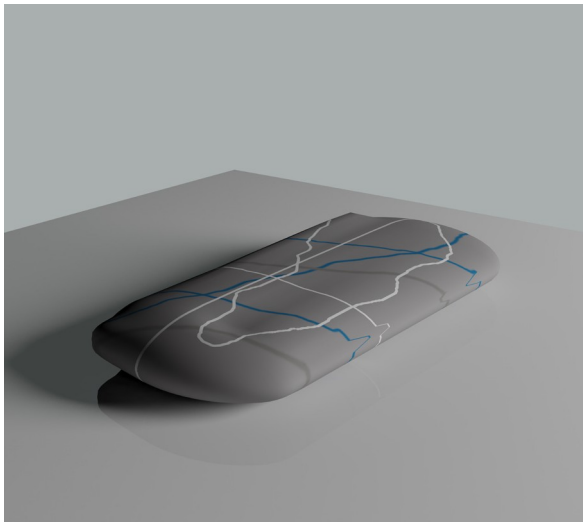


Top Left: The maps created in Photoshop from the objects Unwrap UVW Modifier.
Top Right: Test render of the first pebble object. The edge shows how the maps which were drawn in Photoshop just do not match up.

A Second Test Object

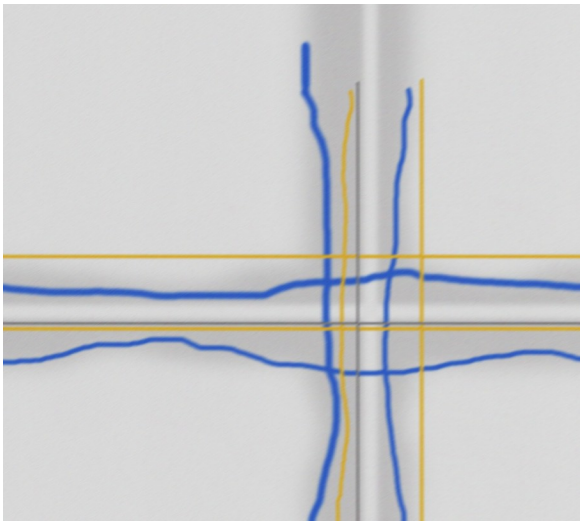
The second test object was created from a capsule shaped object which again was flattened. This shape had an Unwrap UVW modifier added but this time the maps were more accurately applied, and a texture created in Photoshop which had the lines on it more accurately applied. Again, this was not good enough and the accuracy of where the lines join was still not acceptable.





Top Left: Map created in Photoshop from the Unwrap UVW modifier of the capsule object. One long side and the two ends worked well but the opposite side was still unacceptable.

Top Right: A quick render of the object flattened and converted to an editable Poly object so that it can be pushed and molded into a pebble shaped object.



Top Left: The map created for a cube which is more easily mapped on to an object.
Top Right: Test render created using the spherify modifier.

A modifier called Spherify

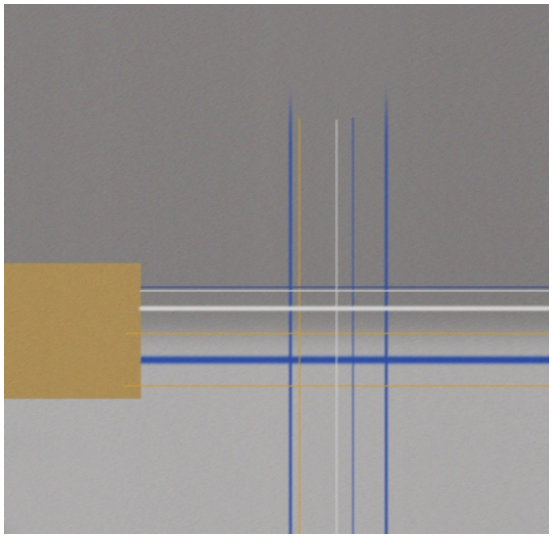
It is very easy to accurately map images to a cube and to draw the map onto a Photoshop image so that the lines match up where the cube will join. The discovery of a sphere modifier which turns the cube into a sphere was a real breakthrough. In the modifier stack the cube first has a Unwrap UVW map added and a template produced to work with in Photoshop. This was then imported back into 3ds max and added to the Unwrap UVW modifier. The Spherify modifier was added to turn the cube into a sphere and then this object was converted to an editable poly. This meant that it could be squashed and pulled into shape rather like a piece of clay and the map, although deformed slightly, remains intact. There is a slight line or crease on the curved surface which would have been the edge of the original cube

which was still unacceptable but the addition to the modifier stack of a turbo smooth modifier solved this. There are still issues with the map not working as planned but with this image it won't matter at all.

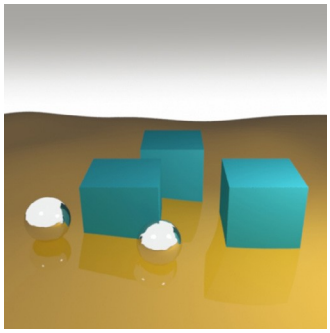
The final result is exciting, and this development connected with previous work will provide the components to produce the images sketched out at the beginning of this exercise.

Producing the final image

Three cubes were produced, and along with a series of spheres with a chrome material mapped to it arranged in a landscape. The yellow landscape was given a soft undulation by converting the box object to an editable mesh and pushing and pulling some of the vertices. An Unwrap UVW modifier was added to the cube and the map created was opened in Photoshop. Right is the map created from this modifier. It follows the folds of the box so that the lines will seem to wrap around the sphere when it is produced. The orange square represents the base of the object which will not be seen and this helps to get the object the right way up.

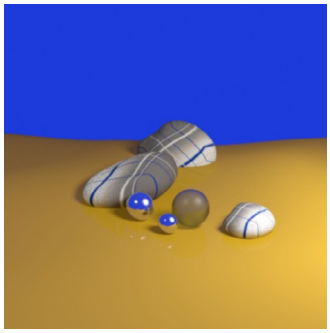


Above: The map created for the individual pebbles. Here Photoshop was used but the line was too sharp so a Noise and Motion Blur filter were used to address this.



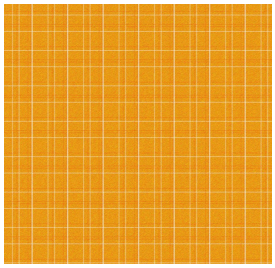
One

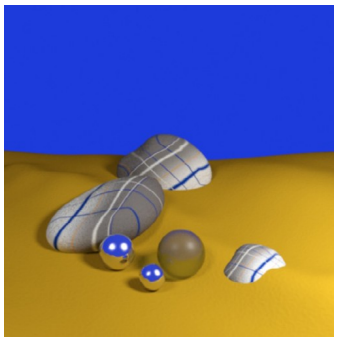
Two



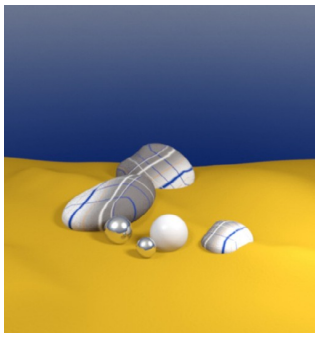
Three

Right: The map created for the landscape in the final image.

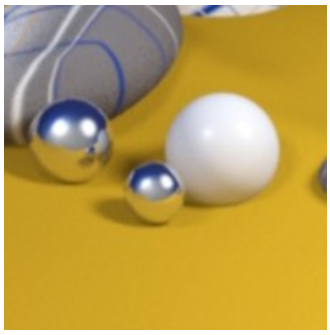




Four

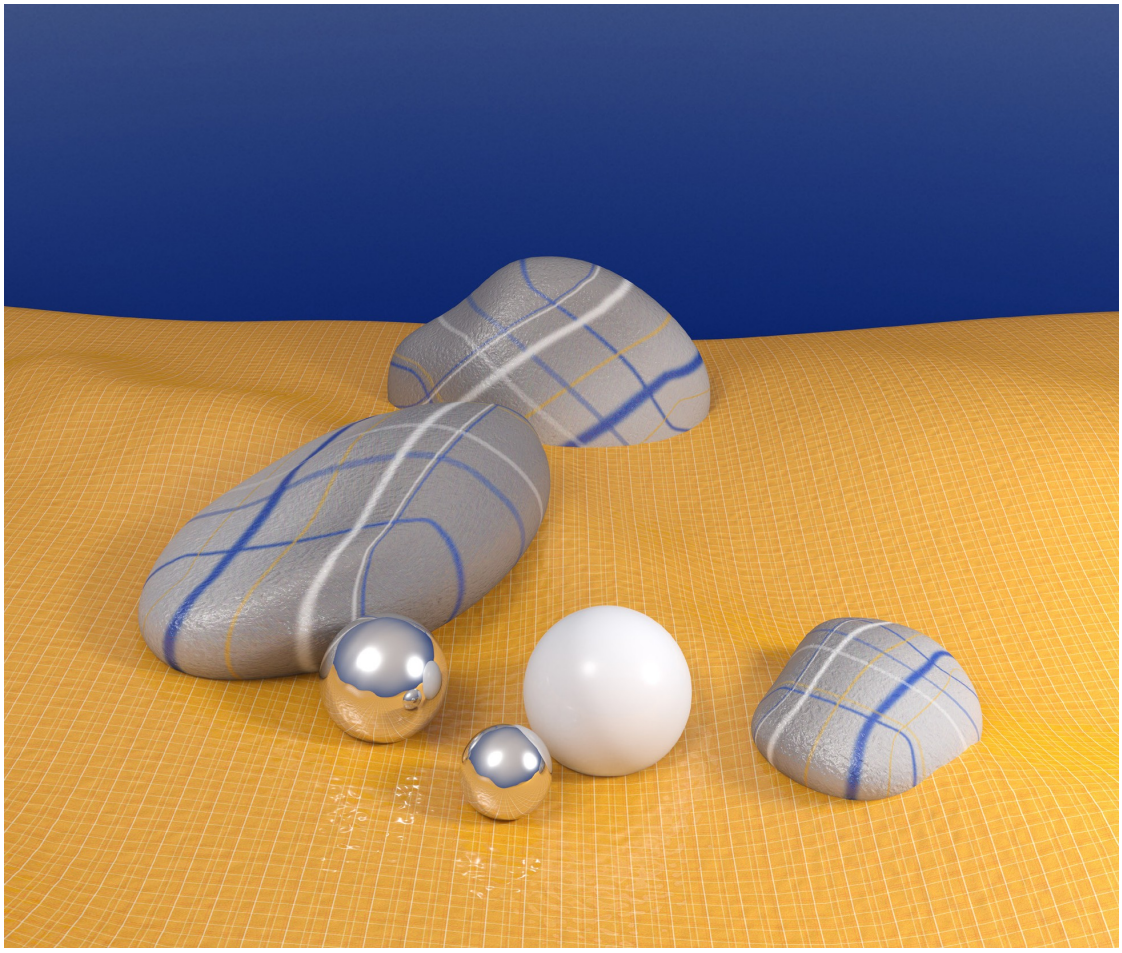


Five



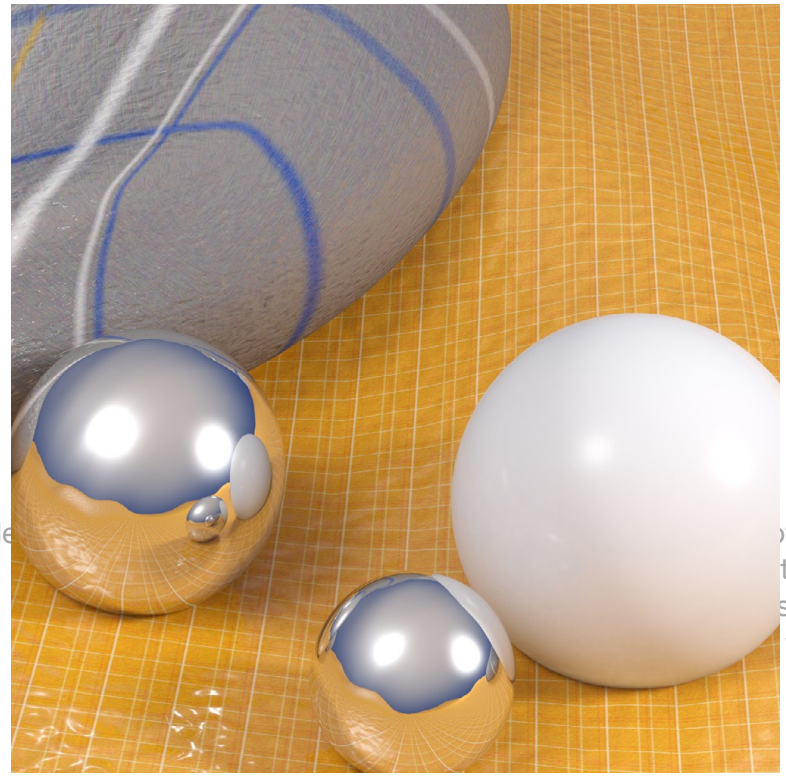
Six

Previous Page One Two & Three and above on This Page Four Five & Six: A series of six images showing the development of the pebbles illustration. Here a ‘real world’ environment was created by enclosing the developed scene in a sphere and mapping an image of a cloudless sky to the inside of the sphere. Image five shows the correct reflection in the chrome spheres as a result of the development of a correct environment.



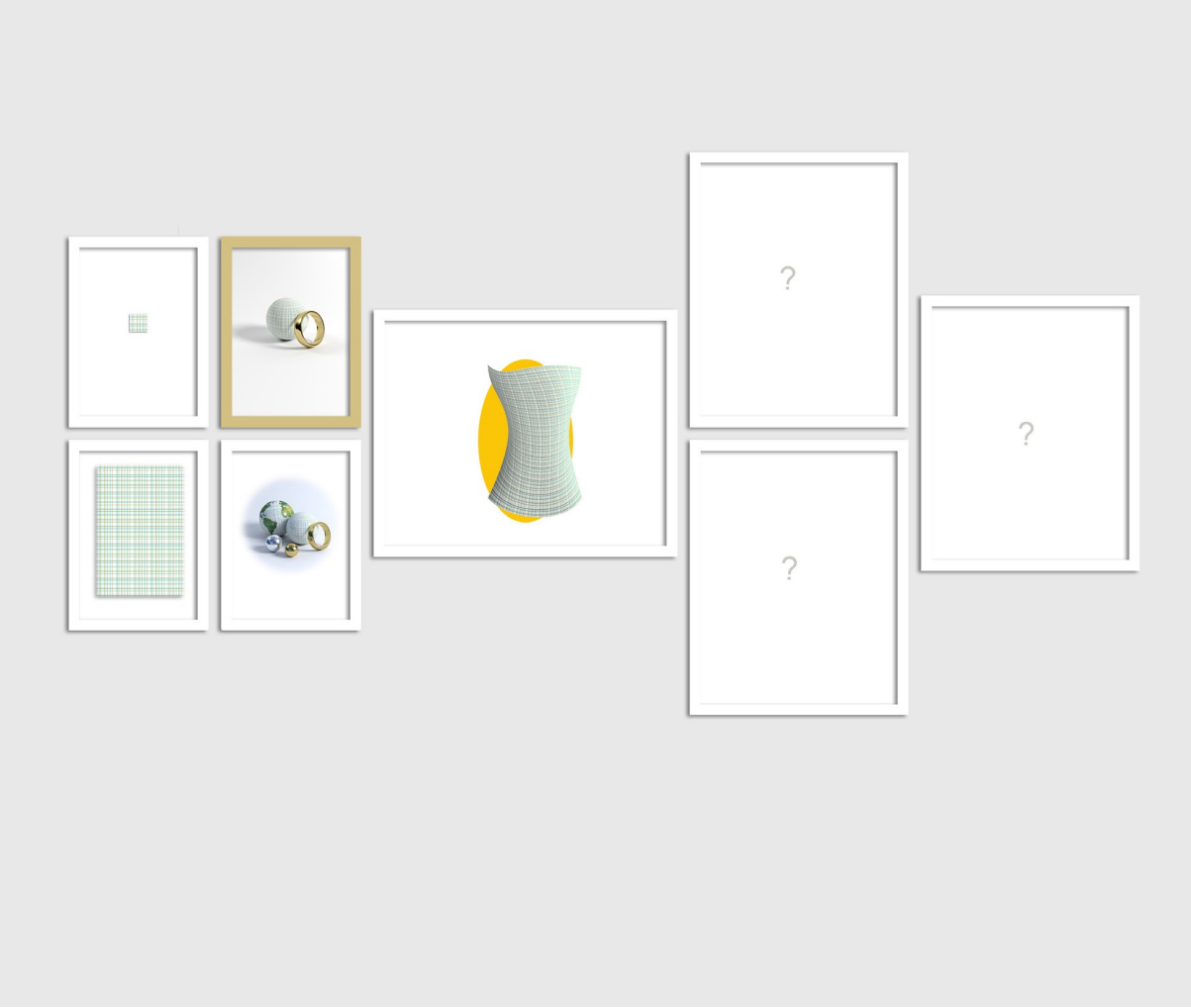
Objects with the map added were now given a Spherise Modifier to turn it into a ball. It was then converted to an editable mesh and pushed and pulled into a pebble form. From this point onwards the scene was modified and developed to add reflective surfaces and bump maps to the materials until the desired effect was reached. On reflection to was felt that the landscape needed some form of texture or pattern so a further map was developed, again in Photoshop.

Throughout the development of this image the lighting and shadow is constantly developed to give a soft shadow. Final gather is also explored to give the reflections and maps a realistic feel.



Above: A de f the orange
the pebbles,
Previous page: s per inch, is
ten hours to
render.

An Exhibition Proposal



At this stage it was proposed that the Northern School of Art should stage an exhibition reflecting the research work undertaken so far this year. The proposal here is to show a series of images illustrating the journey which has been taken place through learning. Inspired by the work of Wendy Ramshaw in her installation Room of Dreams 2006. Ramshaw's work (see right) is photographed against a white background and mounted in a series of closely grouped white frames. One of which is picked out in gold leaf. This is what was proposed for the images produced throughout this research. Some of the final renders already fitted the proposal and others would be edited using Photoshop.

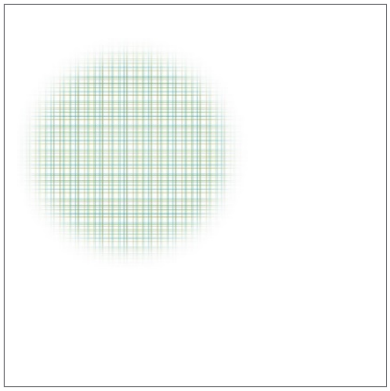
A Personal Statement for the Exhibition
The Journey

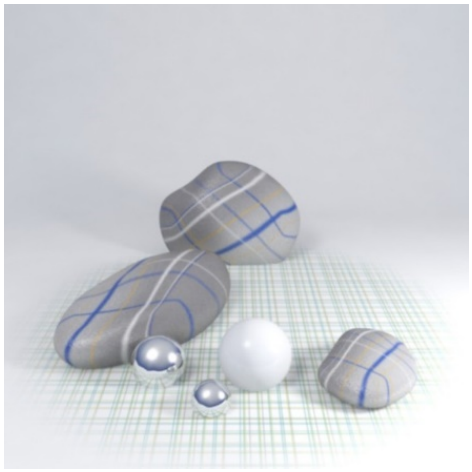
This series of images illustrates the journey taking place through research and the learning so far. It starts with the development of pattern using Photoshop's Pattern and Fill commands to produce texture maps for 3ds max. (Image i and ii). The mapping of texture maps on to simple objects is represented in image iii and iv. Image vi and vii shows more complex maps which try and wrap the texture around the object.
Above: Wendy Ramshaw's Room of Dreams (2006) as an inspiration for displaying and producing work for an exhibition.

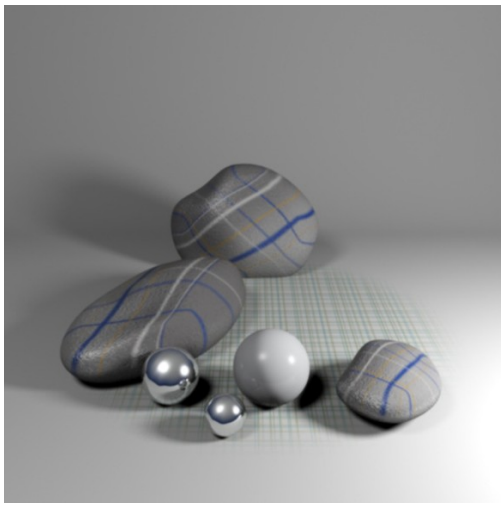
Pebble Illustration for Exhibition

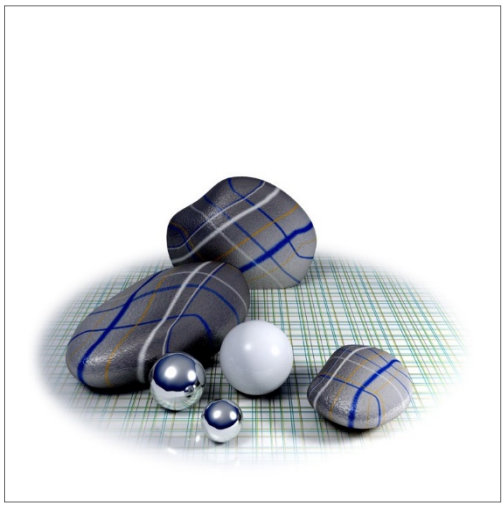
The previous exercise was repeated with the environment changed. To follow the theme of the Wendy Ramshaw exhibition with objects rendered on a stark white background, the environment was removed and a simple white background was created. This background curved up at the back behind the objects. The digital set up was a bit like a photographer's studio table with the effect that the background would be stark white and seem less. It was then decided to place a texture map underneath the object and the green pattern was used which had been developed for other images.

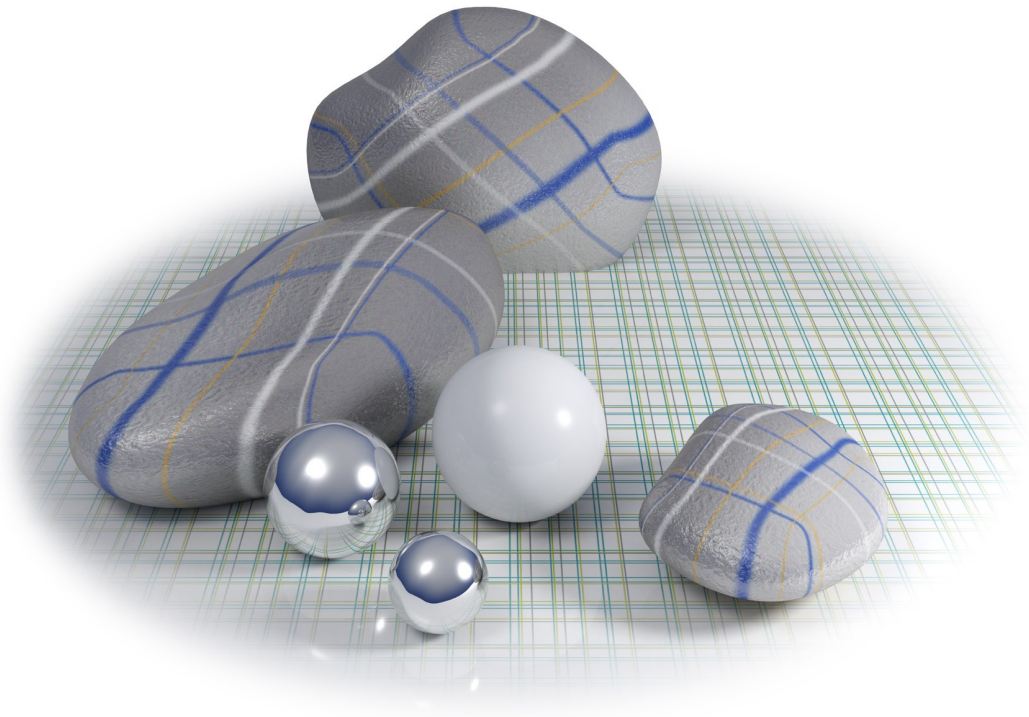
Below Left: An Unwrap UVW map was created from the background and a simple circle of the pattern placed in the area of the map. This would appear to be underneath the objects in the finished render (see Below Right).











Top Right and Left: Initial renders of the Pebbles in their environment and Above Final Render. The lighting and shadow was constantly worked on to achieve a soft feathered shadow.

Glass Pebbles on a Plate

Above: Initial sketch for Pebbles II A Quick Photoshop sketch.
Below: Some research photographs to use as reference.



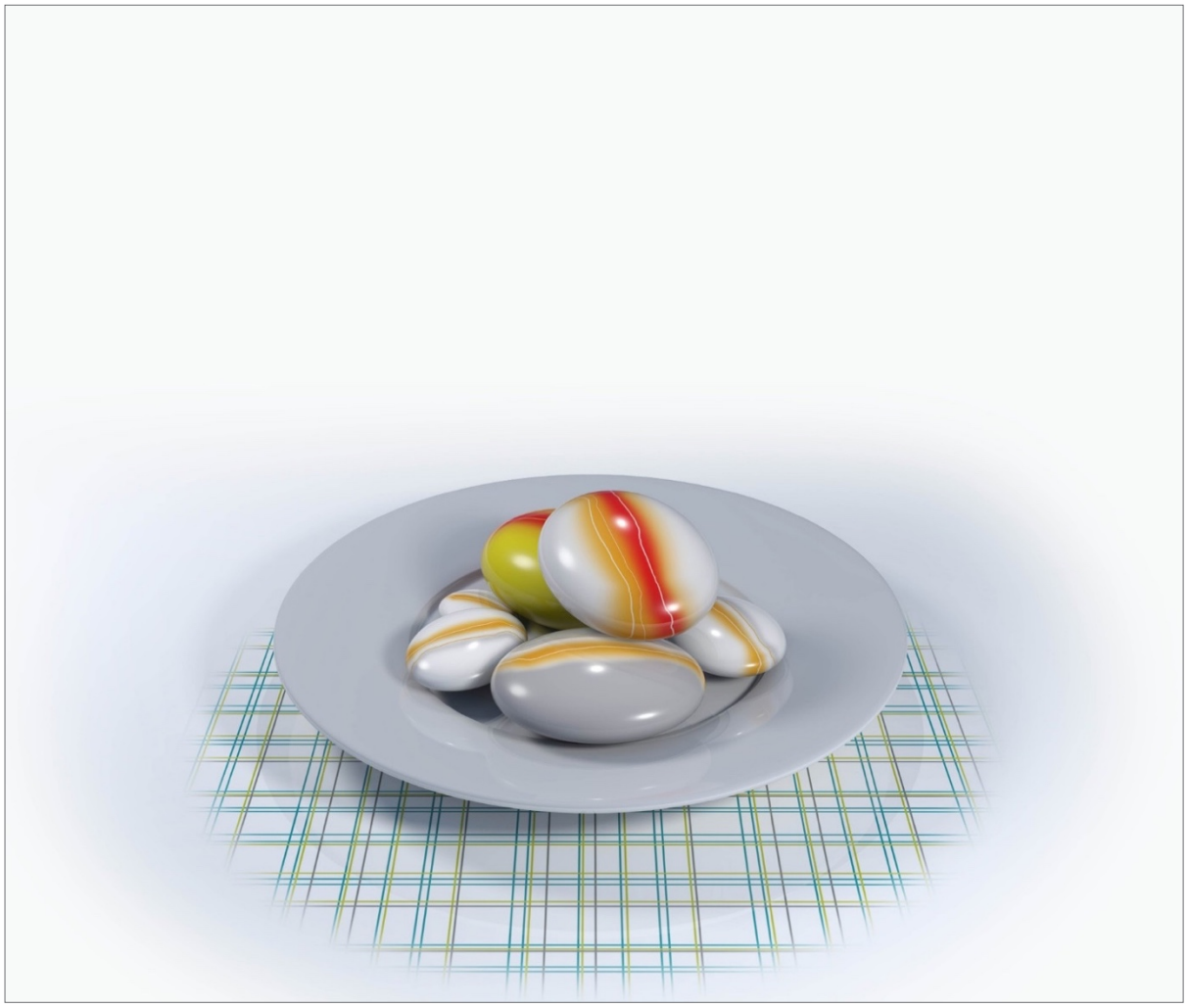

This was an exercise based on decorative glass beads and paperweights used for decoration. Initially a pile of glass pebbles were proposed on a white background but through initial sketch work it was decided that if they were piled up on a plate this would make the scene more real. A plate was created by drawing a cross section of half of a plate using a spline tool and then using the lathe modifier to turn

it into a 3D object. This worked well and initially the plate was given a white ceramic material, which should reflect the objects placed on it. As with previous exercises, the pebbles were developed by starting with a cube object and then producing a template using an Unwrap UVW Modifier. This template was worked on in Photoshop to produce three Maps, which were attached to materials in 3ds max and mapped on to three separate cubes, each with an Unwrap UVW Modifier attached to it. As before the cubes had a Spherify Modifier added to it to change it into a ball.

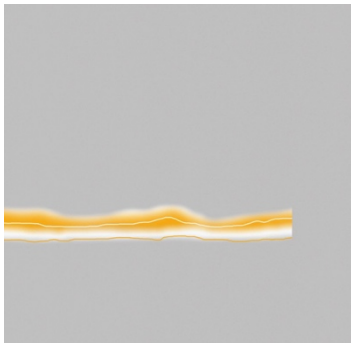
The research showed that these glass beads and pebbles seemed to have a thin coating of clear glass, which was both reflective and refractive. To achieve this some development work was undertaken which resulted in the object been cloned and the clone slightly enlarged using the Scale Tool. This new object was then given a new Glass Material and the effect was that the outer layer of the stone appears to be transparent. Both objects were selected and then grouped together. After which the object was squashed and pulled into a pebble shape using the Scale Tool.

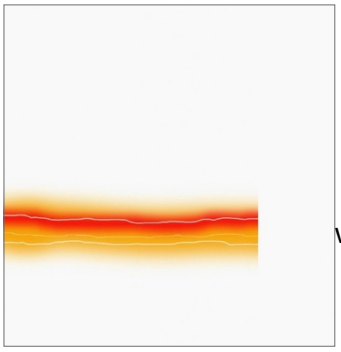
In the final image the white ceramic material used on the plate was replaced by a standard material which was coloured slightly grey. This was also given a reflect/ refract map to make the surface appear reflective.

Above: Second Concept Sketch for Pebbles II
Below: Test renders checking lighting and shadow.



Above: Final Image for Pebbles II





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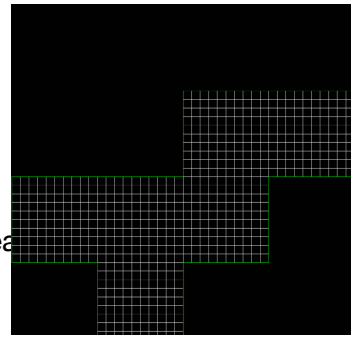
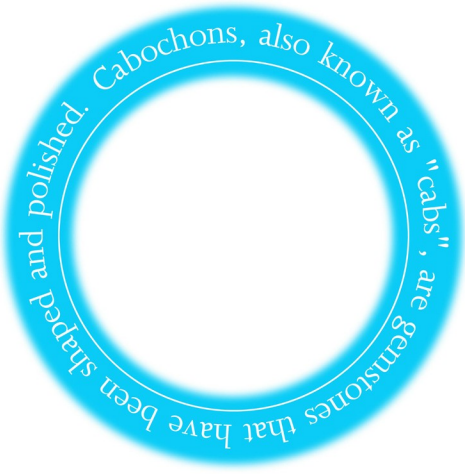


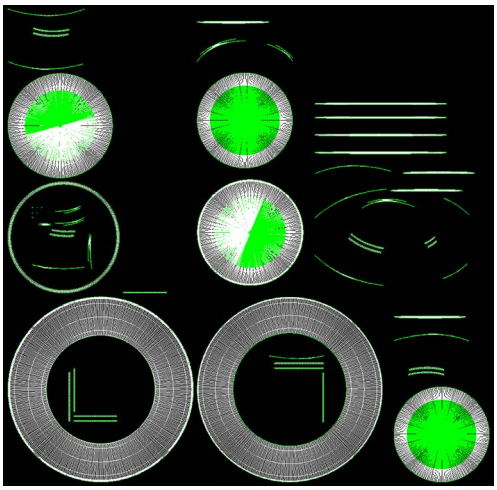
Above: Maps produced in Photoshop to be added to the 3ds max model.

Reworking Glass Pebbles on a Plate

The final image for Glass Pebbles on a Plate was unsatisfactory. The background was too dark and didn't fit in with overall exhibition and so it was decided to re work this image and initially change the plate to white and add some graphics but primarily to remove the glass material from the pebbles. Page 31 shows a test render from 3ds max where the plate was changed to white, which was considered more acceptable.

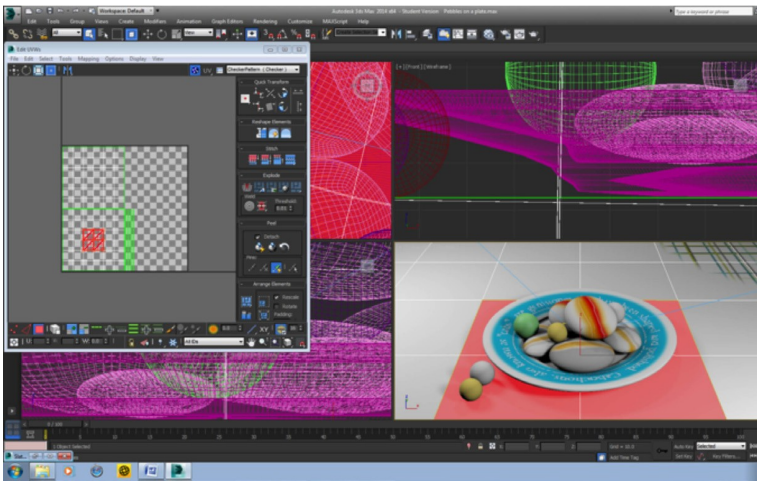
Some time ago initial learning with Photoshop showed the development of the shape tool and text tool to create a ring of text. Photoshop's text tool will automatically link to a path created using the path tool or shape tool. An unwrap UVW modifier was used on the plate object and the map see image bottom right. This is an object with a dense mesh structure and shows just how complex an object's maps can be. The intention through further study is to develop objects using complex maps and work with them to create a sheet of maps in Photoshop or by traditional methods of drawing.

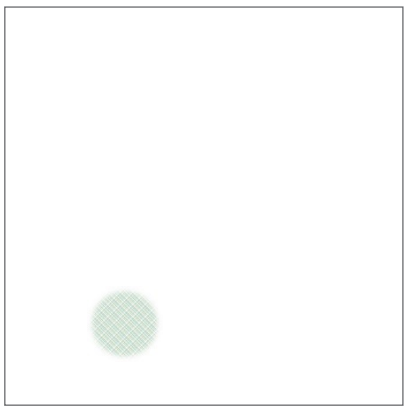




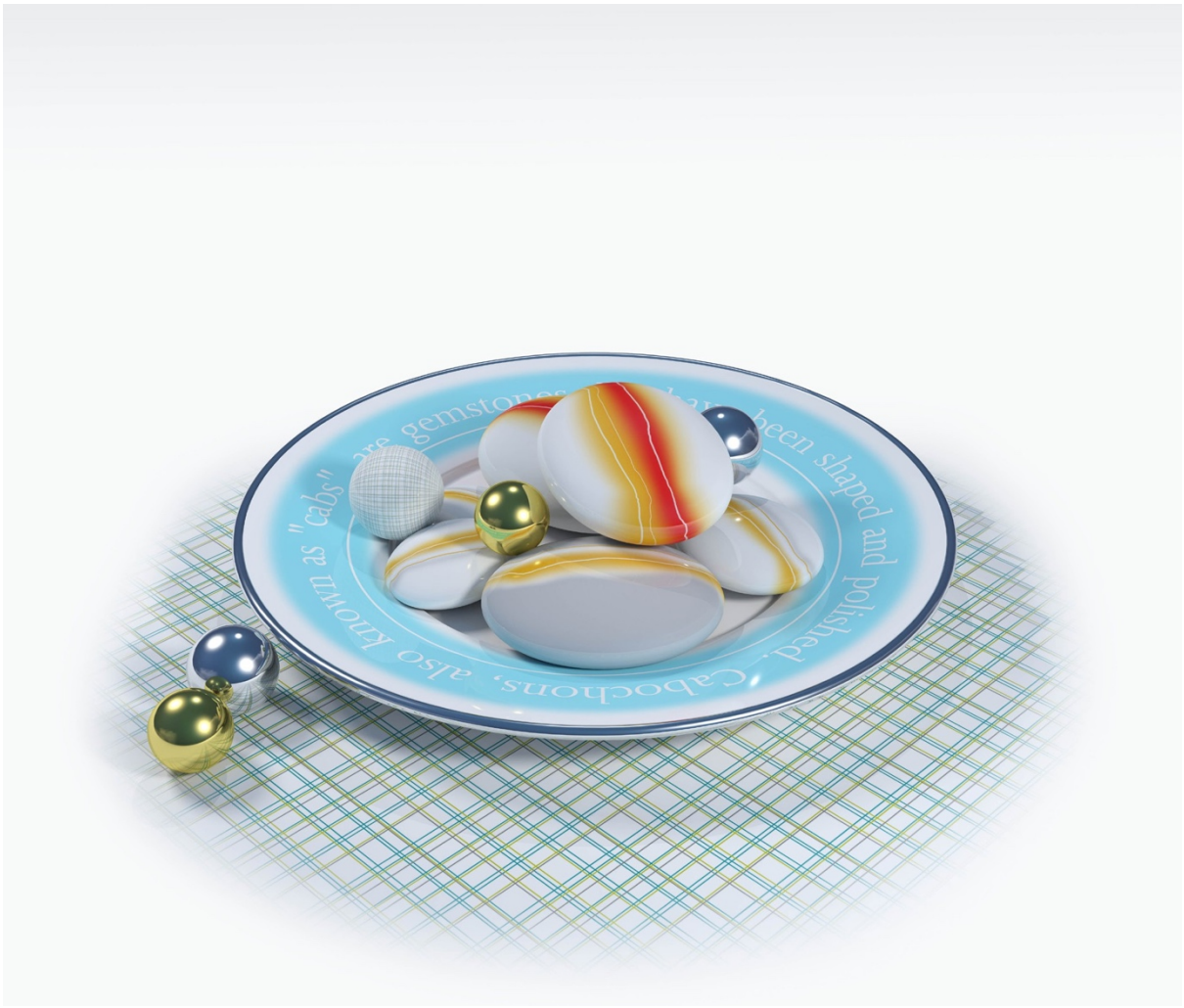
Top Left: Graphic designs for the plate in Photoshop and Top Right: The UVW Map for the plate.

Above: Print screens showing the materials used in the scene





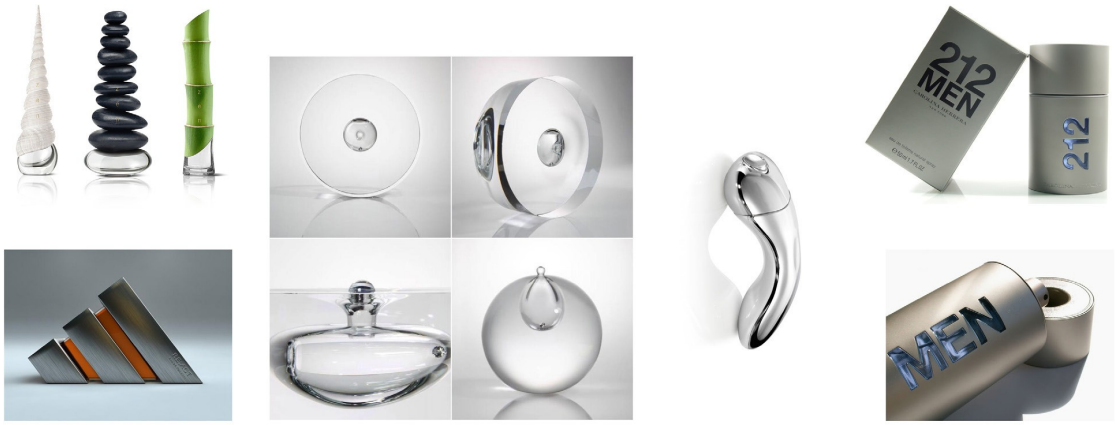
Above Left: The map for the base showing the centre of the top of the box object.
Above Right: The UVW Map created in Photoshop for the base object.

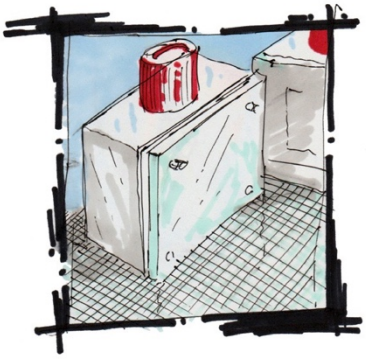


Above: Model reworked and the final image produced.

The Final Image for Exhibition. Consolidation of Learning
The Brief

Looking at the array of design work for after shave and perfume bottle as an inspiration for a project. Below shows some ideas by established designers. So the brief here is to produce a piece of work using the pattern developed earlier and lots of reflective and refractive materials. Again a high resolution image would be produced primarily of exhibition quality at least a meter square.

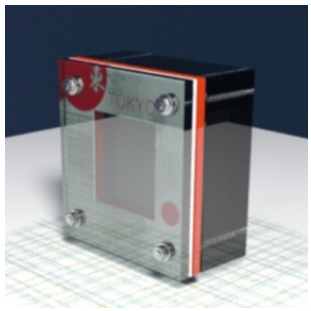


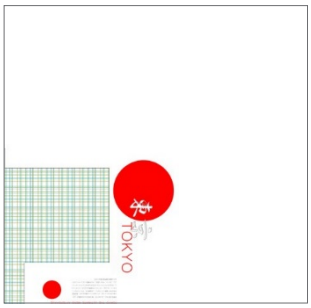


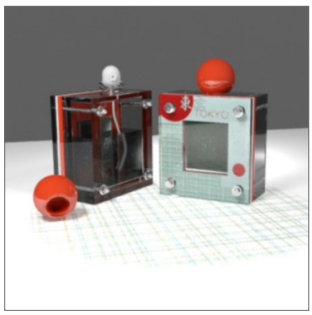
Right: Quick sketch for bottle design. The design was used just to develop patterns and materials in 3ds max.

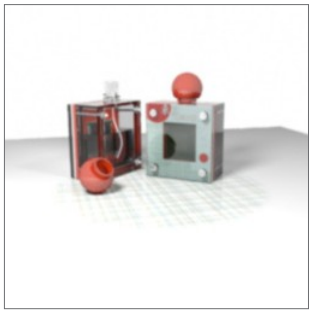
The design chosen was more for a practical investigation rather than an aesthetic one. It included glass, Perspex and water to explore the development of refraction ie light passing through a transparent object. A theme of Tokyo and Japan was used for no apparent reason it just set a theme for the graphic panel which would be sandwiched between the green glass of the print and the Perspex block which made up the main body of the object. Other materials used would be shiny plastic and chrome just to develop some reflections. So this is a bit of a Heath Robinson design with no real style and just as an exercise a mock up model in Perspex and card was created. This would help to assess the quality of the digital model against

the real model. Again the model was arranged in an environment and the lighting was changed and developed to obtain the best lighting effects

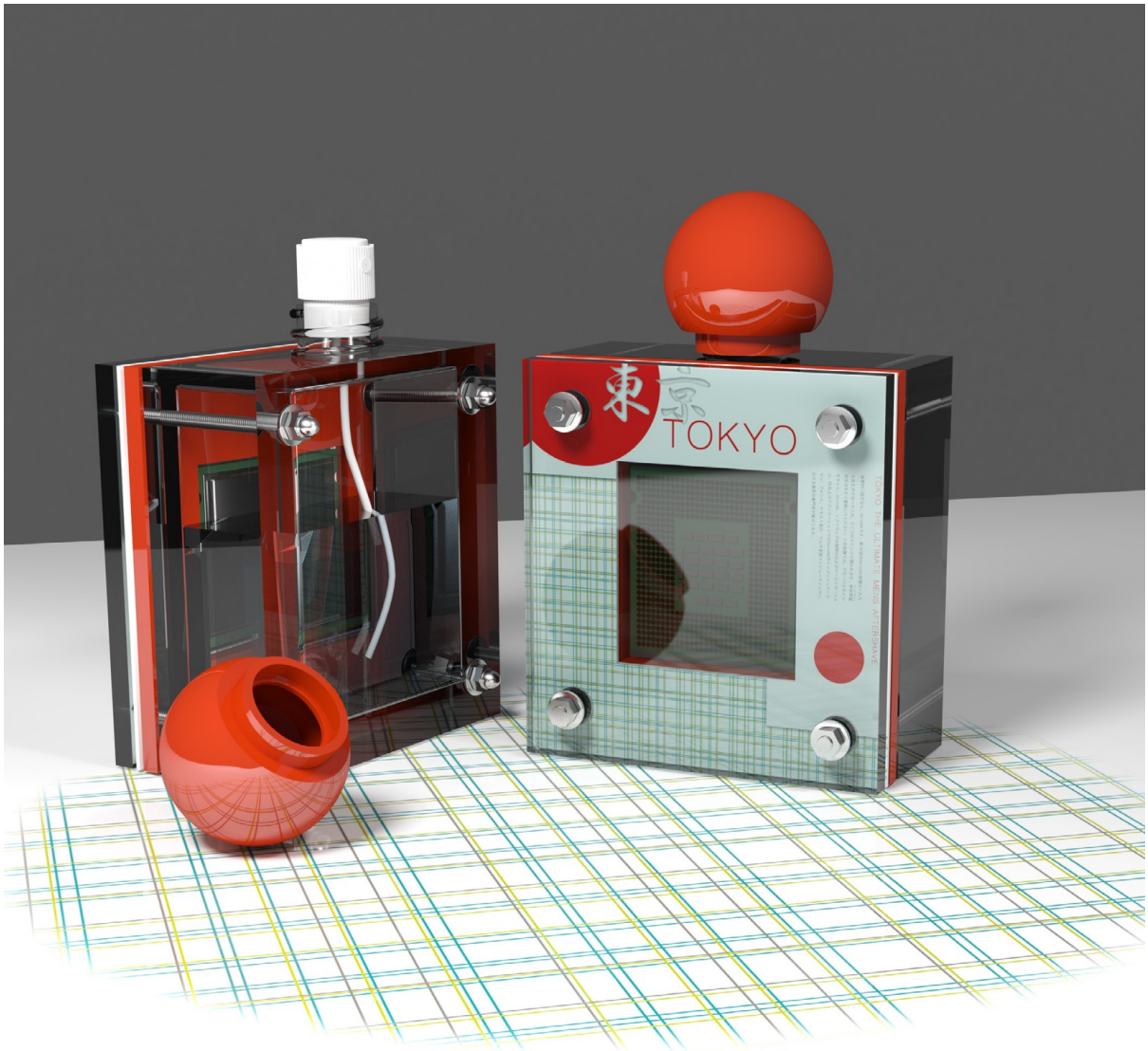






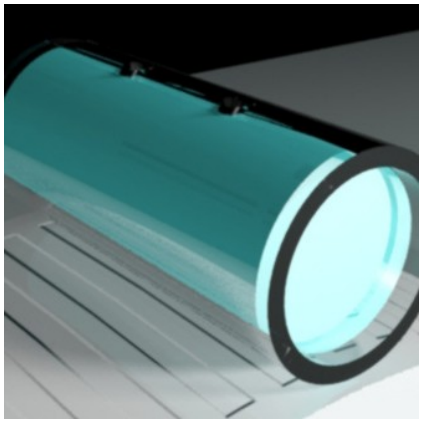



Above: Test renders for the bottle case exploring lighting and detail. The top Right shows the map for the bottle lable.



Above: Final render for exhibition.

Part Three: The Development of Drawing Work to Use as Bump Map Images which create Relief and Texture in 3D Models.



Research shows that texture can be added to a material by creating a black and white pattern and connecting it to the bump node of a standard material. 3ds max does this by taking everything which is black in the map and recessing it on the surface of the material. It's a method of adding texture without using a complex mesh object.

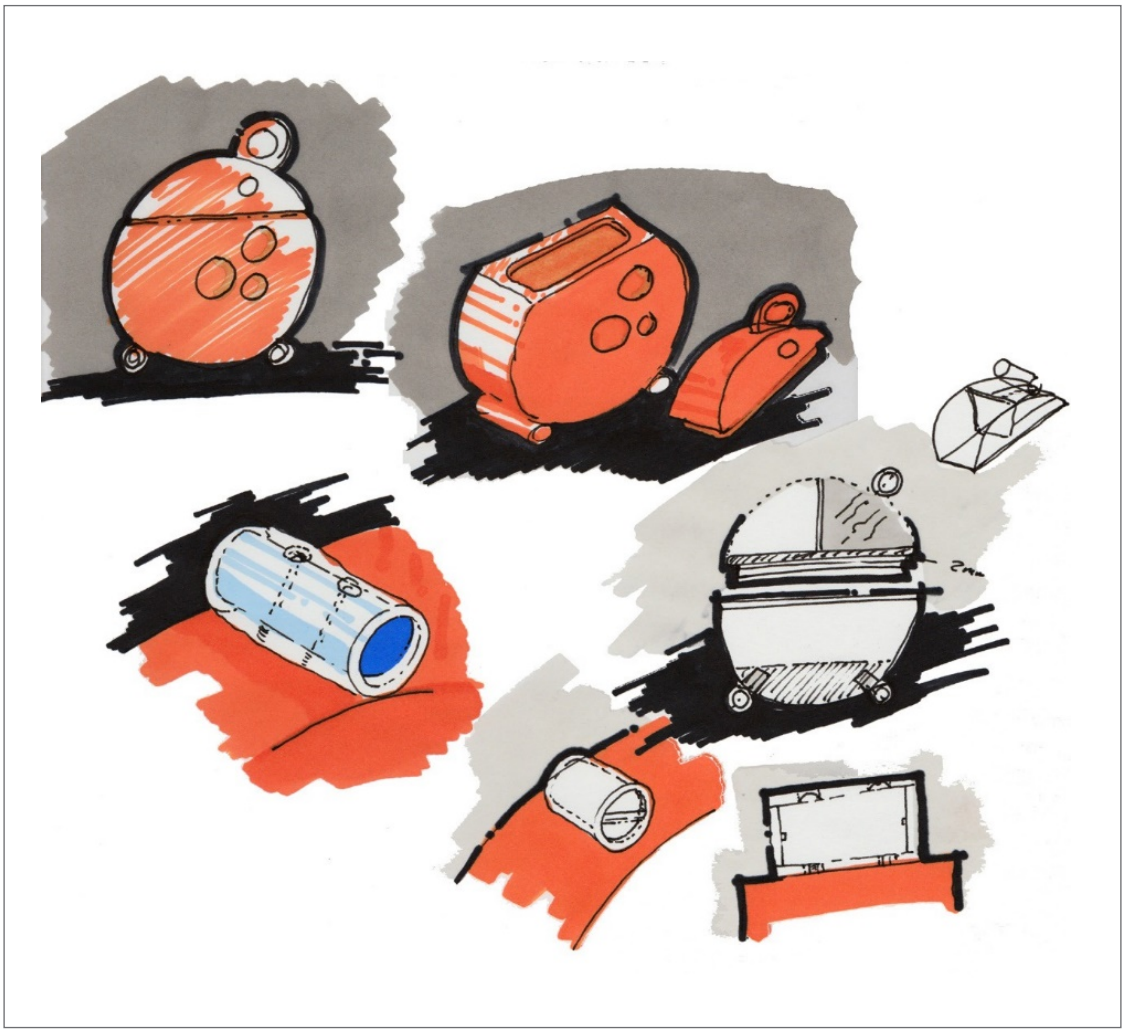
creating a black and white map to a specific design should allow for the development of specific embossed patterns in an object so a project to work specifically with bump papa was created.

Left: Clarice Cliff Autumn Crocus Bon Jour preserve pot 1930 Used as a starting point for this exercise.

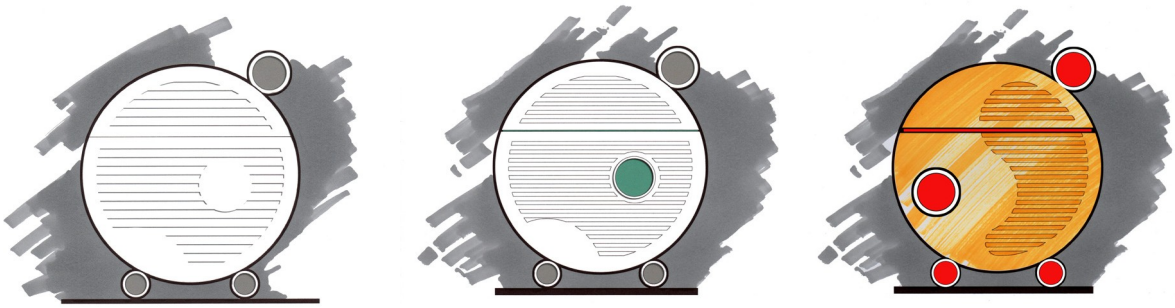
Inspired by a Clarice Cliff pot which was probably a preserve pot, a design for a little pot was created which would have an embossed 1930s Art Deco feel to it. The intention was to add detail which would use transparent and reflective materials in the design but mainly to create a beautiful little object. Primarily here the design work would be taken from the CGI model to build a finished object in the workshop working from the original drawing work. An interview with designer Jonathan Ive stated that design education is relying more and more on computer aided design rather than work shop based hands on 3D development. This Ives says is down to cost and space as Universities see computers as relatively in expensive in comparison to workshops and 3D prototyping.

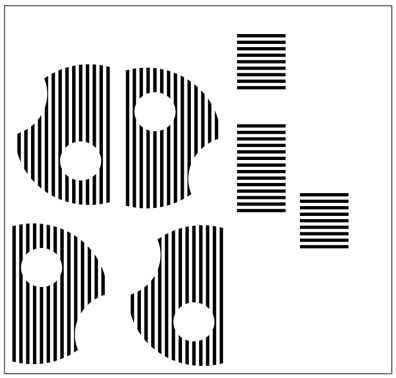
Design education is tragic. Dezeen Nov 2014
www.dezeen.com. Jonathan Ives.

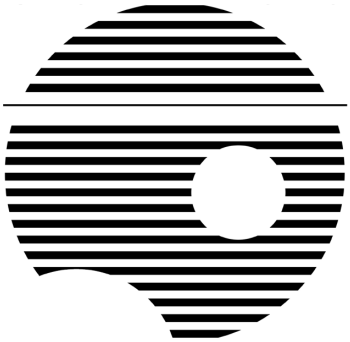
The shape of the object was dictated to by the original Claris Cliff pot and its distinctive cylindrical feet and handle. Some initial sketch work was undertaken to explore the idea and at this point it was decided to investigate Art Deco images to add the relief to the object. At this point the front elevation of the object was created in Photoshop and five proposals developed. One proposal was chosen to take further and develop into a 3D digital model in 3ds max. A black and white map was created to represent the relief which was to be added to the front of the digital mode. The model was created and from the components an Unwrap UVW modifier was developed. This was taken into Photoshop and the black and white maps produced.



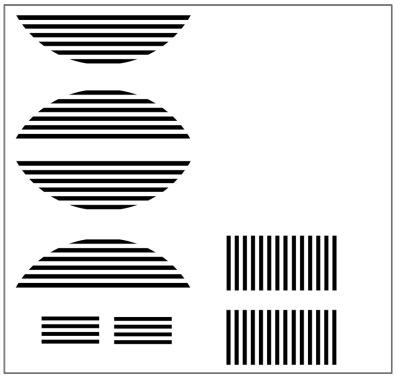
Above: Initial marker pen sketches created to explore the initial design.



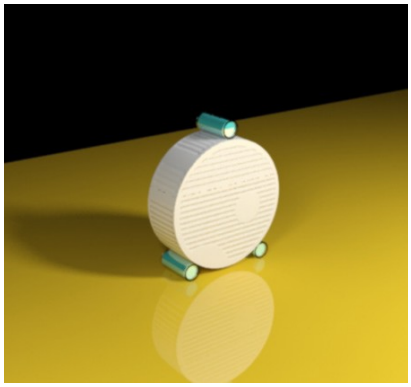


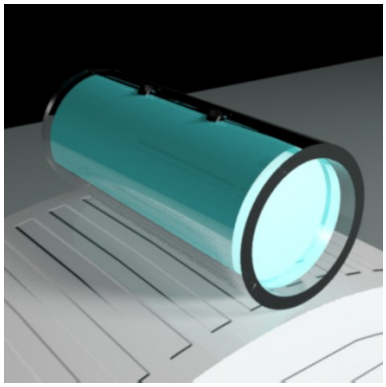


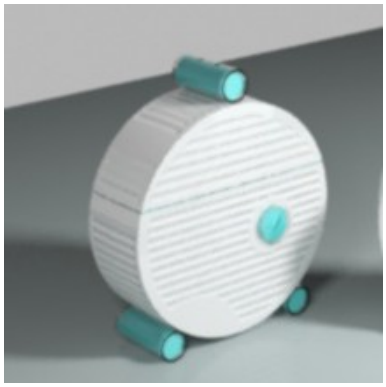
Above: veloping the digital model.



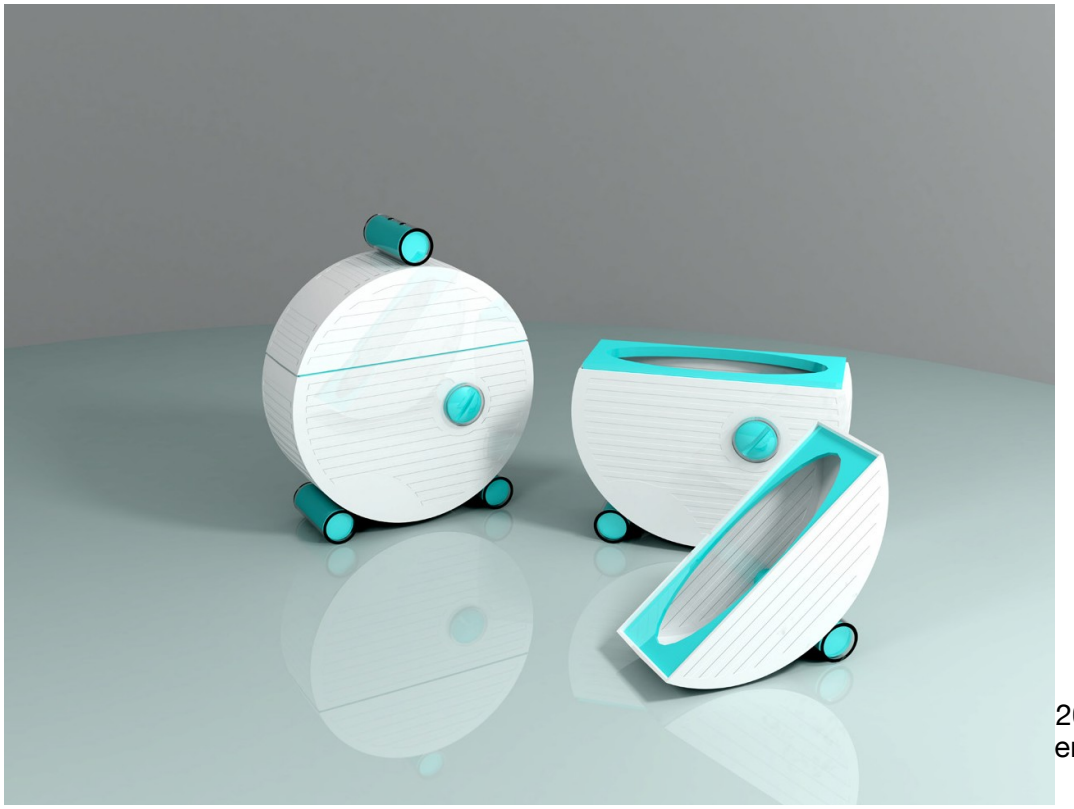
Left and above: The Unwrap UVW modifier produces a template for the development of precise bump maps to add to the material on the object and the final black and white maps. NOTE to keep the quality and sharp less of the image the size of the initial maps are increased from 27cm to 270cm.





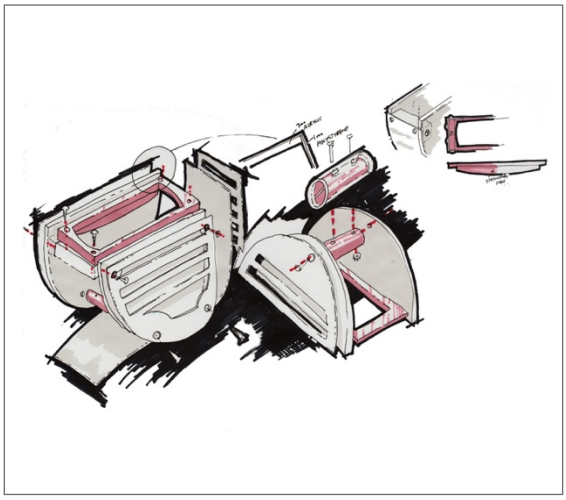


Above: Initial test model created in 3ds max quickly to explore the possibility of developing the bump map onto the surface of the model.



Above: Test render exploring the colour of the object.

Above: Final Image



Left: Sketch for proposed model which was never realised.
Sketch work developing a method of constructing the finished pot.

Materials proposed to be used would be primarily Perspex and plasticard (polystyrene sheet) with the relief design cut out of plastic using a laser cutter.

Design Education is Tragic

Apple's head designer Jonathan Ive says he struggles to hire young staff as schools are failing to teach them how to make products.

Speaking at London's Design Museum last night, Jonathan Ive attacked design schools for failing to teach students how to make physical products and relying too heavily on "cheap" computers.

"So many of the designers that we interview don't know how to make stuff, because workshops in design schools are expensive and computers are cheaper," said Ive.

"That's just tragic, that you can spend four years of your life studying the design of three dimensional objects and not make one."

Ive, who is Apple's senior vice president of design, said that students were being taught to use computer programs to make renderings that could "make a dreadful design look really palatable".

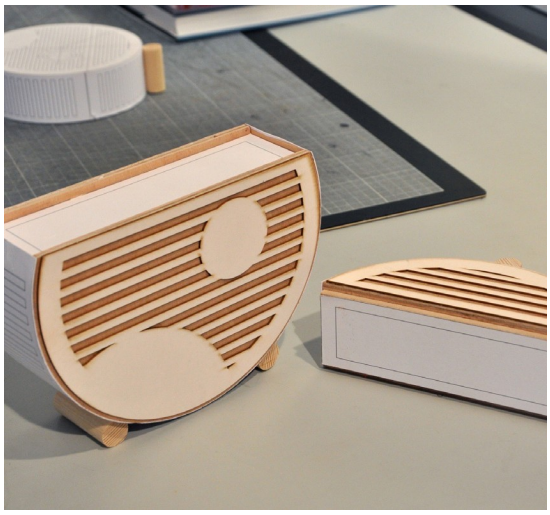
'Design education is tragic'. Dezeen Nov 2014 www.dezeen.com. Jonathan Ives.

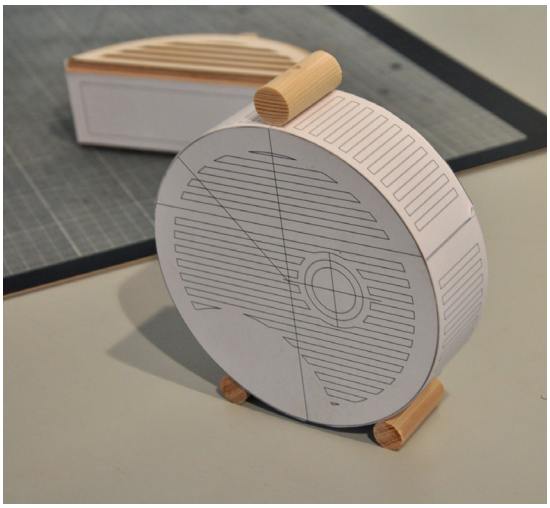
Right: Jonathan Ive Senior Vice President of Design, Apple INC

Card and Wood Sketch Model.

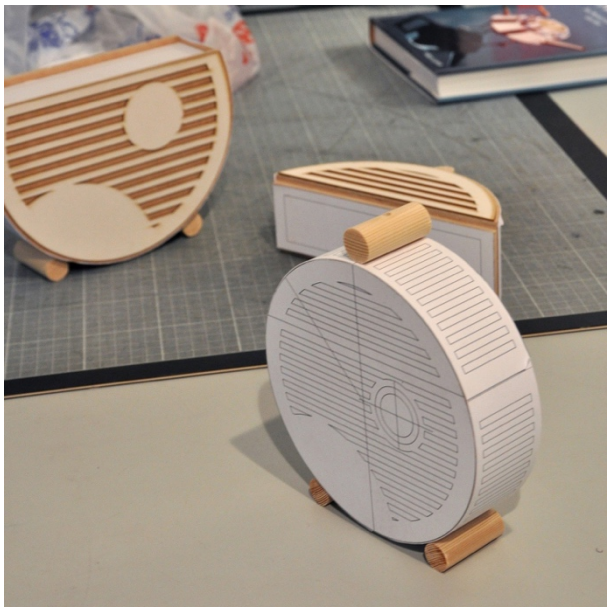
Following the article by Ive's which I agree with, it was decided that a card and wood model would be created to explore the size and shape of the pot further. Past experience has always taught that this is the correct way to develop ideas through the design process. However it is tempting these days to skip this area of development and to rely on the digital model which in a lot of ways can be quite seductive. In this exercise the scale of the object, when produced as a sketch model seemed wrong. It was re drawn and scaled down a little and re evaluated. The proportions seemed more acceptable if they were a little fatter in the body and a little smaller in the circumference of the circle.

It is very easy to be seduced by the quick slick renderings produced by 3D software, once you get the hang of it. This exercise proved that a return to the traditional ways of developing an idea need to be looked at. At this stage this research was to be returned to at a future time and the project was halted at this point.





Above: The initial sketch model from the CAD design work. The grill is cut using the original CAD drawing using the Laser Cutter.
Above Right & Right: Further models are developed to evaluate the design.

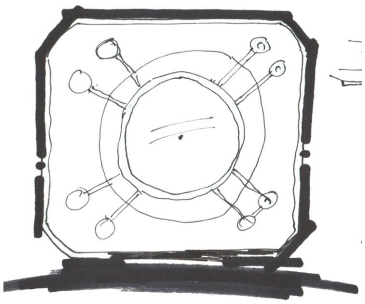


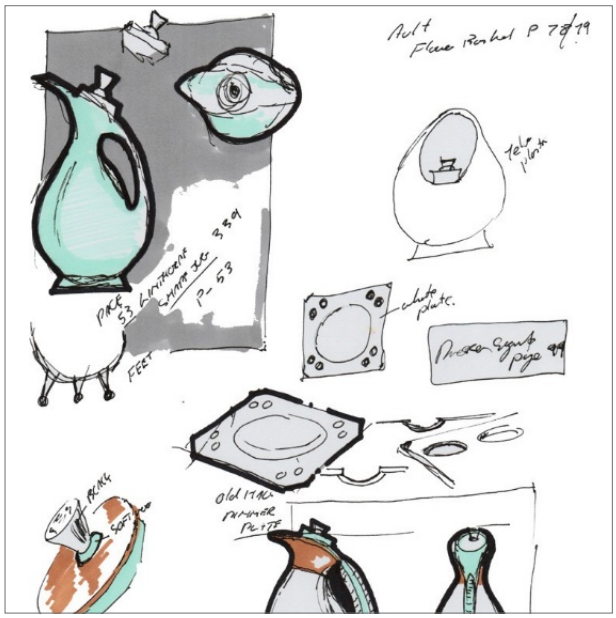
Further Design Exploration Inspired by Christopher Dresser

As an exercise in design using bump map as part of the overall design it was decided to explore the work of Victorian Artist Christopher Dresser. Dressers work is often imitated as is shown with the image bottom right of the sugar bowl re produced in plastic by Alessi in the 1980s.

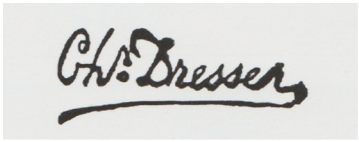
Here Dressers design for a plate for Old Hall Potteries in 1885 has been used. The design is brought up to date and the intention would be to manufacture this as a two shot plastic moulding.

Top Middle & Right: Old Hall Potteries China Ware Christopher Dresser 1885.
Top Right : Sugar bowl by Christopher Dresser reproduced by Alessi in Italy in 1985.



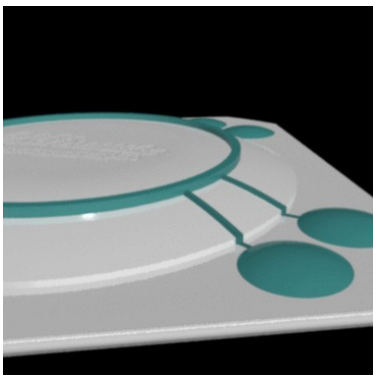


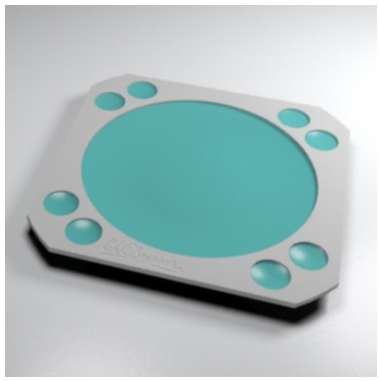
Above and Right: Sketch work exploring a number of Dressers designs for jugs, plates and such.



Left: Dressers signature which would be used in the design as a relief cut into the final design

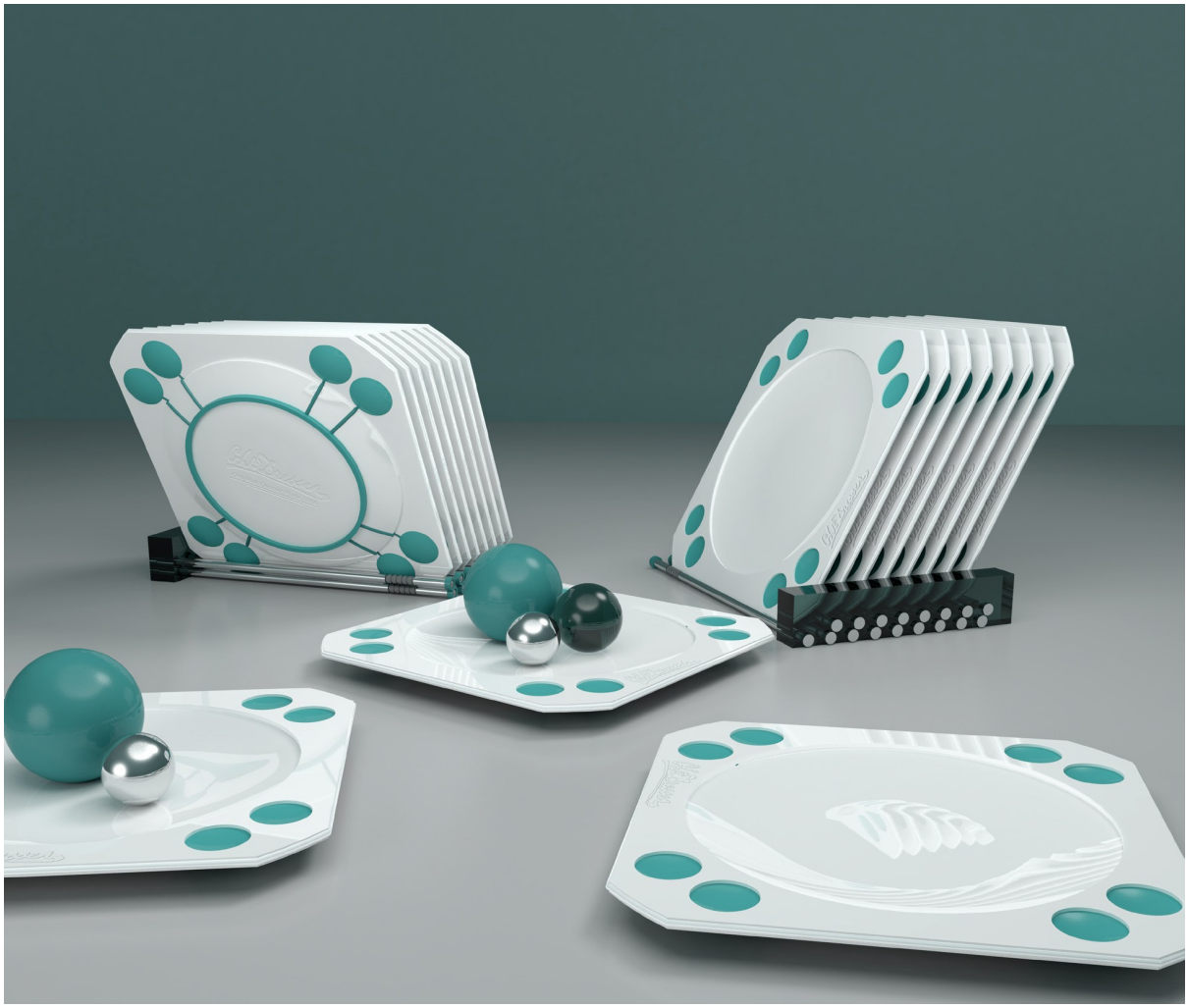
Source: Lyons, H. (2005), Christopher Dresser, Antique Collectors Club.





Above:Test low resolution renders for the plate. A bump map was used which was developed from Christopher Dressers signature.
(see top of page) and added to the edge and the base of the plate.

Page 48: Finished render for Christopher Dresser Plates. They are designed to stack into a support made from stainless steed rod and acrylic. This looks good in the image but without development in 3D in the workshop there is no real evidence that it would work.



Left: Final Image for Transparent Object III Sphere. Based on Wave Form Bowl by Christopher Dresser 1880.

Working on from the work and research influenced by Christopher Dresser in the previous chapter, this object became the inspiration for the ‘Transparent Objects’ series of images in the final chapter.

The Journey

The Journey: Tony Shaw Rese

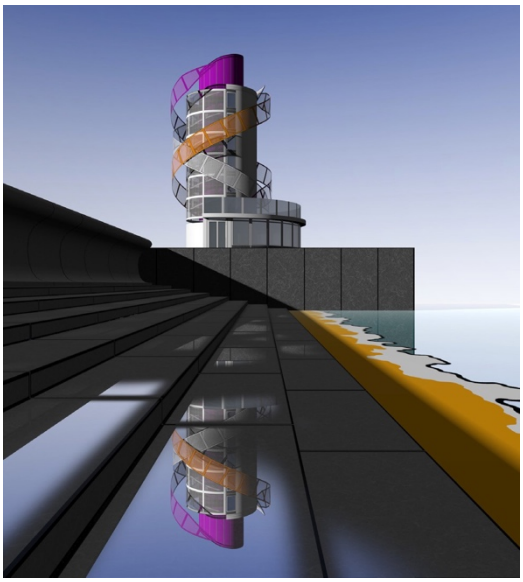
A Practical Investigation into the Development of Pattern and Texture for Use in 3D Models

Part Four A Conclusion: The Development of Work for Exhibition Using Transparency and Reflection.

A Conclusion: The Development of Work for Exhibition Using Transparency and Reflection.

Floating Objects Project

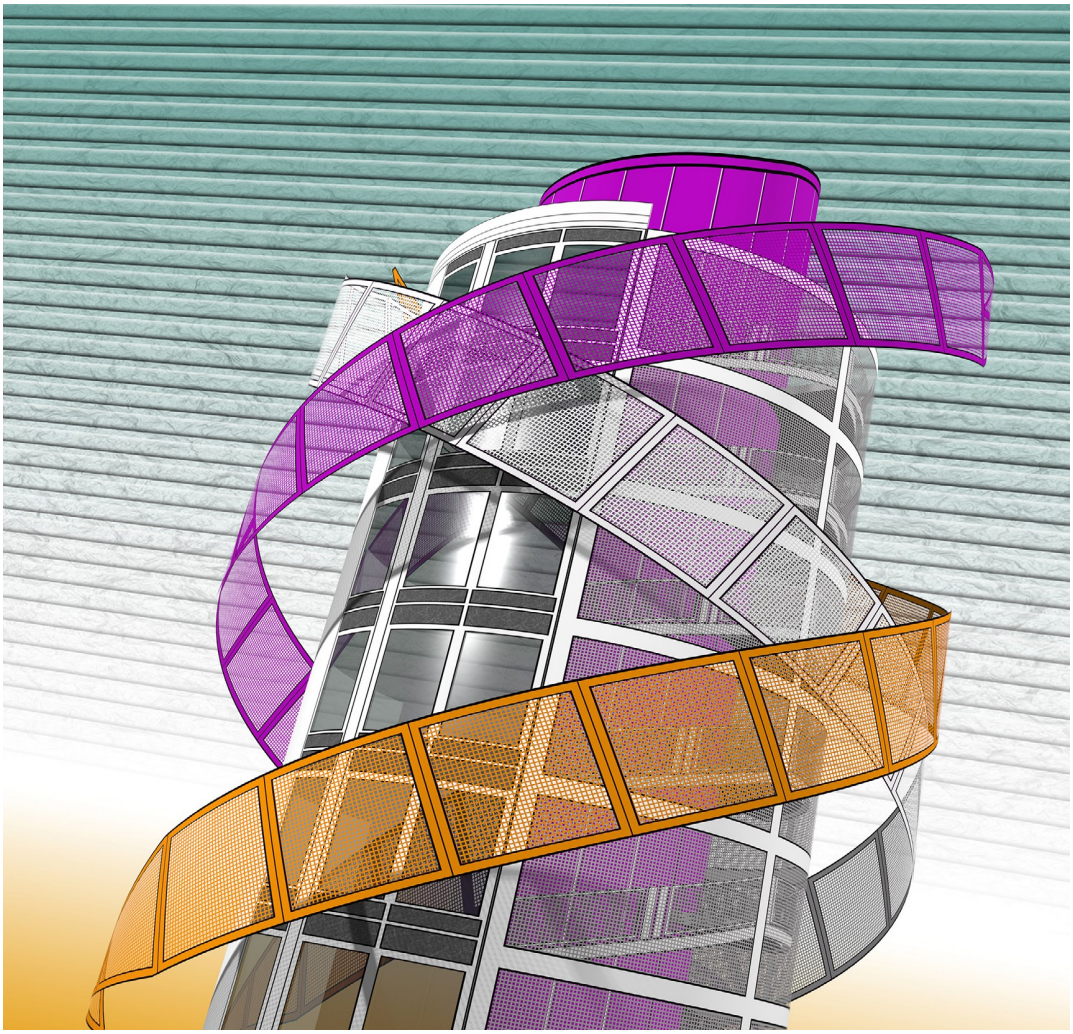
Through the initial work such as the pebbles on a plate and the rings and balls work was very crisp and sterile. This is fine for presentation drawings for objects such as the work for St Ives Pot but I wanted to produce work for the gallery which contained a more spontaneous element. The work must demonstrate the learning which has taken place through the last three years but must have a more appealing 'handmade' dynamic.



Right: Redcar Beacon in a landscape. The reflective puddles on the steps were created using black and white maps mapped to the Materials Transparency Slot using the addition of a Ray Traced Material.

Through previous research I had developed a method of producing paper thin graphics with transparent elements in them. I used this to create the images of the Redcar Beacon and explored some works based on the work of Lichtenstein. I now wanted to create images where the use of traditional media such as watercolour or ink would be used to create the initial work which would be mapped on to the simple models which would be created. This exercise would also use the development of reflective surfaces where specific areas were developed to be

reflective this was done by again developing black and white maps to be linked to a single material map.

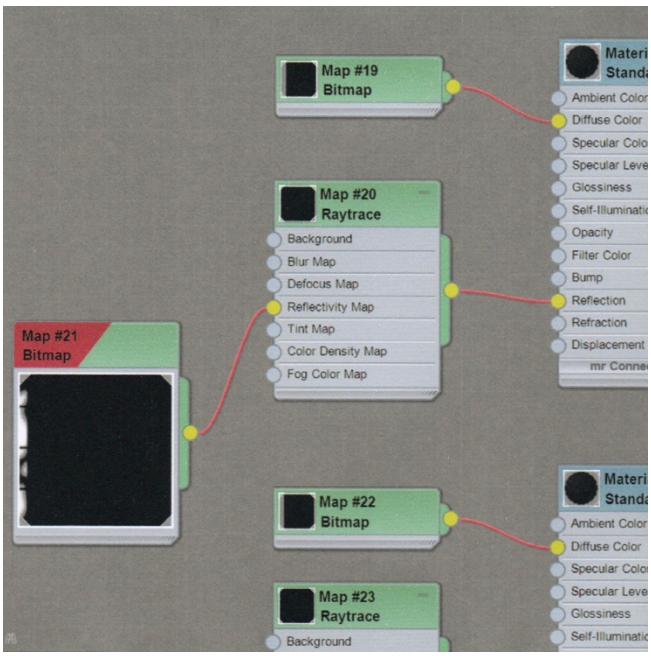


Above: The first image of the Redcar Beacon, produced using transparency maps. The mesh of the panels and the cut away windows was created using a black and white image mapped to the materials transparency slot.

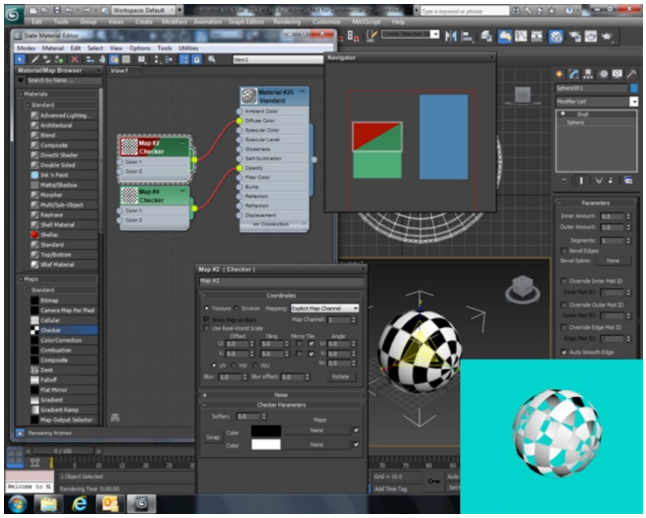
In the material editor the standard material has a series of slots or nodes to which you can link other materials or images. Depending on the slot determines how the image is used. Black and white images when linked to the bump map mode will give the effect of embossed or textured surfaces. Transparent objects work by the Diffuse Colour slot linking to the colour or image which is produced in Photoshop and the Opacity slot being linked to the black and white image. Areas which are black will appear transparent and these images must be developed together in

Photoshop to produce files which are the same size. For complex objects the object modifier Unwrap UVW is used to provide a template for use in Photoshop.

The intermittent reflection is developed by adding another layer to the materials. A Raytraced Material is connected to the Reflective slot on a standard material. A black and white image is then connected to the Reflective slot in the Raytraced material. The image can be mapped to the original standard material through its Diffuse Colour slot.



Left: This is the material created for the reflective pools in the image on page 49.It shows the texture of the stone as a Bitmap connected to the Diffuse Colour slot. The reflection which is just visible as a black and white bitmap on the left is connected to a Reflectivity slot on a Raytrace material which is in turn connected to the Reflection slot on the Standard Material.



Right: The Standard Material has the Chequered Map attached to the Diffuse Colour slot. A further black and white Chequered Map is attached to the Reflection slot of the Standard Material.

The Transparent Objects Project

The proposal grew from a number of quick sketches, developed with the intention of developing the learning which had taken place so far. These series of images would be explored as floating/transparent objects suspended in front of a backdrop. This should give the chance to develop some shadow and reflection of some simple objects.

From the initial sketches some further detailed sketches were undertaken as development drawing to see if these ideas would work visually.

Above Left and Right: The Development sketches for Floating Object 1

Initial work

It was decided to produce abstract ink brush strokes and washes as a starting point for the proposed four illustrations. The initial traditional work was fine but the temptation to put these images into Photoshop to enhance them was too great. The brush strokes were scanned into Photoshop and initially the black was enhanced and the grey in the background was taken out to ‘clean up the image. This could then be used to add colour to produce images to be mapped on to the surface of the digital model. The individual images produced were quite exciting and had the feel of a traditional screen print. However the ink wash images were discarded as just not good enough at first but when scanned into the computer and worked on

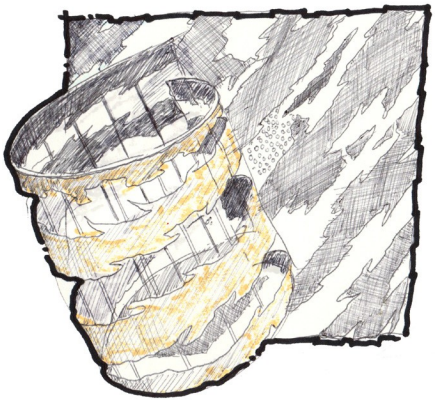
using Photoshop the results were exciting and it was decided to use these images over the paint brush images for the first illustration. Initially two images were produced to map onto the digital models.

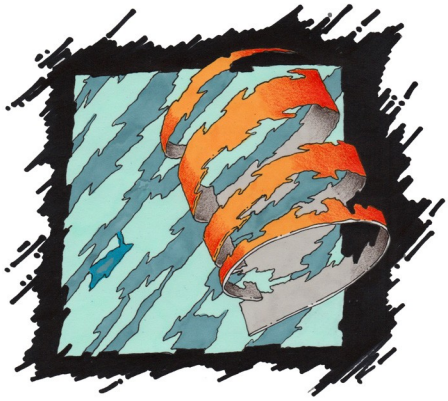
Above Left;:Initial ink wash created using ink on wet water colour paper.
Above Right: After the original image was scanned into Photoshop the resulting image would be used as a ‘Material Map’ for ‘Transparent Objects’ Images.

Transparent Object 1: Cylinder.

The model consisted of just a cylinder object with a square object created as a background contrast as developed in the initial detailed sketch work.

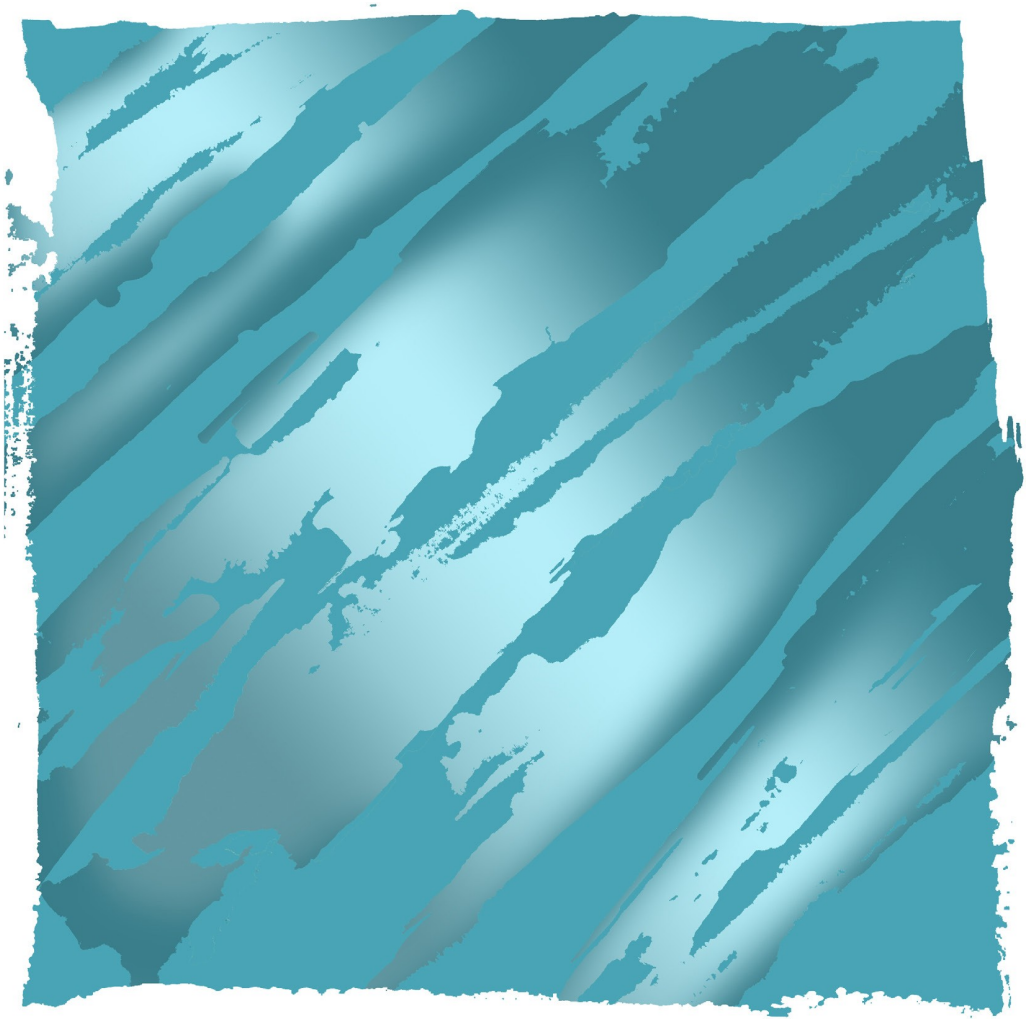
Below: Initial sketch work for Transparent Objects 1: Cylinder





UVW Maps were produced for the cylinder and the square in this first image and then worked on in Photoshop See (UVW maps). Many test renders were produced at a low resolution which works as sketch development within 3ds max until the

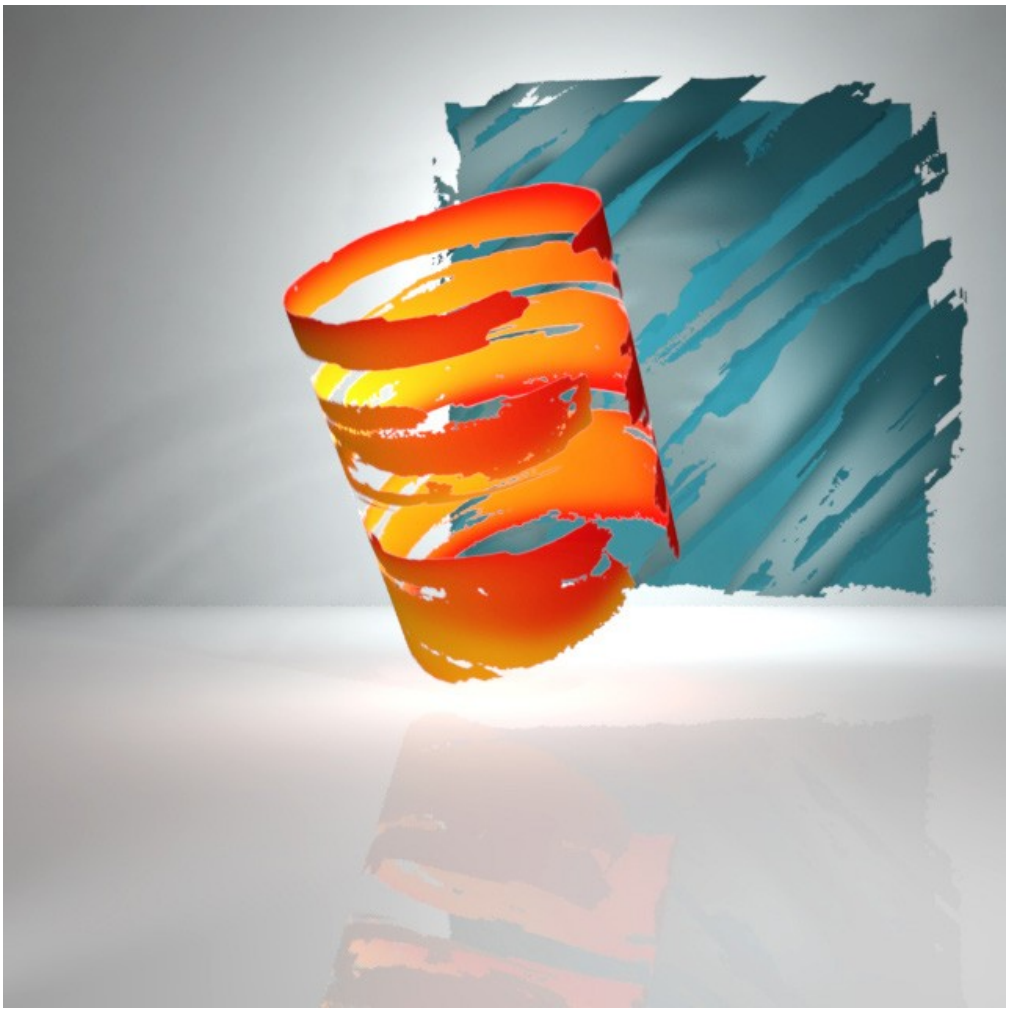
decision that the image was acceptable. At this point a final high resolution 5000 dpi by 5000 dpi image was rendered. The finished render when saved as a 300 dpi Tiff file would produce a large scale final image which is just under half a meter square. This included a high quality reflective setting and a high final gather, which meant that the total render time was over nine hours.



Above: Background developed in Photoshop from the original ink wash image.

The finished image was too fussy. Again the concept here was to produce crisp clean simple images using the technology sparingly to enhance the original ‘screen print work’. It was decided that the overall grey background was too dark. The initial sketch work showed a stark white background with the introduction of a square object to

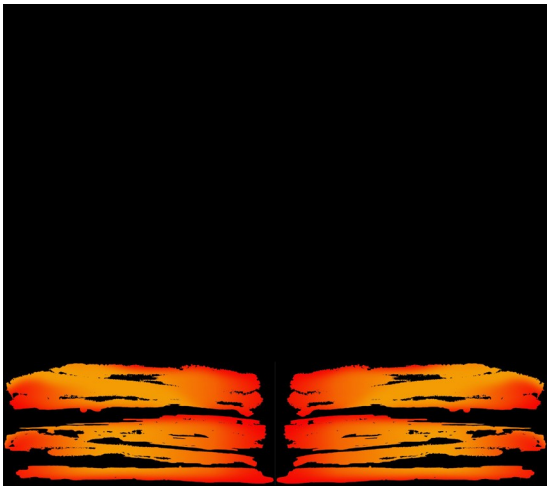
create a false background behind the object, which would show up the shadow cast by the floating object. Although interesting this complex background detracted from the initial concept. It also proved difficult to light so it was removed leaving the original scene background. This always shows up as white space with no light or shadow. The pattern developed for the square object looked exciting as a piece on its own but I felt it over complicated the scene so this was simplified to a plain image which was given a torn edge detail, again using Photoshop.



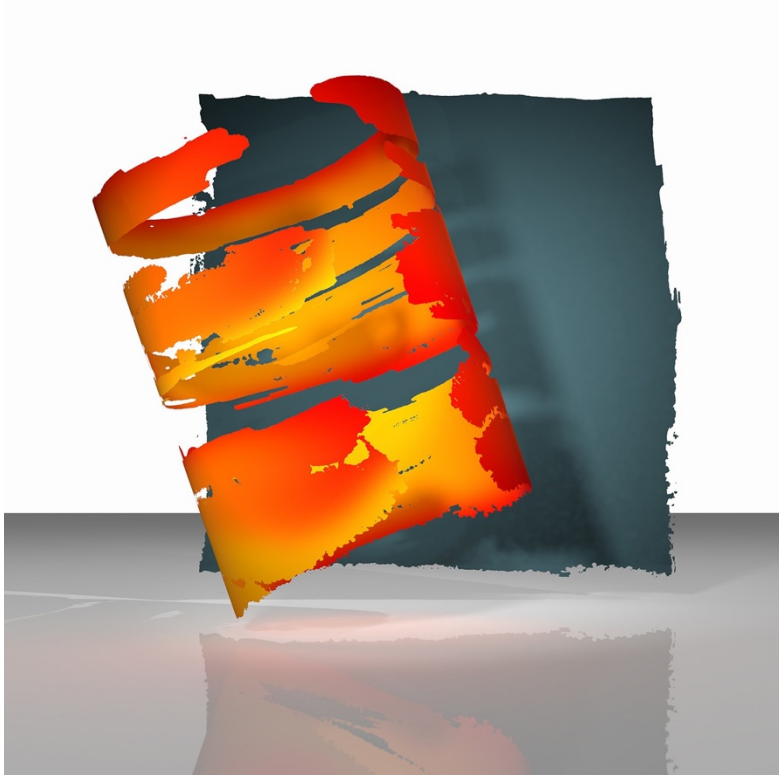
Above: A more detailed initial render using the correct Material Maps which are shown on the facing page.

Again here the objects were created using a series of Unwrap UVW maps, which were connected to the material map of the object at the Opacity and Diffuse Colour nodes. Using an Unwrap UVW modifier for each simple square object in the stack before any bending of forming is done allowing for the effect to work.

There is a lot of time invested in working and reworking an image using low resolution test renders to get the affect wanted for the image. At this point two extra glass objects were introduced just to see what would happen. This is the temptation to over complicate an image just because you can and it had to be remembered that simplicity is the key to this series of images.



Left: The colour map for the Cylinder Object which is developed on the facing page.



Above: The final proposal high resolution render for Cylinder Object.

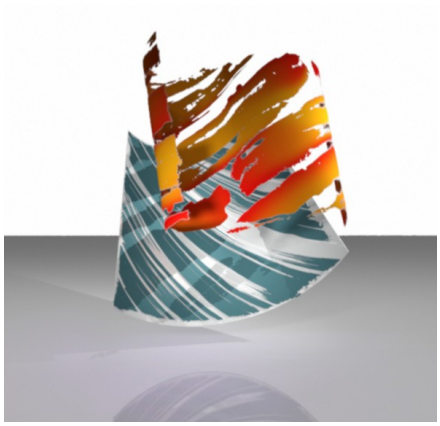
Above: The temptation to over complicate an image just because you can. Glass material was added to the objects to see what it would be like but it was considered that it over complicate the image.

The three other objects were developed using the same background and lighting. This included a ‘Wave’ object using a ‘Bend’ Modifier. Here two separate ‘Bend Modifiers’ were used in the ‘Modifier Stack’ to create the alternative bends. This was something I had not achieved before. The use of the textured background again detracted from the overall image and so this was simplified and a plain white but reflective background was used for this image

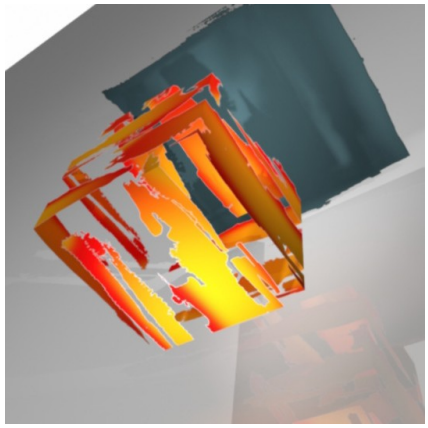
The Spherical Object undertook the same process of development, changing the background and lighting to gain the best effect. Here the initial map had issues and white edges showed up around the map. The map was re done and all the white background was taken out and the map drawn after the black and white transparency map was created. The resulting image is not too good but it worked better.

The final and most complicated image was the Cube Object which has a ‘Spheriphy’ Modifier added to it rather like the Pebble Objects from the previous chapters. This looked like a flattened sphere. The Cube Object again has its

modifiers added after the Texture Map is applied. It is not possible to add this texture to a sphere object and get the same effect. After the Spherify Modifier is used to turn it into a sphere it is then converted to a Mesh object so that it can be squashed into the desired shape. The original intention was to manipulate the object to resemble the abstract shape of a pebble but initial tests proved again over complex and detracted from the original shape.



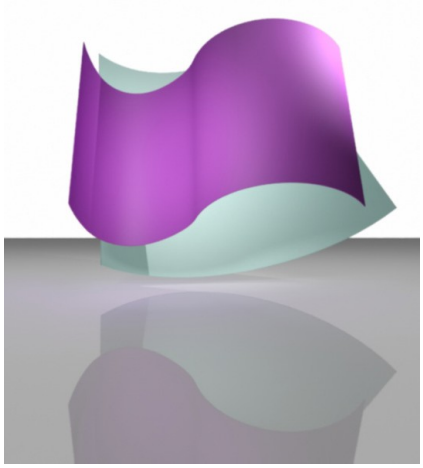
Top Left: The initial low resolution render for Wave Object and Top Right: The final image after the background was simplified.



A tion render for Sphere Object and Above Right:an ir t. The material Maps are not working correctly as th them

Technical Notes and a Conclusion

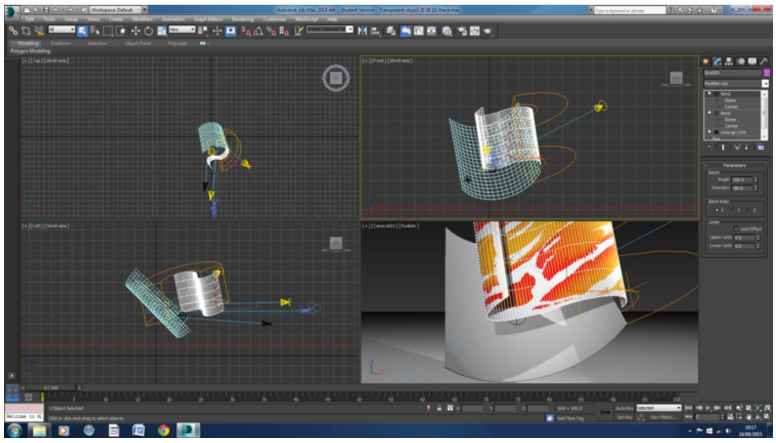
Generating objects with transparent elements is something that has been developed through this series of images. To get the required effect isn't easy and the 'recipe' for achieving this needs to be recorded. A great deal of re learning has taken place here from previous exercises to achieve the effect.



Firstly the object has been kept simple to a square or sphere. This was because I still need to explore more complex objects and to understand how to work with complex UVW Maps. To see the inside of the object properly a mirror image of the pattern or texture has to be created in Photoshop as seen in the final images.

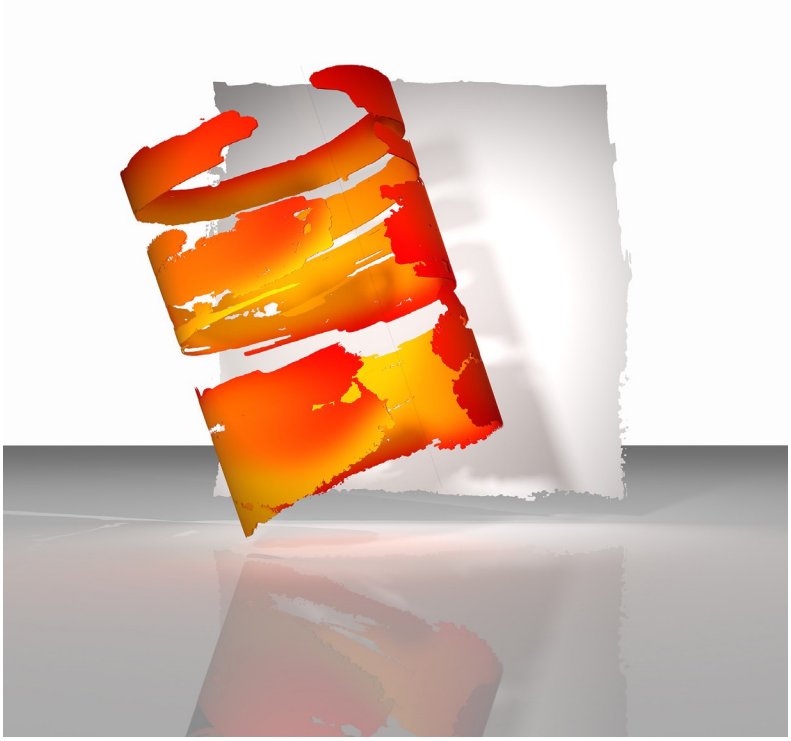
Above: An initial low resolution render for the 'Wave Object' with no texture maps. This allows for the development of lighting without the confusion of reflection or shadow.

The alternative to this is to use 'Force Two Side Rendering' in the render set up. This gave the same effect but the shadow of the object showed the shadow of the original object not the shadow created by the pattern. The object in 3ds max has a 'Modifier Stack' (see print screen image on the facing page) which shows the modifiers such as 'Bend' and 'Taper' but these have to be added to the object after the UVW Map has been applied. If it isn't odd effects can happen or the map does not work. The use of a 'Shell Modifier' will help to render the inside of the object.

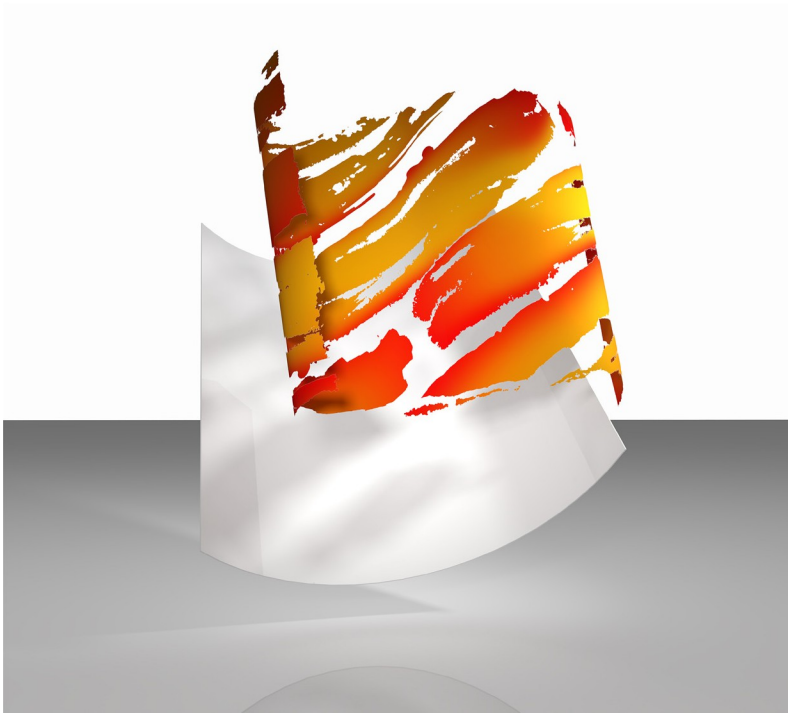


Above: The print screen for the 3ds max model of the Wave Object.

The four series of images now completed.



Cylinder Object i.



Wave Object ii.

Sphere Object iii.

Cube Object iv.

Throughout this exercise the images were refined and simplified to try not to detract from the simplicity of the ink wash image mapped on to the surface.

The Journey: A Practical Investigation into the Development of Pattern and Texture for Use in 3D Models.

Book List and Other Learning Resources

Books and periodicals.

Birn J, (2000), Digital Lighting & Rendering , Berkley California. New Riders.

Gahan,A. (2011), 3ds Max Modelling for Games, Volume 1. Oxon. Focal Press.

Haywood Rolling, Jr, J. (2013),Arts Based Research, Peter Lang.

Murdock, K, (2013),Autodesk 3dsMax 2013 Bible, Indianapolis. John Wiley & Sons.

Nelson, R. (2013), Practice as Research in The Arts, Palgrave Macmillan.

Platform. MacRae, K & Marshal, G. (2012), Build Your Own Computer, Somerset. J H Haynes & Co Ltd.

Taylor G, (2012), Advertising in a Digital Age, Create Space Independent Publishing.

Artists

Piller, M, Elliott, P & Peterse, F, (2015).The Amazing World of M. C. Escher, National Galleries of Scotland.

Bonaventura, P.(2012),The Art & Craft of Richard Woods, Surrey. Lund Humphries Ashgate Publishing.

Hockney, D. (1993) That's The Way I See It, London. Thames and Hudson.

Livingstone, M. (1981) David Hockney, London. Thames and Hudson.

Rondeau, J.Roy Lichtenstein, A Retrospective (2012), London. Tate Publishing.

Vella, A. (2011), Seven Volume Catalogue Raisonne of Moors Drawings. Henry Moor Foundation.

Lyons, H. (2005), Christopher Dresser, Antique Collectors Club.

Emmerson, R & Tilmouth, M. (2010), Matt Steele, Architect, a Biography, Scotland The Royal Incorporation of Architects.

Websites www.cgsociety.org
A comprehensive portal for Computer Graphics Professionals, bringing together digital artists with the latest in computer graphics technologies and practices.

http://www.alisonjacquesgallery.com/artists/42/works/
Supporting artists such as Turkish and American Artist Haluk Akakce

http://www.matdolphin.com
a London-based design studio and the creative partnership of Tom Actman and Phil Cook.

http://au.autodesk.com
Autodesk University (AU) offers a year-round learning and networking experience that helps AU members develop professionally and advance their careers. Membership is free.

http://www.tate.org.uk/visit/tate-liverpool
Tate Liverpool exhibitions and Gallery,Albert Dock Liverpool.

http://www.northernprint.org.uk/home.html
Northern Print, Newcastle. Northern Print is a gallery and printmaking studio located in the heart of Newcastle's Ouseburn Valley, just a few minutes from the city centre. Close to other attractions such as Seven Stories; Biscuit Factory and Victoria Tunnel.

http://santitafarella.wordpress.com/2009/05/09/david-hockney-sends-his-friends-apple-iphone-flowers/
Hockney's Flower Series Articles.

Exhibitions and Other Useful Resources

Summer Exhibition the Tate Collection, Tate Liverpool,

Lichtenstein A Retrospective, Tate Modern, South Bank, London 2014

Game Masters Exhibition (2014) The National Museum of Scotland, Scotland.

The Amazing World of M. C. Escher (2015), Scottish National Gallery of Modern Art, Scotland, August 2015.

You tube Haluk Akakce The Birth of Art
http://www.youtube.com/watch?v=SCxG9VjJQQU

Autodesk YouTube learning videos http://www.youtube.com/user/3dsMaxHowTos

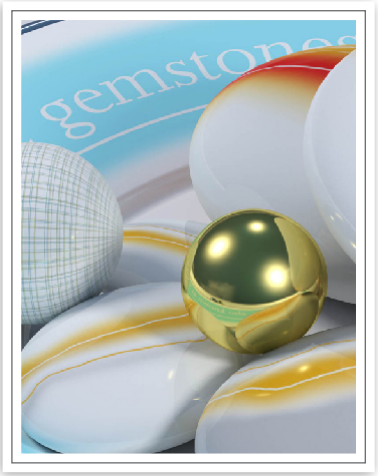


Plate With Pebbles, Detail 2016