Australian Institute of Architects ACT Chapter

Register of Significant Architecture

RSA No: **R136**

Name of Place: **CSIRO HRPPC Phytotron**

Other/Former Names: **Building 005**

Address/Location: Julius Road ACTON ACT

Block 1 Section 2 of ACTON

Listing Status:	Registered	Other Heritage Listings:	Commonwealth (2004)
Date of Listing:	1986	Level of Significance:	Territory
Citation Revision No:	2016	Category:	Scientific
Citation Revision Date:		Style:	Post-War International
Date of Design:	1962	Designer:	Sir Roy Grounds of Grounds Romberg & Boyd
Construction	1962	Client/Owner/Lessee:	CSIRO Division of Plant Industry
		Builder:	
Renovations	1998-2000 & 2009		

STATEMENT OF SIGNIFICANCE:

The CSIRO High Resolution Plant Phenomics Centre (HRPPC) Phytotron, when built in 1962, was the third major phytotron in the world. A phytotron is a building in which plants can be grown in controlled climatic conditions. As no further major phytotrons were developed after the 1970s, due to a change in the study of plant adaptation, and with several other phytotrons now demolished, the CSIRO Phytotron is a rare, early surviving example of a large scale phytotron which combines glasshouses and controlled environment cabinets.

The Phytotron has been associated with the specific scientific work of the CSIRO Division of Plant Industry that included the study of pasture development diseases in tobacco and other crops, the analysis of the control of flowering plants, and the nature and improvement of yield potential. Some of this work is considered to be of international standing. The Phytotron demonstrates a major step in the development of the scientific study of plant adaptation to climate and other environmental variables with all previous studies conducted 'in the field'. It demonstrates a high degree of creative achievement in its use of large controlled temperature glass houses in combination with control environment cabinets. It also has technical importance for its early use of solar panels.

The Phytotron is of importance as one of a group of major expensive scientific facilities of the post-war Commonwealth Government scientific endeavour that include the Parkes Radio Telescope, Homopolar Generator at ANU and the Lucas Heights reactor.

Although influenced by the two preceding phytotrons located in Pasadena, USA and Paris, France, the CSIRO design was the first to use large controlled temperature glass houses in combination with control environment cabinets. It has technical importance for its early use of solar panels.

The Phytotron is important for its association with the architect Sir Roy Grounds. His message “Cherish the earth, for man will live by it forever” is featured on the wall of the entrance. Although not a major example of an architectural style or Grounds' architectural work, it well demonstrates Grounds' design skills, with its innovative laboratory functional features and the modern style architectural expression of the building with its smooth wall surfaces and cubiform patterning in the sunhoods.

Description

The building has a row of glasshouses facing north with a masonry southern half containing a variety of other facilities. On the wall of the entry is a message from its architect, Sir Roy Grounds: “Cherish the earth, for man will live by it forever”. The building has four levels. The ground floor houses laboratories, offices, change areas, a workshop and plant areas, including the evaporating ponds and fans for the airconditioning for the upstairs laboratories. Level 2 has laboratories, the glasshouses, plant area and the main workshop. Level 3 has the staff room and level 4 is plant space.

The controlled environments for research are achieved in the 15 glasshouses lining the north of the building, as well as 400 refrigerated cabinets which are either used in conjunction with the glasshouses or located in another part of the building.

The building has a reinforced concrete structure and floors, with cement blockwork walls laid with straight joints. The exterior had face blockwork, and internally there is a mixture of face blockwork and some recently painted blockwork walls. The pitched roof is metal decking except over the glasshouses where it is glazed. The ceilings of all spaces, except those immediately below the roof, are painted concrete. The foyer originally had parquetry flooring, where in 2009 a fully glazed controlled environment laboratory, a central growth cabinet room, was created. An access ramp for the disabled and a display and information area to explain the building’s function and history were inserted in the foyer, with views deep into the research area.

The external windows and doors in the masonry walls feature concrete frames/hoods which protrude from the facade and have rounded corners. The south elevation also features painted rainwater downpipes at regular intervals which, with the fascia and gutterboard, a visual framing for the elevation. The building has an airlock in the west wall to allow for the controlled movement of material into the building. This replaced a former large fumigation chamber.

The building is equipped with solar panels for domestic hot water. These are an original part of the building's engineering services. They were a very early Australian example of the use of solar hot water, and are still operational.

The Phytotron displays some of the features of the Post-War International style, such as cubiform shapes in the patterning of the south elevation, plain, smooth wall surfaces, and external sun control hoods. To the south of the building, at the western end, there is a small courtyard which features a pond, grassed area, trees and shrubs. It is to some extent enclosed by a retaining wall set into the rising ground on the west.

There are three CORDYLINE AUSTRALIS located immediately to the west of the building. These New Zealand trees are said to represent three New Zealanders who had a strong association with the Phytotron - Otto Frankel, Lloyd Evans and John Ludwig.

Condition

Originally the Phytotron was equipped with three diesel generators to provide power in case mains power was interrupted. These were located at the east end of the building on the ground floor. At some time the generators were decommissioned and the area converted to a workshop. Another change to the building was the creation of a new entry door in the south elevation at the east end of the building.

The refurbishment of the building between 1998 and 2000 was to meet building compliance standards. This consisted of reglazing the glasshouse, new sunshades on the east end, replacement of the fumigation chamber at the west entrance with an air lock, repainting, floor tiling to southern entrance lobby, replacing terrazzo with painted fibro cement panels and cladding to balustrades alongside the glasshouses. The original stack bonded face blockwork exterior walls and some interior blockwork walls were rendered and painted.

In 2009 the laboratory working spaces were brought up to current standards, and the tubular entry canopy was restored to its original design.

Background/History

The Division of Commonwealth Scientific and Industrial Research (CSIR) was established in 1926 as a significant initiative by the Commonwealth to support scientific research. The CSIR decided to locate two of its Divisions, Economic Entomology (now Entomology) and Economic Botany (now Plant Industry) in

Canberra. In 1949 the Commonwealth Scientific and Industrial Research Organisation (CSIRO) was created to succeed CSIR. The CSIRO studies various aspects of plants. In the 1950s, the then Chief of the Division of Plant Industry, Dr, later Sir Otto Frankel investigated the development of the world's first phytotron dating from 1948 at Caltech, Pasadena in the United States of America. A phytotron is a controlled environment research laboratory for plant research. The history of the development of large-scale phytotrons is relatively recent. These laboratories were designed to address research questions related to plant adaptation and the influence of a variety of environmental factors such as light, water and temperature.

The phytotron promised a significant advance in the ability to study plant adaptation. Issues of plant adaptation were very important in Australia given the reliance on agriculture, horticulture and forestry. Previously plant-adaptation studies were undertaken at field stations in Australia. Frankel persuaded the CSIRO and Commonwealth Government to fund the construction of a phytotron in Canberra. Engineering and architectural design work was undertaken during the late 1950s.

The design of the phytotron differed from the American phytotron in the development of controlled environment cabinets used in conjunction with regulated glasshouses. The cabinets were designed by R.N. Morse of the Engineering Section of CSIRO. The building was designed by the architect, Sir Roy Grounds (1905-81) who established his practice in Melbourne in 1932 after travelling in Europe and America. He practised until 1937 and later worked on defence buildings during World War II. In 1954 he formed the practice of Grounds, Romberg and Boyd Architects. He became recognised as one of Melbourne's and Australia's leading architects of the modern movement. He was awarded the RAIA Gold Medal in 1968, and was knighted in the same year. Grounds designed many residential and public buildings in Melbourne and some in Canberra. His buildings in Canberra are the Australian Academy of Science (Shine Dome), (1959), Town Houses in Forrest, (1960), three houses in Vasey Crescent, (1961), Campbell and Nos 4 and 24 Cobby Street, Campbell, (1965-71) and the ANU Botany Building, (1968). Frankel knew Grounds through the latter's design of the Australian Academy of Science building. The Phytotron was completed in 1962.

The focus of the work of the Canberra Phytotron was agriculture, forestry and horticulture, and its prime research years to date were in the 1960s and 1970s. It was the major research facility for the Division during these years and is still in use today. The original quarantine procedures for the building were quite strict. However, in recent years this has not proved necessary and simpler procedures are now in operation.

Until the advent of the CSIRO Phytotron, field stations were trying to grapple with problems such as pasture development, especially for Queensland, as well as such problems as diseases in tobacco plants. The Phytotron was a major benefit to research in such areas. Other major achievements include the analysis of the control of flowering, and yield potential definitions and improvements. These latter studies are considered to be of international standing. Research at the Phytotron is also important in relation to research on global warming and carbon dioxide increase. As a national research facility, it has also been an important meeting place for scientists from around Australia and overseas.

Large-scale phytotrons were a product of the period 1948-1970s. Another phytotron was established in Australia, in Brisbane by the Colonial Sugar Refinery company to study sugar cane. This operated from the late 1960s until the early 1970s. It was decommissioned and largely stripped of equipment. The Brisbane phytotron was only about one-sixth the size of the Canberra Phytotron.

After the phytotron in Pasadena and another in Paris, the Canberra Phytotron was the third such facility in the world. This was followed by other phytotrons in Moscow, the United States of America and Europe. Some of the phytotrons built in other countries are still operating, but the original Pasadena phytotron has been demolished. A change in approach led to the use of small controlled environment cabinets, without large glasshouses, from the mid 1970s. Plant adaptation research has also shifted its focus to molecular botany and away from phytotron based research and the phytotron glasshouses are now largely used for transgenic plants.

The Canberra Phytotron underwent refurbishment between 1998 and 2000. Another renovation was carried out in 2009, when the building was reopened as the High Resolution Plant Phenomics Centre – part of the Australian Plant Phenomics Facility established in April 2008. The APPF has two nodes: The Accelerator in Adelaide and the HRPPC Phytotron in Canberra. The latter was entered in the 2010 AIA ACT Architecture Awards, and was awarded a Commendation for the way its architects, S2F Pty Ltd, enhanced the facility and successfully extended the life of the building for many years to come.

ANALYSIS AGAINST THE HERCON CRITERIA ADOPTED IN THE ACT IN SEPTEMBER 2014:

a. **Importance in the course or pattern of the ACT's cultural or natural history**

The Phytotron is important in the course of Australia's and the ACT's cultural history as one of a group of major expensive scientific facilities of the post-war Commonwealth Government scientific endeavour that include the Parkes Radio Telescope, Homopolar Generator at ANU and the Lucas Heights reactor.

c. Potential to yield information that will contribute to an understanding of ACT's cultural or natural history.

The CSIRO Phytotron has potential to yield information on the development of the scientific study of plant adaptation to climate and other environmental variables.

d. Importance in demonstrates the principal characteristics of a class of cultural or natural places or objects

The CSIRO Phytotron is a building in the Post-War International Style (c1940-c1960). Indicators of the style are its cubiform overall shape, plain smooth wall surfaces and external sun control hoods.

f. Importance in demonstrating a high degree of creative or technical achievement for a particular period

The CSIRO Phytotron demonstrates a high degree of creative achievement in its use of large controlled temperature glass houses in combination with control environment cabinets. It also has technical importance for its early use of solar panels.

h. Special association with the life or works of a person, or group of persons, of importance in our history.

The Phytotron is important for its association with the architect Sir Roy Grounds. Although not a major example of his architecture, it well demonstrates Grounds' design skills.

REFERENCES

- AUSTRALIAN HERITAGE DATABASE - Commonwealth Heritage List - Place ID 105560.
- J.R. Conner, *A Guide to Canberra Buildings*, A & R, RAIA, 1970.
- Duncan Marshall and Marilyn Truscott, *CSIRO Phytotron Conservation Management Plan*, 2005.
- Rapport Pty Ltd, *Heritage Issues Report and Statement of Heritage Impact*, 2013
- AIA ACT Chapter 2010 Architecture Awards Booklet.