

QUESTACON

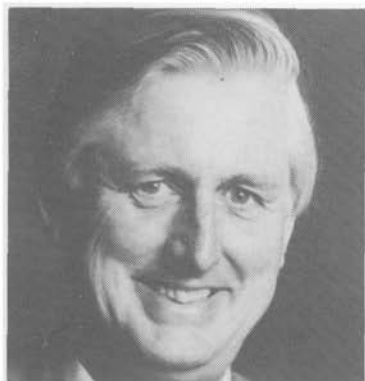
Questacon is in many ways the Cinderella story of the science and technology centre community. As Micheal Gore explains in his article, Questacon came into being through great energy on a shoe-string budget, and is now set to become a national science centre.

There seems to be a common feature in the budget end of the business, and this is the extensive network of contacts which develops around the project. This may be the result of necessity since making the exhibits and finding premises for virtually nothing involves a great deal of cajoling and persuasion, whereas a well funded project simply buys in people and resources. Then again it is more likely that a determined founder of such a project already has the network in place.

Location	Cornèr of Donaldson St and Elouera St, Braddon, Canberra, Australia
Date opened:	September 1980
Floor area:	600 sq m
Number of exhibits:	120
Number of staff:	
Number of visitors:	1000 per week
Opening times:	Tues to Fri 10.30-4.30, occasionally at weekends
Entrance fees:	Adults A\$2, school children A\$1, pre-school children free

QUESTACON

Michael Gore



Dr Michael Gore trained as an electrical engineer at Leeds University and took his PhD there in Applied Physics in 1961. He was appointed to the staff of Australian National University in 1962.

It was after a visit to the Exploratorium in December 1975 that he decided to build what became Australia's first interactive science centre—the Questacon. The success of the Questacon led to the Australian Government deciding to establish a national science and technology centre which will open in 1988, and Dr Gore has just been appointed as its foundation director.



Questacon is housed in part of an infants' school and will eventually be incorporated in the proposed National Science Centre.

The following article originally appeared in the *Journal of the Australian Science Teachers Association*.

The Questacon Project began in 1977 and from its inception developed along the lines of a scientific experiment. It was established as a working model which could be used to test and evaluate the concept of a hands-on interactive science centre.

The Questacon is not a conventional museum: it is a participatory science centre where all the exhibits are designed to be used by visitors, permitting them to carry out simple experiments and to gain some insight into the scientific principles involved. The centre was inspired by, and modelled on, the Exploratorium in San Francisco, which is generally acknowledged to be the world's first wholly interactive science centre.

Many established science museums around the world have begun to add hands-on exhibits to their collections, but there is only a mere handful of centres throughout the world which are exclusively dedicated to this interactive philosophy. The Questacon is one of them.

The idea to establish the Questacon Science Centre first took hold in early 1977. Then followed two years of slow, relentless spadework. This culminated in an agreement by the Commonwealth Schools Commission to provide a grant of \$50,000 under a special educational innovations programme. The grant was made available in mid 1979, 'for the purpose of establishing an experimental participatory science centre in Canberra'.

In the beginning

Because from the beginning the Questacon has had to operate on a shoestring budget, the help of virtually every scientific organisation in the Australian Capital Territory (ACT) was enlisted to construct exhibits. As well as the Australian National University, the workshops of CSIRO (Commonwealth Scientific and Industrial Research Organisation), the Canberra College of Advanced Education, the Technical Colleges and the Physics and Engineering Departments of the Australian Defence Force Academy were all persuaded to help.

As the Questacon grew and started to gain a national reputation, major companies like Esso, Commonwealth Industrial Gases, Shell, Kodak and many others began to provide support. Some gave much needed financial help while others constructed and donated hands-on exhibits.

One of the first problems which had to be addressed was where the fledgling science centre was to be located. The problem was solved early in 1980 when Senator Carrick, then Minister for Education, agreed to a recommendation from the ACT Schools Authority that part of the old Ainslie Infants School be leased to the Australian National University for the purpose of housing the project.

From the beginning it was felt that the centre should have a distinctive and original name, especially as it was to be the first science centre of its kind in Australasia.

The name Questacon is composed of two words 'quest' and 'con'. *Queste* is a French word derived from the Latin word *quaerere* meaning to seek. *Con* is a Middle English word (1200–1500 AD) meaning to study or to learn. It also has the meaning of steering, as in a vessel, and this is how the conning tower of a submarine gets its name. Hence the name Questacon means to seek and to study.



Intricate patterns are traced out in sand released from the base of a swinging pendulum.

Staffing

From the education point of view, one of the most exciting aspects of the Questacon, other than the exhibits, has been the Explainers, and in particular the student Explainers. When the centre operates there are at least 15–20 Explainers on duty. This dedicated and diverse group of people circulates around the Questacon and talks in an informal way with the visitors about the exhibits. Each one possesses considerable skills and knowledge about the exhibits, their use and the scientific concepts that they illustrate, so he or she can provide simple, friendly guidance for visitors of all ages.

The more senior Explainers, many of whom are retired, have a wide range of backgrounds and include scientists, engineers, technicians, military personnel, bank managers and a host of others. Younger Explainers come from ACT secondary colleges and the tertiary institutions.

Together these people form an exciting team. Their interaction with each other and the visitors gives the Questacon a powerful, yet informal, teaching resource. The student Explainers derive much benefit from working with the older, more experienced members of the team. In addition, through their interaction with the visitors, they develop self-confidence and valuable communication skills. As part of their training all the Explainers attend special training sessions given by lecturers drawn from all three of Canberra's tertiary institutions.

Some of the more senior student Explainers have become part of the Questacon travelling Science Circus which is described in detail later.

Modus operandi

It was known from the Exploratorium that in order to operate a hands-on science centre successfully it is essential to have a team of technicians available at all times to keep the exhibits in running order. Exhibits which are used by the public need regular adjustment or minor repairs and the necessary work must be carried out as fast as possible in order to avoid having a host of 'out of order' signs.

Because the Questacon's limited financial resources have not permitted any technical staff to be employed, the centre has had to be kept in 'cotton wool' and operated on a very restricted basis. By not opening the Questacon continuously to the public, the volume of maintenance has been minimised to a level where it has been possible for the workshop staff of the ANU Physics Department to handle the work without jeopardising their primary role of supporting the teaching

and research staff.

In spite of this constraint the Questacon is visited each week by nearly a thousand primary and secondary school students who come to the centre in organised groups from all over the country. In addition, the centre now opens its doors to the public during the school vacations. When it does, it averages around 600 visitors a day, many of whom are tourists from all over Australia. As well as its principle role, that of education, the Questacon has now developed into one of Canberra's major tourist attractions.

Exciting new developments

In 1982 the Australian Bicentennial Authority (ABA) set up a task force to make recommendations as to which projects concerning science and technology should be included in the ABA's national programme for the 1988 celebrations. The main recommendation was the establishment of a National Science Centre which should incorporate the Questacon's interactive philosophy and should eventually incorporate the Questacon itself, together with its exhibits. The aim was to extend the Questacon's exciting facilities so that they could be shared by all Australians.

Following this recommendation, a considerable amount of work was carried out which led to the Government giving its approval to the establishment of the Australian National Science Centre (ANSC) as a lasting memento of the 1988 celebrations.

That decision is now being transformed into reality. In May 1986 construction started on the new Science Centre on a prestigious site within Canberra's Parliamentary Triangle. This site will enable the ANSC to take its place side by side with those other guardians of Australia's cultural heritage; the National Library, the Australian National Gallery and the High Court of Australia.

But the establishment of the ANSC will not simply mean the construction of a fine building in the heart of Canberra. It is planned that the National Science Centre will have an extensive touring component which will reach out to all Australians, no matter whether they live in cities or in the outback.

Travelling circus

In its role of acting as a test bed for the proposed Australian National Science Centre, the Questacon has already established and operated a mobile component. The Questacon Science Circus visited the New South Wales centres of

Goulburn in April and Wagga Wagga in July. It was a tremendous success and on both occasions attracted large crowds. However, its greatest success to date was its participation in the 55th ANZAAZ (Australia and New Zealand Association for the Advancement of Science) Congress in Melbourne where the Science Circus was staged for four days during the Congress in the huge Monash University Sports Centre.

The next step in the development of the ANSC happened long before the first sods were turned for the construction of the building. In order to raise the public perception of the project, a prototype Australian National Science Circus visited six towns and cities in February 1986. It travelled nearly 8000km in 33 days and made stops in four states, South Australia, Victoria, New South Wales and Queensland.

The Questacon Science Centre was not operating at that time so the embryo Australian National Science Circus



Questacon director Michael Gore (left) hands over a spinning bicycle wheel to a visitor so he can experience the gyroscopic effect.

borrowed 40–50 of its hands-on exhibits to take on the 'grand tour'. In addition, ten of the young Questacon Explainers, who had already gained wide experience in the Questacon Science Circus team during 1985, accompanied and ran the National Science Centre's travelling component.

The interactive hands-on exhibits

The Explainers, in addition to talking informally to the visitors about the exhibits, also staged a series of short science demonstration shows. Each show bears an intriguing title that often masks the scientific topics covered and is delivered in a way that is aimed to appeal to the tastes of a very wide audience.

The very popular 'Slime Show' discusses some of the fascinating properties of non-Newtonian fluids. 'Balancing the Improbable' concentrates on a whole host of demonstrations which relate to that dry and dusty old topic, centre of mass. One of the demonstrations illustrates the difference between men and women – mathematically!

On top of these there is 'Music', 'Pressure' and the ever



Bubbles of air from a hand pump rise through a column of viscous liquid. The larger bubbles rise quicker, swallowing up smaller ones in their path.

popular 'Liquid Nitrogen Show'. There is a show which deals with the construction of scientific toys from rubbish, and another called 'Science Roundabout' which covers some fascinating aspects of rotational mechanics. The effect on the young Explainers who have had the good fortune to be able to take part in this very exciting venture has been profound. As any teacher knows, the very fact that they have had to find ways and means of getting over a wide range of scientific concepts to an even wider-ranging audience has meant their own understanding has increased. But perhaps even more importantly, their self-confidence and ability to communicate has also been significantly extended.

The basic philosophy of the Questacon hands-on exhibits used by the ANSC is to allow visitors to carry out simple experiments and learn how scientific principles relate to everyday situations.

In one exhibit the visitor simply waves a white stick to and fro and in so doing produces a coloured picture in thin air. This demonstrates persistence of vision, a principle that is at the heart of both movie and television pictures.

Another exhibit allows visitors to learn something about a television screen by letting them freeze their shadows in position on a specially prepared wall. By spinning around on a rotating turntable it is possible to gain some understanding of the scientific principles put to use by skaters, ballet dancers, gymnasts and springboard divers.

Using a simple, half-silvered mirror, visitors can experiment with the fundamental laws of reflection and at the same time try on a friend's hair, nose or even their smile. One can mix colours by hand but never them get wet or messy, discover why some helicopters need a stabilising rotor but others do not, make soap bubbles that have corners, construct a strip of paper with only one side, test personal reaction times and engage in a host of other fascinating activities.

Other ANSC plans

It is planned that the ANSC will develop a number of other programmes which will be of benefit to the various science centres which are now beginning to develop in several state capitals. Monash University, in collaboration with the Museum of Victoria, established 'Experilearn', a hands-on science exhibition back in 1983. In Newcastle, plans are well advanced with another interactive science centre – Super Nova. In early 1985, in Sydney, a team was formed at the Power House Museum to begin the work of designing and

Despite budget limitations restricting opening hours, Questacon is visited by nearly one thousand school students each week.



building hands-on exhibits. And in Brisbane, Perth and Adelaide, plans are also being made to develop this new and exciting breed of science centre.

The ANSC, which carries with it a wealth of experience gained over the past seven years by the Questacon will be able to provide significant help and advice to these newly emerging science centres. The Questacon experience was not gained easily or cheaply and there is no reason why other science centres should have to waste scarce money and resources making mistakes which have already been made and corrected in Canberra. In a few years time it should be possible to have all Australia's science centres collaborating and exchanging expertise and exhibits.

The ANSC would be the appropriate agency to make and coordinate approaches to Australian industry for help in making interactive exhibits. This is an area in which the Questacon Science Centre has already had considerable experience and success.

The ANSC could, for instance, approach the automobile industry with ideas for the production of several interactive

exhibits which are all related to that particular industry. Hydraulic systems, brakes, steering mechanisms, differential gears, viscosity of oils and electronic ignition systems would all lend themselves admirably to the hands-on philosophy. Once the exhibits were produced they would then go on display in science centres all around Australia.

One area of scientific endeavour in which the ANSC will engage will be to organise and coordinate youth science lectures modelled on the type that the Royal Institution in London has been running regularly for over a hundred years. First-rate demonstration lectures are expensive and time-consuming to organise, but when done they will provide a level of stimulation in the audience that is very hard to equal.

Lecturers would have to be carefully chosen, both from Australia and from overseas, not only on the basis of their mastery of the subject but also on their skill and ability to communicate their knowledge in an interesting and absorbing manner.

The ANSC will also organise regular workshops involving staff of other science centres with the aim of sharing and disseminating information and expertise. It will maintain close contact with developments in overseas science centres and try to negotiate staff exchanges on both a national and international basis.

Help and advice can also be provided to science teachers throughout Australia. To that end the Questacon has already begun to establish valuable links with Science Teachers' Associations. Earlier this year the Wagga Wagga Science Teachers' Association helped the Questacon Science Circus by nominating local students to join and help the staff from Canberra when they visited the Riverina District.

Conclusion

The Australian National Science Centre is being established with the aim of raising public understanding and awareness in science and technology. It has set out to make science understandable, interesting, fun and perhaps most important of all, relevant to everyday life.

The ANSC is a very exciting project and it could well have far reaching effects on science education in Australia. But in order to succeed a lot more work will be needed, as funds are in short supply and science still does not command a high profile in the minds of the nation's politicians, nor with the public at large. It is for this reason that it is so important that Australia has a National Science Centre by the time it celebrates its Bicentenary in 1988.