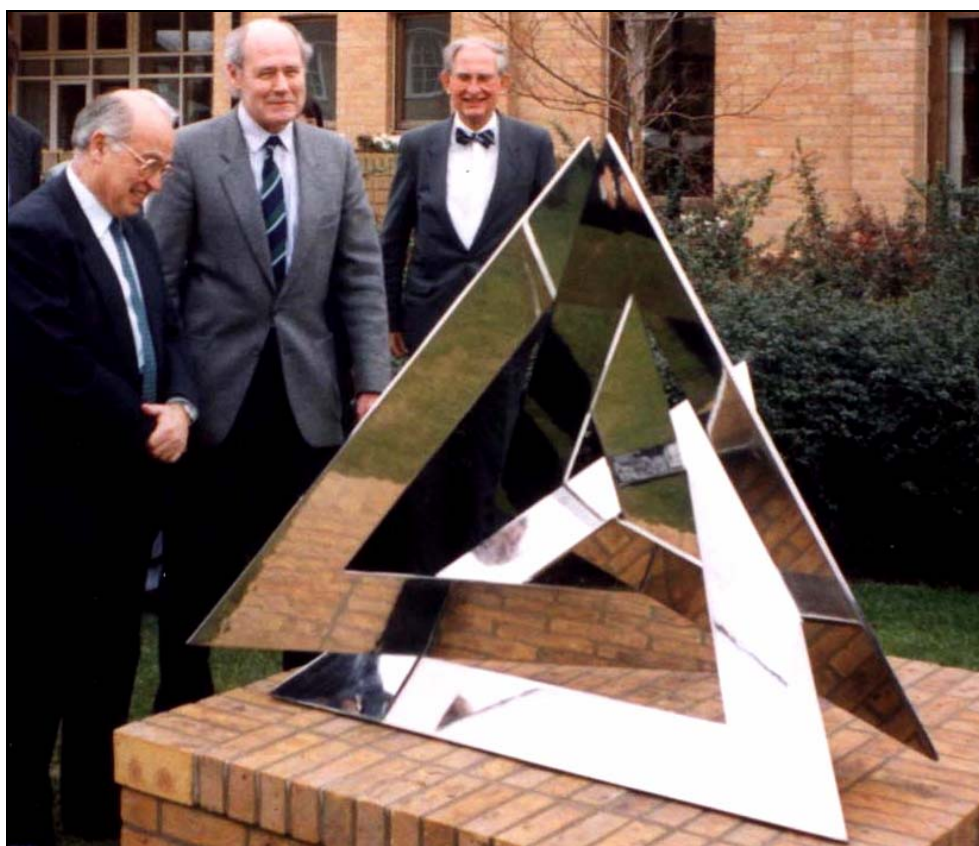


ISAAC NEWTON

My sculpture *Intuition* started another adventure for me when it came to the attention in 1992 of Professor Donald Coxeter of Toronto University. The magazine *Leonardo* had asked him to write a paper on *Symmetrical combinations of 3- and 4-sided hollow triangles*.

In his article Donald named the diagram that illustrated my sculpture as *Collapsed Intuition*. I wrote to tell him that my sculpture didn't collapse and enclosed a photograph of it standing in front of the Isaac Newton Institute at Cambridge University that had been taken when it was unveiled by Sir Michael Atiyah, Master of Trinity, Isaac Newton's old college. This led to a series of letters between us and eventually to a meeting when I happened to be in Toronto sculpting the little dancing girl, *Lilly*.



Sir Michael Atiyah unveiling 'Intuition' at the Isaac Newton Institute

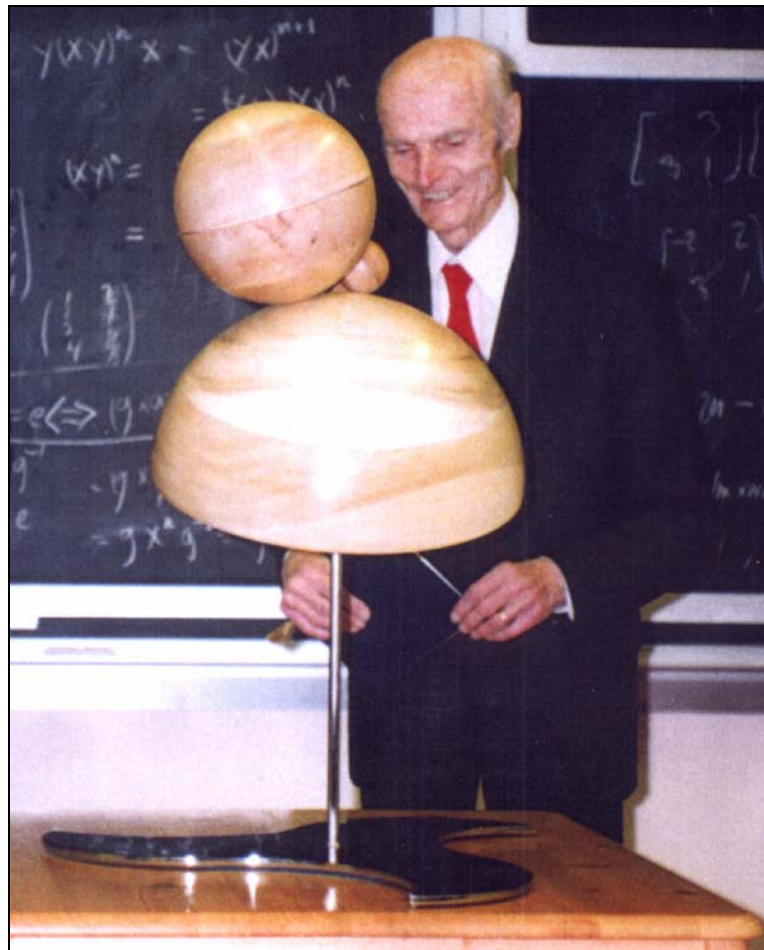
In 1997 John Chadam, the Director of the Field Institution in Toronto, wrote to say they would like an edition of *Intuition* outside their building to mark Donald Coxeter's 90th Birthday. Of course they couldn't afford one but he wondered if my Patrons would like to donate it! Robert and Damon kindly agreed to do this. Ronnie Brown presented a gift I had made for Donald birthday when he gave a lecture on 'Knots' at the Field Institution.

The year before Donald had written to me proposing that I should consider doing a sculpture on something that he had discovered about 'geometric progression', where spheres were 'mutually tangent'. I didn't understand what he was talking about, but with the aid of his instructions I was able to have 'five spheres' made where $x = 1.8832$.

The idea is that each sphere exactly fits 'beside the next' in a cluster called a Fibonacci sequence. I couldn't have seven spheres made to the measurements he sent me as the largest one would be nearly eight foot in diameter! The 5th sphere could just be managed if it was just a hemisphere.

The problem was how to make the sculpture light enough to handle, bronze being quite out of the question because of the weight; besides it shrinks on cooling and therefore the diameters of the spheres would change slightly.

There is a little Post Office store in the village next to ours where we buy Montgomery Cheddar cheese, the finest produced in England. I happened to be in there one day and saw for sale a display of turned wooden bowls. When I asked who had made them the storekeeper told me that it was his son Karl's hobby and that one day he planned to make wood-turning his profession. He also told me that at the moment the boy's output was restricted by the size of his lathe, but he was saving up to buy a larger one. This led to a deal. If Karl promised to make me five spheres of various sizes, I would pay him by buying a new lathe. He immediately set to work and the result was *Firmament*.

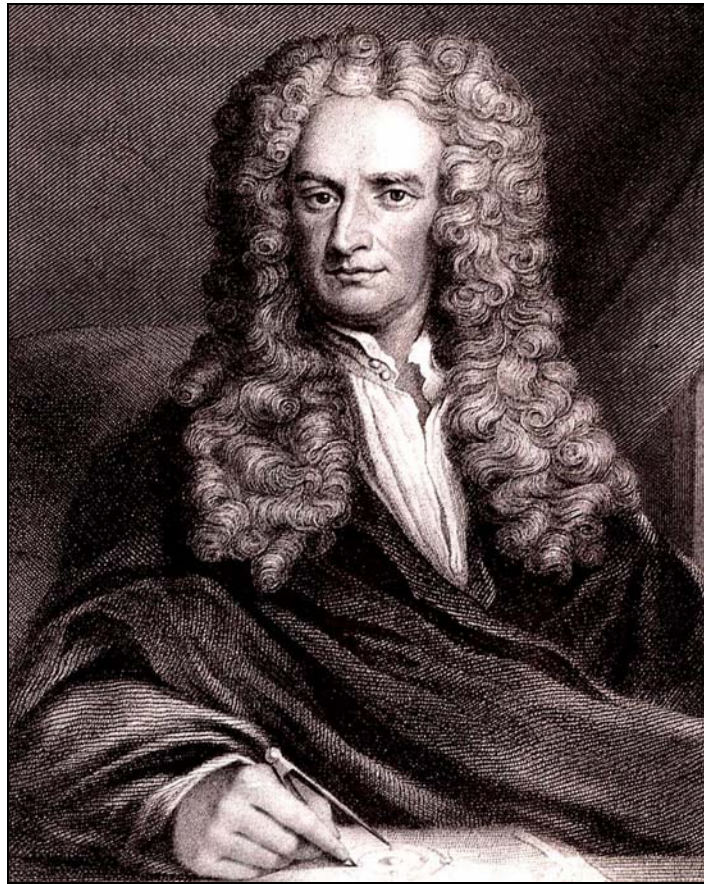


'Firmament' and Donald Coxeter

When Ronnie presented *Firmament* I asked him to put Donald original letter to me with the dimensions inside the top sphere. Years later, when Donald asked Margie and myself to afternoon tea, I was delighted to see *Firmament* in his large sunny sitting room and was able to open the sphere and show him his original instructions!

After this meeting I am afraid our correspondence came to an end and I lost touch with him. Six years on Margie saw Donald's obituary in *The Times*, which made me recall our conversation over tea and biscuits when I had asked him how come he still had such an active mind at the age of 92. I shall never forget his answer. He told me that when he was 15 years old his father had persuaded him that on getting out of bed *he should stand on his head for 15 minutes*. He said he was still doing it each morning!

Recently a young Canadian journalist named Siobhan rang me to say that she had been commissioned to write Donald's biography. She asked if she could come and interview to me, and when she did, I told her the story about how he used to stand on his head. She had not heard it before and so I am hoping it is included in her book. Perhaps we should all do the same thing!



Isaac Newton
'In his hand he took the Golden Compasses...'

When I first met Sir Michael Atiyah he was Master of Trinity College, Cambridge. I had written to him and suggested that maybe an edition of *Intuition* would look good outside the Isaac Newton Institute! I was delighted when I received an answer saying that he agreed and suggested that we should meet and discuss the project, so I drove up to Cambridge to show him a maquette of the sculpture. The Institute had only just been completed and was looking a bit raw as the gardens had not yet been landscaped, although they had planted a sapling that was a cutting from the original tree that had inspired Isaac by dropping an apple on his head, or so the story goes!

Sir Michael showed us round the Institute and he chose a spot for the sculpture. Damon and Robert had generously agreed to donate the sculpture and Sir Michael agreed that the Institute would pay for the plinth. I placed the order for an edition with my friend, Richard Stone, who owns an engineering company in Yeovil just down the road from Agecroft.

Richard knew the sculpture well as he had made the first maquette. I don't think the poor man knew what had hit him when I first went to see him and showed him the three paper triangles that I wanted cut out of stainless steel and joined together. I shall never be able to forget the day that I helped him put the pieces of the sculpture together as I have a large white scar across the inside of my right wrist that was caused by a white hot weld!



Richard Stone in Aspen with the large 'Intuition'

Robert is involved with the Aspen Institute and wanted to give them a heroic *Intuition*. The size of sculpture that Robert envisaged would be too large to fit in an aeroplane and therefore would have to be fabricated on site so I suggested that we could make it out of stainless steel planks like the *Creation* we had built out of wood for Ramiilaj. I asked Richard if he would be able to prepare the pieces in England, and then come and weld them together with me in Aspen. Luckily he agreed, so I ordered the material and booked the air tickets. After Richard had welded the steel planks together we had to use a very large mobile crane to lift it into position, as it weighed over a ton!

I found out later that the Borromean Rings were also used as a Christian symbol for the *Trinity*, because, unlike the triple Russian wedding ring where if you cut one the two remaining ones stay interlocked, with the Borromean Rings if you cut one ring and remove it, the other two fall apart.



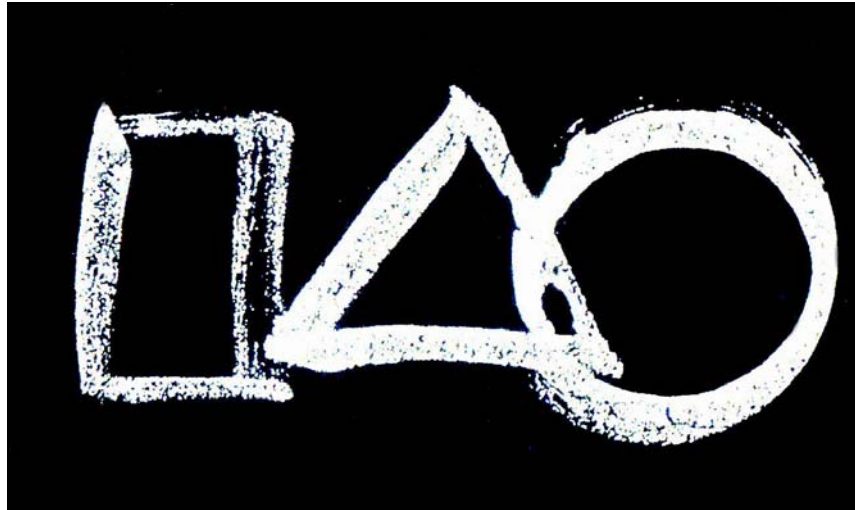
Borromean carving in Damascus

Recently I read that a carving of the Rings was discovered in Damascus on the wall of what is thought to be the oldest Christian church still standing, dated at AD 400. I have coloured it to make it simpler to read. The loops are the circumferences of six circles lying round a similar central circle.



Viking Rune Stone

Another extraordinary revelation concerning *Intuition* came in a letter contained a rubbing of an old Viking rune stone found in Sweden. The scene shows a human sacrifice and above the victim is depicted the Borromean rings as triangles. Apparently this symbol represented the presence of the god.



'Earth, Man and the Universe', Taoist calligraphy

The Borromean combination teased my imagination once again when I came across a Taoist calligraphy that used three symbols representing Earth, Man and the Universe. I decided to try and see if I could make them into a sculpture. The \square is the Earth, the \circ the Universe and the ∇ Fertility Goddess.



Zen

My own interpretation of Man's union with Nature and the Universe, I is based on the 'fact' that we are the only creatures in the whole of the Cosmos that are *aware of our own existence*. I call my sculpture *Totem*. It is a combination of a square, a circle and the two petals of *awareness* blossoming from the centre; 'I am *aware* therefore I am'. Of course this is based on the teachings of Descartes: 'I think, therefore I am', and Rousseau: 'I am therefore I am'.



Totem

I had asked Sir Michael to make sure the Isaac Newton plinth was ready when we delivered the sculpture so we could cement it down straight away. This was important, as I had already been subjected to a Cambridge student prank at Churchill College in the days of Ronnie Brown's Maths Road Shows.

The Road Show began with an exhibition of 12 of my museum-sized bronzes sculptures at Leeds University. It had then gone to Liverpool, Bangor, Swansea, Oxford, London, Barcelona, Zaragoza and lastly to Churchill College, Cambridge, named for Winston Churchill and where his archive is stored.

The sculptures travelled in black wooden boxes that acted as plinths. The whole exhibition fitted into a seven-ton truck. We would arrive at the site and unpack the truck, lift the sculptures out of their boxes, turn the boxes upside down and put the sculptures on top. All this worked very well but during the first night they were left on show in the Churchill Quadrangle and the students moved all the sculptures around so that the titles on the boxes didn't match the sculptures, which involved a lot of work moving them back to their right plinths next day. A back breaking job with no volunteers offering to help!

That evening Margie and I dined with Herman Bondi, the Master of Churchill, and he apologised for his students! Knowing that Herman was a friend of Tommy Gold and my having read Fred Hoyle's book led to a

fantastic conversation, him talking and me listening! Tommy Gold once told me that he and Herman Bondi used to play 3-D drafts, three glass boards one on top of the other. Tommy said that Herman always beat him, because he was better at remembering the position of the pieces on three boards!



Wadham College, Oxford Road Show

Robert and Damon came to the unveiling of *Intuition* at the Isaac Newton Institute and Sir Michael gave us a dinner at the High Table in Trinity and allowed Margie and me to sleep in the College, which was quite an experience. We were also all invited to a mathematics lecture after the ceremony which was a hoot, as none of us understood a single word!

The best thing about the visit was when Margie and I were crossing the Cam and saw a kingfisher flying up the river past Sir Michael's garden, which he couldn't believe, as he had never seen one in all his years at Cambridge!

Another fun experience was to be shown the Wren Library that takes up one side of the magnificent hallowed turf quadrangle that we were allowed to walk across because we were with a Trinity Fellow. In the Library I was shown Isaac Newton's tiny 'day to day' pocketbook and was enthralled by what he wrote: *Two shillings for a Stilton; two shillings and five pence for dinner at the White Lion;* but the best entry was: *Number of gowns in the wash – 2.*

The following year I suggested to Robert and Damon that *Intuition* looked a little lonely without its mates *Creation* and *Genesis*, and that maybe we should ask Sir Michael if he would like the two missing sculptures. He wrote back saying that the Isaac Newton Institute would be delighted to have more sculptures so now, to my delight, the three of them are spaced along the lawns in front of the building thanks to my Patrons' generosity.

When we had first visited the Isaac Newton Institute the area behind the new building was an animal field. Now it houses eight buildings and a central meeting hall that cost, I am told, some £200 million. The Centre of Mathematics claims to be the largest of its kind in the world and is guarded by a Gate House with a passageway used by all the students. The problem was that nobody had thought about providing money to pay for the Gates that were needed for the Centre's night-time security!

After Sir Michael retired a charming professor named Keith Moffatt became the Institute Director. One day he rang me and asked if I would be interested in designing some gates for the Guard House, and also if I thought my Patrons would pay for them! I didn't question why some of the £200 million hadn't been put aside to do this, but instead asked Robert and Damon what they thought. They suggested that I go and have a look and see what was involved, and if I was interested, let them have an estimate.

Margie and I drove up to Cambridge and had a meeting with Keith and some of his colleagues who told me that they would like to incorporate two special mathematical knots into the design of the Gates. They gave me copies of the knots and I worked out a simple way of how they could be supported.

The next problem was to show these designs to Richard to see if he thought such a thing was possible. He said that it was not a problem as they could cut the knots out of half-inch thick stainless steel with a *water jet!* Margie took a photo of Keith and me holding the result standing in front of a flowering cutting taken from the Isaac Newton's famous Apple Tree.



Keith and JR the two different 'Knots' and Isaac Newton's Apple Tree

The Gates were dually installed and Damon and myself were invited by the Director of the centre of Mathematical Sciences, Tim Pedley, to the opening of the complex by the Queen accompanied by Prince Philip.

As we were to be there by half past ten, I thought it would be fun for Damon, Margie and I to go up the night before and ask Tim Pedley, Keith Moffatt, and Martin Rees to dinner at the hotel. This led to martin asking us all to dinner at Trinity College, which was much more fun, especially as he asked my friend Professor Carlos Frenk down from the Centre for Computational Cosmology at Durham, for whom I had just done some sculptures, more of which later. Caroline Rees gave us a superb dinner and except for the fact that my shoe fell in half as I walked out onto the Master's lawn to look at students

punting on the Cam in the twilight! Apart from having to paddle around in socks the whole evening it could not have been a more enjoyable gathering.



Private 'Gate' opening ceremony with Damon and Keith

The year before all this took place Damon had donated an edition of *Pulse* to the new Institute of Astronomy. Very appropriately they had placed it on the site of the first large telescope ever built in England. This gift came about because Robert had given an edition of the sculpture to the Aspen Center for Physics and Damon thought it would be nice to do the same for the new Institute of Astronomy in Cambridge.

I had written to Sir Martin Rees, the Astronomer Royal, after reading an article by him on the *Creation of the Universe*, enclosing a photograph of the sculpture in Aspen, along with a suggestion that he might like an edition. Sir Martin replied that he would love to have the sculpture so Damon asked him to Albany. What a fascinating man and what wonderful conversation we had over lunch! One of the fun things of being a sculptor is that I have been able to listen to highly intelligent men discoursing on their favourite subjects.

The Institute is named for Fred Hoyle, the author of *Frontiers of Astronomy*, the book that caused me to buy a telescope when I was a farmer in the Ninety Mile Desert of South Australia more than 40 years before. In the grounds of the Institute there is a sculpture of the great man and I had to have my photograph taken standing beside my hero.

It amazed me to think that I had now met Fred Hoyle, Tommy Gold and Herman Bondi, the creators of the *Steady State* theory, even if Fred was only in bronze. Fred coined the phrase *Big Bang*, but meant it as a derogatory term to describe the theory that replaced the *Steady State*, not realising that the name would stick.



'Fred Hoyle' at the Institute of Astronomy



Sir Martin Rees, Astronomer Royal, Master of Trinity

The Queen approved Sir Martin's appointment as Master of Trinity College a few months after *Pulse* was unveiled at the Institute. I am not sure why the Press photographed Martin looking through *Pulse*, but as he believes in the possible existence of Parallel Universes, it does seem highly appropriate!



Damon and Pulse

Being commissioned to do the Gates reminds me of another similar commission that came about after the Symbolic Sculpture exhibition at Wadham College, Oxford. Wadham was founded in 1612. It is a beautiful building and unique in Oxford as it is built out of the honey-coloured stone of Somerset, similar to those of Agecroft. The buildings were prefabricated 400 years ago in the Ham Hill quarry near Yeovil and then carted to Oxford by horse-drawn wagon, a quite remarkable feat of transport and engineering.

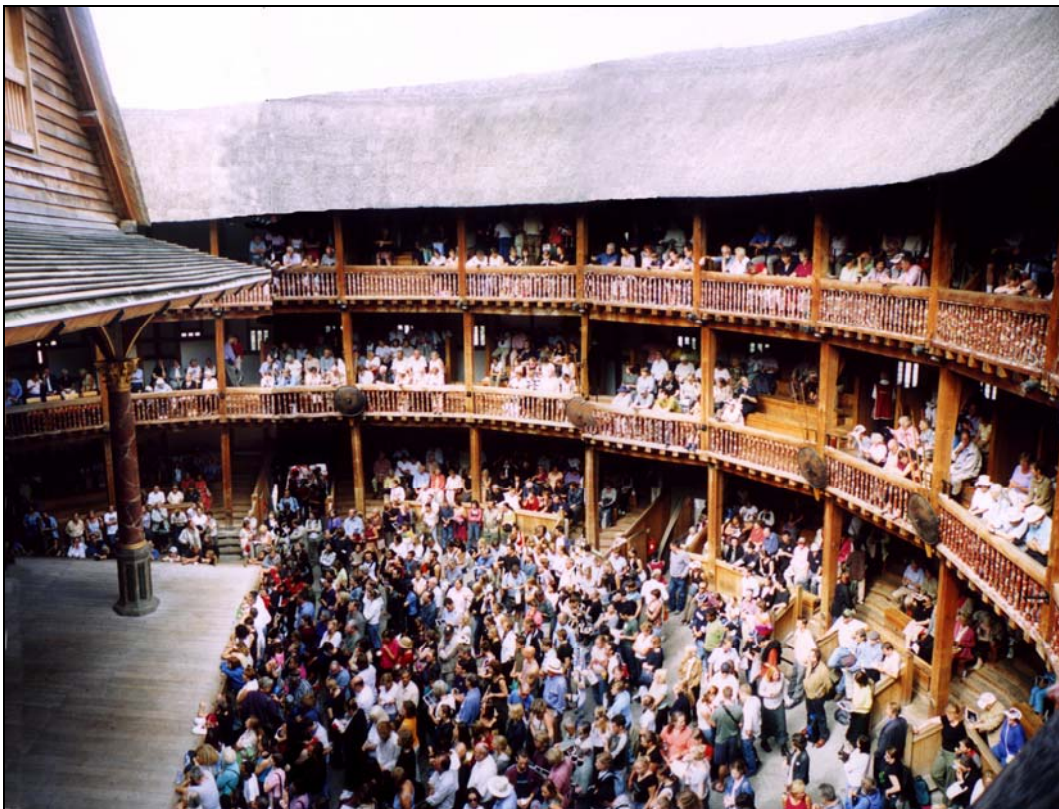
At Wadham there is an inner quadrangle and two outer gardens. One is reserved for the Fellows and was the site chosen for the exhibition. The other lawn backs on to a sunken courtyard of an inn. You can look over the wall into the pub's courtyard, which is worth doing because it is claimed that is where the first performance of a William Shakespeare play was acted in front of a paying audience who looked out from the windows of the first-floor!

I am ashamed to say that Shakespeare has not played much of a part in my life. When at Rugby I was given the part of a walk-on soldier in my House's production of a scene from *Julius Caesar*! More enlightening was when my class went to Stratford-upon-Avon to see *Midsummer's Night Dream*. I remember my mother taking me to see Flora Robson in *A Winter's Tale* and finding it very

boring, as I didn't understand what was going on. However, I have watched and thoroughly enjoyed the films of *Henry the Fifth* and *Hamlet*. It was not until I heard someone talking enthusiastically about their visit to the Globe Theatre in London that I realised I had definitely missed out on something special. We chose *The Taming of the Shrew*, as I thought a comedy would be a better starting-point than a full-blown tragedy!

Our gallery seats were booked well in advance so Margie and I were in the front row on the middle floor with a good view of the stage and able to look down into the 'pit'. As the benches are wooden and the play runs for nearly three hours, we took air cushions! Making sure that I had my binoculars in my pocket, we set off to meet our friends and share a merry lunch beside the Thames as a means of preparing for the long ordeal.

I had expected to see the traditional *all male* cast, with boys playing the female rolls. It was not until the day before that I learnt I was going to see an *all female* cast with girls playing the male roles! I could not imagine Petruccio, the rough gentleman from Verona, as a woman! What had I let myself in for?



'Globe Theatre' looking down on the 'pit'

Within minutes the atmosphere of the theatre had captivated me and it was as though a great big glorious party had begun. For three hours we were entranced and I don't think I have ever enjoyed a play as much in my life. When Petruccio called for his spaniel, Troilus, I was completely won over and wished our spaniel, Holly, could have been with us!

The play was magic and beautifully acted by the girls. Petruccio was masterful and Kate a real *shrew* right up to the end when, quite rightly, she came to her senses and was *tamed*!



The traditional dance done at the end of each performance

One other fun happening came about because of the exhibition of *The Universe Series* in the gardens of Wadham. One day my chemistry-professor friend, Bob Williams, asked me to lunch in the Fellows' dining room and I happened to sit beside an elderly professor from Persia, Eprime Eshag.

Eprime was a financial statistician and a friend of one of the sisters of the Shah of Persia. Through her he had been able to raise a vast amount of money that had financed the building of the new Wadham Library and Students' Residence. Eprime asked me to his home in Oxford for coffee when I next visited Wadham to talk to Bob about his 'atom sculpture'.

Eprime was a bachelor and lived on the ground floor of the house, which he had named 'Urmia' after the beautiful lake in north-west Persia where he had been born. The sitting room opened out onto a lawn surrounded by Persian rose bushes, about which he gave me a riveting lecture because they are the ancestors of all European roses. I nearly dropped my cup when he said that he would like to have *Dependent Beings* at the end of his lawn to look at for the remaining years of his life.

Of course as well as being surprised I was also delighted and ordered an edition to be cast in Italy. When it was delivered I took it to 'Urmia' and we erected it on a plinth on his lawn.



Eprime in his Persian Rose Garden

The next surprise came when Eprime announced that he was going to marry and at the same time donate the sculpture to the Wadham chapel. We had a great time choosing exactly where the sculpture would go in the beautiful chapel and, when the College had granted permission, we installed it.

The Master of Wadham gave us a champagne party in his sitting room to mark the handing over of the sculpture to the College. I took along a maquette of *Dependent Beings* I had had cast for the occasion and John Fleming, the Master, hid it under a tea towel on a side table. When the time came for a toast the Master presented Eprime with the maquette, bringing tears to the old man's eyes. It was a superb moment and a memory to cherish. Eprime died within a year of moving the sculpture to its new home.

Dependent Beings has had a varied and surprising history. I created the sculpture using squares immediately after I had made *Eternity* out of equilateral triangles. I see the rough dark side of the sculpture as male and the smooth gold side as female and the two interlocking surfaces as 'loving companions'.

After the Road Show of *The Universe Series* in Barcelona, the University bought a bronze edition of this sculpture to put in the gardens of their offices that occupy an old convent off the Rambla. The convent had provided a beautiful setting for the exhibition, with the plinths set in the arched cloisters. An edition of the sculpture also ended up at Wisconsin University, Madison, in the Waisman Institute.

Robert and Damon both have the sculpture carved out of Imperial Red Indian granite in their collections. Carving something like this in granite is quite an achievement and calls for incredible skill, which the Italians in Pietrasanta have in excess.



'Dependent Beings' carved in Imperial granite

I also had the Italians carve *Eternity* in black serpentine from Africa. It stands in our garden and is to be our gravestone in time, but not until I have carved a notch in the edge so the line has a *Beginning* and an *End!*



Eternity