

BUXTON MICRARIUM

The town of Buxton is set in the rugged and spectacular countryside of the Peak District of England. The Fifth Duke of Devonshire and his two successors established Buxton as an elegant spa town around 1780, and it is here that the well-to-do took the waters for their health. The Micrarium is a jewel of a place established in a small but elegant late Victorian building. It has a timeless quality creating an atmosphere of wonder which would have appealed to the gentleman scientists of the day as much as to today's public. On entering the Micrarium the visitor sees pools of light which are the projected images of microscopic specimens, many of them living organisms. Each image can be selected, magnified and moved by the visitor.

The equipment was designed and constructed by Dr Stephen Carter, who founded the Micrarium, and specimens are prepared at his lab attached to his home. The Micrarium is run as a family business with no additional financial assistance.

Dr Carter died recently while attending the opening of Micro World in New Zealand, and was due to fly to give a talk at the Exploratorium. Plans to move the Micrarium to Dorset have now been abandoned, and Stephen Carter's wife Janet and other members of the family will continue to run the Micrarium in Buxton.

Location:	The Crescent, Buxton, Derbyshire SK17 6BQ
Date opened:	14 August 1981
Floor area:	90sq m
Number of exhibits:	350
Number of staff:	3 permanent (all members of the family) 3 temporary during the seven months the Micrarium is open
Number of visitors:	37,500p.a. approx 2:3 child:adult ratio excluding parties
Opening times:	Easter to end of October Daily 10-5pm
Entrance fees:	£1.50 adults £1.10 OAPs, £1.30 students, 80p children Adult part rate £1.30 School party rate £1 adult, 70p child

BUXTON MICRARIUM

Dr Stephen Carter



Stephen Carter was born in 1930 and was hooked on microscopy by the time he was seven. Having qualified in medicine, he went to Ghana where he was the only pathologist in the country at that time, and he carried out a major clinical trial into the effectiveness of a new antimalarial drug. This led to an interest in pharmaceutical research and his subsequent career as a Senior Scientist in ICI's Pharmaceutical Division.



ROD LEACH

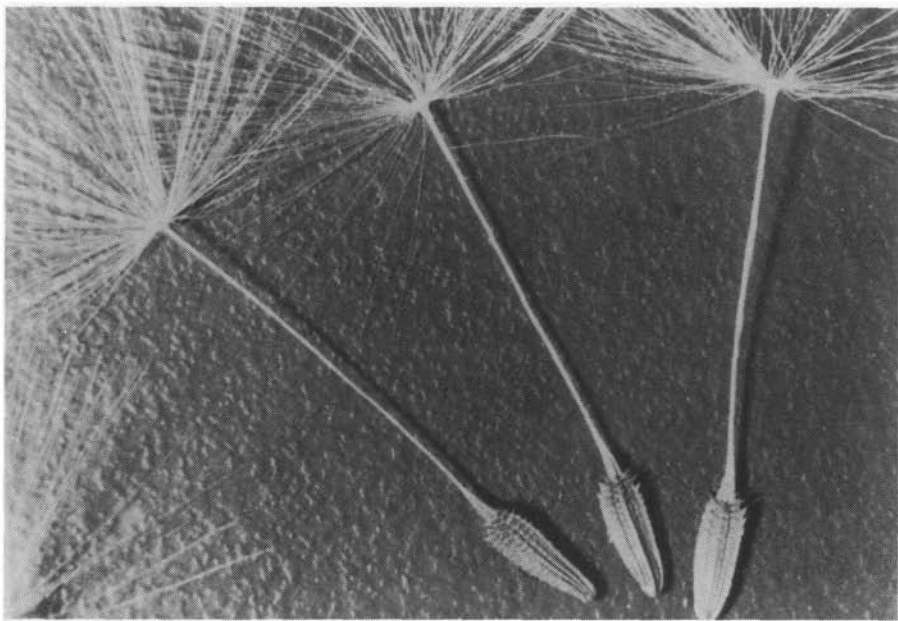
The Buxton Micrarium, housed in the Pump Room of the old spa town.

Buxton Micrarium is essentially a family venture; conceived, brought into being and run by the family – myself, my wife and our three daughters.

As a 'hands-on' science centre it is probably unique in this respect as well as in its concept and subject matter. Our problems in setting it up have been considerable but not insurmountable, and the experience we have gained the hard way may be more generally applicable than this unusual background might suggest. We take the optimistic view that mistakes – even big ones – are a valuable aid to learning and not always regretted in the long term.

The basic idea

The idea for the Micrarium can be traced back to my own schooldays when I became fascinated by the vast wealth of exquisite creatures and natural objects which the microscope reveals. To help with accurate drawing I would sometimes tilt the microscope horizontally and, using a mirror, project the image down onto a sheet of paper so that outlines could be directly traced with a pencil. I soon found that this was also



All manner of microscopic subjects can be viewed at the Micrarium, from living micro-organisms to crystals growing before your eyes. Here are dandelion seeds.

the best way of sharing my interest with my family and friends. Being able to see the same details or witness the same events at the same time made comment and discussion immediate and relevant, whereas looking alternately down a single eyepiece is not a shared experience and discussion is often at cross purposes. Without doubt, this early realisation played an important part in the ultimate development of the Micrarium idea with its main reliance on remote controlled projection microscopes.

My schoolboy hobby led naturally to a career in medicine with emphasis on laboratory rather than clinical work, firstly into tropical pathology and later in ICI's laboratories doing fundamental research into the nature of malignancy and the mechanism of cell movement in a pharmaceutical context. Throughout my professional career, therefore, the micro-

Stephen Carter points out details on an image projected from above. The image can be moved around the screen using a small joystick.



scope remained the most important research tool available.

The opportunity of taking 'early retirement' from ICI opened up the possibility of returning to a broader interest in microscopy and by degrees the idea took shape that the general public – hitherto virtually excluded from the most extensive and all-pervading part of the natural world we inhabit – could be let in to experience the excitement and delight of exploring for themselves. While technology is shrinking the world we normally see and reducing the opportunities for exploration, technology is also expanding the world we cannot see. This world is vast beyond imagining and as a territory for true exploration can never be exhausted.

The name

The name of any project which seeks to capture the public imagination is very important and a lot of thought was given to it. The word 'Micrarium' uses classical roots to express precisely what it is: a place for very small things. It is cognate with such familiar words as aquarium, vivarium, herbarium and terrarium. It fits well with the closely analogous concept of the planetarium. The planetarium aims to present and interpret the world of outer space – the domain of the telescope, while the Micrarium is correspondingly concerned with the world of inner space – the domain of the microscope. When the concept of the Micrarium is fully established, we believe that the word will come to seem absolutely right and indeed inevitable. In the short term however, it has a distinct disadvantage – most people have little knowledge of word derivation or root meanings so it does not immediately convey what it is to the uninitiated. This may not be as serious as it seems because whatever words we use to describe the Micrarium, people insist on getting it wrong!

Finance and legal status

The funding required to set up the Micrarium came entirely from family savings and an *ex gratia* payment received on retirement. Attempts to supplement these limited resources by obtaining grants proved disappointingly unsuccessful. We did not seem to fit into any pre-defined category, and explaining what we were trying to do proved absurdly difficult in the face of pre-conceived ideas. Some applications took a lot of time and effort and in some cases we still await replies!

Most ventures of this kind seek charitable status as a matter of course, but for a project as personal as this, retaining total control over its direction and ethos is paramount and we

decided against it. It is easy to accept that such a decision brings expected penalties such as a severe restriction in sources of funding. What is not so easy to accept, however, is the general attitude that because we have put our own financial survival at risk, we are somehow less deserving of support and encouragement.

One direct consequence of under-funding has been the absolute necessity of making all the special equipment ourselves. This was a major undertaking because the microscopes are in no sense adaptations; they are designed and constructed for their specific function. Making 50 remote controlled microscopes, each of which has the facility for push button specimen selection, magnification change, focus and scanning, as well as automatic information display, took the entire family two years. Expertise in engineering and the use of machine tools was acquired as we went along.

Two distinct advantages arose from this necessity, however. The constraint on me to design only what we could construct made the simplification of every mechanism essential; and the fact that anything we could make we could also



Stephen Carter and family in the workshop at their home. Since his death the operation of the Micrarium is still very much a family concern.

mend means that breakdowns in the equipment are rare and short lived.

Location and site

We took the Micrarium to Buxton because we failed to find a site elsewhere and, being our nearest 'tourist town', Buxton represented an obvious fall back position. We set it up in a former spa building (the Pump Room) because this was offered to us by the Local Authority and it seemed a good idea at the time. Both decisions were serious errors of judgment from which we have been lucky to survive.

There is a fundamental incompatibility between scientific enlightenment and spa treatment, which goes deeper than one might suppose. Buxton still lives largely in the past and remains intensely proud of the fact that it once made its living out of persuading sick people to drink its local spa water for their health. The Pump Room was a late Victorian addition to the earlier spa complex and to add to the mystique, the basin from which the water was reverentially dispensed was contrived to look like a well so that visitors would think they



An interior view of the Micrarium. A visitor can select a number of subjects to view on each of the screens, moving the image and selecting the magnification as required.

were drinking directly from the source rather than from a piped supply.

Local conservationists are usually delighted if a new and appropriate use can be found for a historical building whose original purpose is obsolete, but in this case the occupation of the 'source' of the health giving waters was treated as sacrilege. The Borough Council had assured us that as a 'World First Tourist Attraction and Educational Amenity' we would be greatly welcomed in the town, so we were ill prepared for the welcome we actually got which started with a motorised float being cheered through the town on Carnival Day protesting at our arrival. Local opposition has remained unpleasant and sometimes vicious, but having committed all our resources to Buxton we have no choice but to stick it out.

The fickleness of Local Authorities is notorious and although initially enthusiastic about our project it may be that public criticism of their own decision to offer us the Pump Room changed this attitude. Whether calculated to do so or not, their subsequent actions came close to destroying it completely.

Handing over the building itself was delayed for trivial bureaucratic reasons until our run-up time to the opening date had been reduced from a planned six months to an absurd eight weeks. We have never fully recovered from that nightmare attempt to do the impossible – either in terms of the rushed decisions and temporary expedients, or the damage done to our reputation and publicity by being obliged to open with half of the equipment not operating.

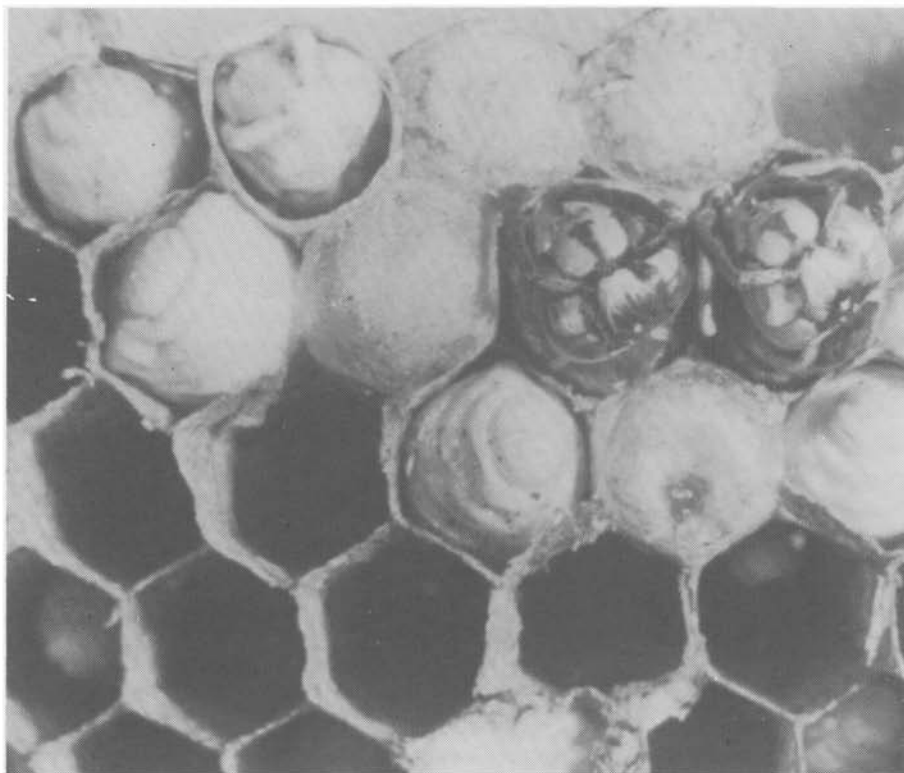
The Council's undertaking to put the building in order before we occupied it was not carried out and thousands of pounds worth of damage was done to equipment and furniture by water streaming through the ceiling. After much agitation they agreed to do essential repairs and told us the money had been set aside. Nothing happened: more extensive and depressing damage was done. The money had been re-allocated and we had not been informed. Apologetic? – not a bit of it, the Planning Director was furious that we had complained!

The most damaging piece of bad faith, however, concerned the allocation of road signs which are nowadays considered essential for the survival of enterprises of this kind, and may increase visitor numbers by as much as 40%. We were persuaded not to approach the County Authority directly for signs but to be integrated into a complete town scheme which the Borough was preparing. We readily agreed. It took two years (yes, two years!) to devise and implement this

scheme and at the end of that period we were the only tourist attraction in the town to be left out. A Council spokesman explained that they had to draw the line somewhere. So indeed do we; and for some time our main priority has been to move on and integrate into a community which is not ashamed to lead the world into an important field of educational leisure.

The future

It has been difficult to maintain morale and motivation in these circumstances, but the period in the village stocks for a crime we did not commit may soon be over. We are unlikely to recover all the capital originally invested in Buxton but within the next year we expect to recover enough to make the move possible. We are hoping that funding may be easier to



A close up view of a wasps nest. The microscopes were specially designed by Dr Carter to give bright, sharp images with a wide field of view.

come by now that we have something definite to show.

We have been immensely cheered by the evident delight of children on school visits and by comments from the general public whose eyes have been opened to a new dimension in their appreciation of the natural world. We have also been encouraged by the world wide interest in setting up similar projects elsewhere and are keen to help wherever possible. A Mark II version of the microscope is under development (with welcome financial help from the Fund for the Development of Interactive Technology Centres) and it may be possible to make this commercially viable in the future.

The potential for the Micrarium is very great both in terms of the range of things which can be made accessible to the public for the first time and in developing new technology for presenting it effectively. We are looking forward to starting again with better ideas, better equipment and on a better site which will make these developments possible.

Microscopic structures underlie everything we can see or touch whether living or inanimate, and in many cases it is only the knowledge of these structures which makes their properties or functions comprehensible. For everything that Nature presents to our unaided vision there are at least a million billion other things held back for the microscope to reveal.

That should give us enough to go on.