Figure 22.1: *Google image of Royal Observatory, Cape of Good Hope. The H-shaped main building was completed in 1828*

22. The Royal Observatory, Cape of Good Hope, a Valuable Cultural Property

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22.1 Geographical Position

The **Royal Observatory, Cape of Good Hope** is the original name for the headquarters of the present-day South African Astronomical Observatory. It is situated in the suburb of Observatory, a part of Cape Town, Western Cape Province, Republic of South Africa. The entire property of 9 hectares occupies a small hill 3 km east of central Cape Town, within the **Two Rivers Urban Park**. The location was chosen to be within view of the City's harbour to permit the visual signalling of time to visiting ships. The property is one of the last remaining places close to the city centre where the original ecology of the area is preserved.

22.2 Longitude and Latitude

The Observatory is situated at longitude 01h 13m 54s.6 E; latitude 33° 56′ 03″.5 S; elevation 15m. This is the precise place occupied by the Airy Transit Circle, upon which all South African geographical positions were formerly based.

22.3 General Description and World Cultural Importance

The Royal Observatory, Cape of Good Hope, was created on 20 October 1820 by an Order of King George IV of the United Kingdom, a colony of which the Cape then was. The first building was completed in 1828.

For most of its existence it was the major contributor to positional astronomy in the southern hemisphere. Among its most noteworthy achievements are: the first successful measurements of the distance of a star (α Centauri) by Thomas Henderson in 1832/33 and the first use of photography to make a systematic sky survey (Gill, 1885 on). Gill was one of the leaders of the *Astrophotographic Congress*, the precursor of the *International Astronomical Union*.

22.4 Partial Inventory of Extant Items

22.4.1 Buildings

- The main building of the Observatory (see fig. 22.1, p. 210) was completed in 1828. The central part comprised observing chambers for a transit telescope and a mural circle as well as an entrance hall and two small computing rooms. The west wing comprised quarters for the Astronomer and the east for two assistants. It was designed by the noted naval architect John Rennie, Chief Engineer to the Admiralty.
- Other early structures include the south meridian mark for the mural circle (ca. 1828) and a dome running on cannon balls dating from 1849 (for the 7-inch Merz telescope).
- The 18-inch dome (former heliometer observatory), 1888.
- The McClean (Victoria) dome of 1897; an early work by the internationally famous architect Herbert Baker.

22.4.2 Some Movable Artefacts Surviving

- A repeating transit by Dollond, described in a publication of 1820. (used by the first astronomer before the completion of the main building).
- 7-inch telescope by Merz (1849). Used for Transit of Venus 1882. Used also by RTA Innes, the discoverer of Proxima Cen, for double star work.
- A speculum mirror by W. Herschel (1811).
- Time signal pistol 1833.
- Regulator clocks by Molyneux, Hardy, Dent and Riefler. The Hardy clock, which dates from the 1820s or slightly earlier, was in the Transit Room and was used by Henderson in his α Cen work; the Molyneux clocks (one each sidereal and mean) date from a similar time.
- Ross lens used by Gill for his epoch-making photography of Great Comet of 1882

- Large Dallmeyer portrait lens used for *Cape Photographic Durchmusterung* – the first photographic sky survey
- Eyepiece and lens of Airy Transit circle (installed 1854).
- "Kew Pattern" Heliograph by Dallmeyer (1878).
- 6-inch Grubb telescope (1882).
- Astrographic telescope (Grubb, 1889).
- McClean (Victoria) telescope (Grubb, 1897).
- Gill transit circle (1905), the precursor of all modern transit circles.
- 18-inch telescope (1955) on Heliometer mount by Repsold (1885).

In addition, the library, which is the National Library of Astronomy, is one of the most comprehensive astronomical libraries in the world, both for antique and contemporary material.

22.5 Brief Survey of the History of the Site and its Uses

In pre-colonial times the property was probably used for grazing by the indigenous San pastoralists. Later, but before it was acquired for the Observatory, the area was farmland, though rocky, treeless and windswept. It nevertheless supported a remarkable variety of seasonal grasses and bulbs. It is underlaid by greywacke, quartzitic limestone and shale. Although it is the habitat of many interesting flora and fauna, it is particularly noted for being the last remaining natural habitat of a rare Iris *Moraea aristata* and the northern limit of the Western Leopard Toad *Bufo pantherinus*, an endangered species.

From *ca* 1820 the property has been in use as an observatory. In 1971, it became part of the South African Astronomical Observatory.

No longer barren, over the nearly two centuries of its existence the site has been planted extensively with shrubs and trees to act as windbreaks.

22.6 Authenticity and Integrity

We are fortunate in having a number of photographs of the Observatory dating from ∼1842 (see fig. 22.2, p. 213). These are the oldest photographs taken in South African and the oldest of any observatory anywhere (excepting JFW Herschel's photograph of his father's 48-inch telescope).

Many of the buildings on the site are original structures. The Main Building, commenced in 1825 and completed in 1828, is still extant and has been modified only marginally. Two copper domes, shown in the 1842 photograph, were removed in 1883 and the central lantern structure was removed in 1961.

The Royal Observatory, as a living institution, has evolved continuously since its foundation. The original instruments, consisting of a transit and a mural circle, were located in the Main Building. By 1855, these had been replaced by a transit circle designed by Airy. In 1849 a 7-inch Merz telescope with dome was added. A magnetic observatory, comprising several buildings, was established in 1841 but none of these survive today.

Still within the 19th century, a photo-heliograph designed by Warren de la Rue was installed in 1876.

During the regime of David Gill, one of the greatest astronomers of the 19th century, activity on the site reached its zenith. Numerous buildings from Gill's time are extant, including the Astrographic dome (1888), the Heliometer dome (1888), the McClean dome (1895) and the Gill Transit Circle (1905).

The 20th century saw the New Offices (*ca* 1920), the WW II Optical Workshop (now lecture theatre), the Lyot coronagraph (1958) and the Technical Building (*ca* 1988).

Numerous other small buildings have come and gone during this period, including the Franklin-Adams telescope (ca 1909), the 40-inch (Elizabeth) Telescope (1964) and the Astrolabe Hut (ca 1960s).

22.7 Cultural and Symbolic Dimension of the Site

The Royal Observatory was the first major scientific institution to be erected on the continent of Africa, so far as is known.

For much of the 19th century it occupied an important position in the Cape Colonial hierarchy, His or Her Majesty's Astronomer being called upon to give advice and to serve on the boards of cultural and educational institutions.

To the general public it was known as the supplier of time services, operating a noonday cannon (as it still does) and time balls at various places in the Cape Colony. It was also the repository of standard weights and measures for the colony. The weather records are the longest-running in South Africa.

Today it forms the headquarters of the South African Astronomical Observatory, where astronomers have their offices, data reductions are carried out and instruments are constructed. The current observational activities of the SAAO are centred in Sutherland, about 400kms into the interior.

22.8 Documentation and Archives

All phases of the existence of the Royal Observatory are well-documented. Large amounts of material exist in the following archives: Hydrographic Office of the Royal Navy (UK), Royal Greenwich Observatory Archives (now in Cambridge University Library), the

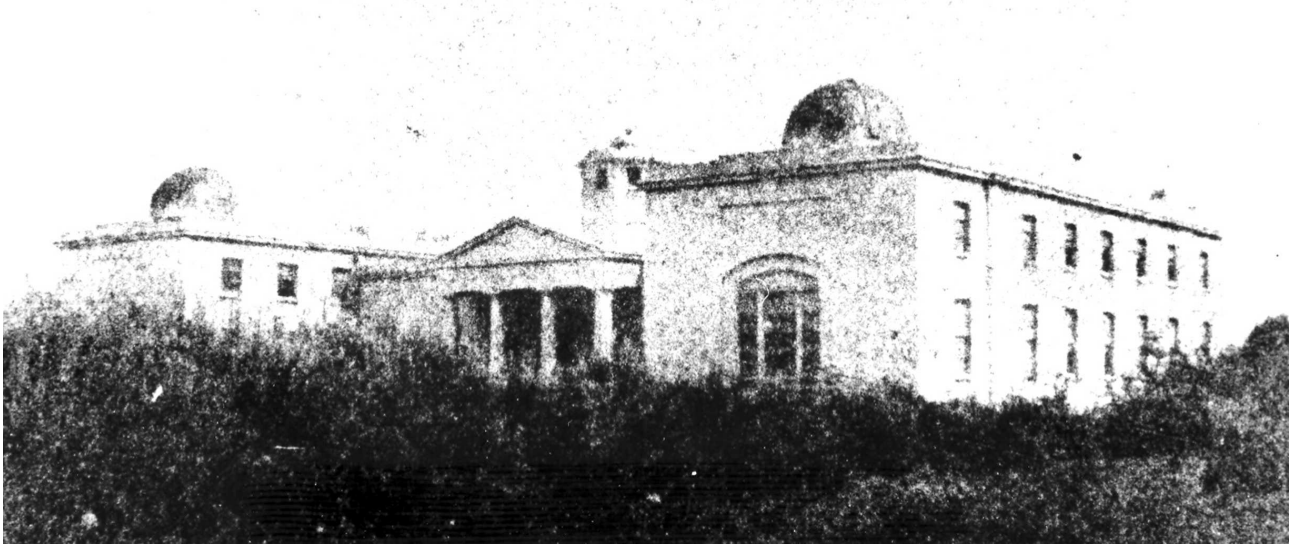

Figure 22.2: *Photograph of Royal Observatory ca. 1842*

South African Government Archives and, of course, the SAAO Archives, kept on the Royal Observatory site.

22.9 Present Site Management

The property is owned at present by the National Research Foundation (NRF), the umbrella agency of which the SAAO and a number of other scientific institutes form part. It is used exclusively for astronomical purposes.

Protection: The property is central to the Two Rivers Urban Park, a conservation area established by the City of Cape Town. It is bordered to the East and North by wetlands. As such, it is protected from encroachment.

22.9.1 State of Conservation of Buildings, Instruments and Archives

Most of the buildings are regularly maintained but certain of those not in use for current astronomical projects require restoration. In particular, the Gill Reversible Transit Circle building of iron and steel is in poor condition. The archives and retired instruments are generally well-protected from environmental damage.

22.9.2 Restoration and/or Maintenance of the Site and Instruments

Certain of the old instruments have recently been restored. These include the Merz 7-inch telescope and the de la Rue photoheliograph.

A museum in the former McClean laboratory contains a selection of the smaller antique instruments no longer in use, ranging from a Dollond Repeating Transit used by Fallows to the photometry equipment of A.W.J. Cousins.

22.10 Buffer Zone

The Royal Observatory site is partly flanked by preserved wetlands and the lower parts of the site itself are subject to occasional flooding, making them unsuitable for development.

22.10.1 Context and Environment, Landscape

The site is no longer dark and rural. Beyond the boundaries of the Two Rivers Urban Park it is surrounded by freeways and major roads, office buildings etc.

22.10.2 Archaeological/Historical/Heritage Research

The Royal Observatory is well documented historically in books by Gill and Brian Warner and by many articles in books and journals. Research on historical matters by various interested parties is fairly continuous. There is a keen interest in the history of the site and recently an independent "Friends of the Observatory" group has been organised, with restoration of old instruments and domes as a major theme.

An application to the South African National Heritage Agency is currently in progress. If approved it would be the first South African cultural site to be so designated for its scientific research history.

22.11 Main Threats or Potential Threats to the Site

The main threat to the Royal Observatory site lies in the ever-increasing pressure on open urban land from real-estate developers.

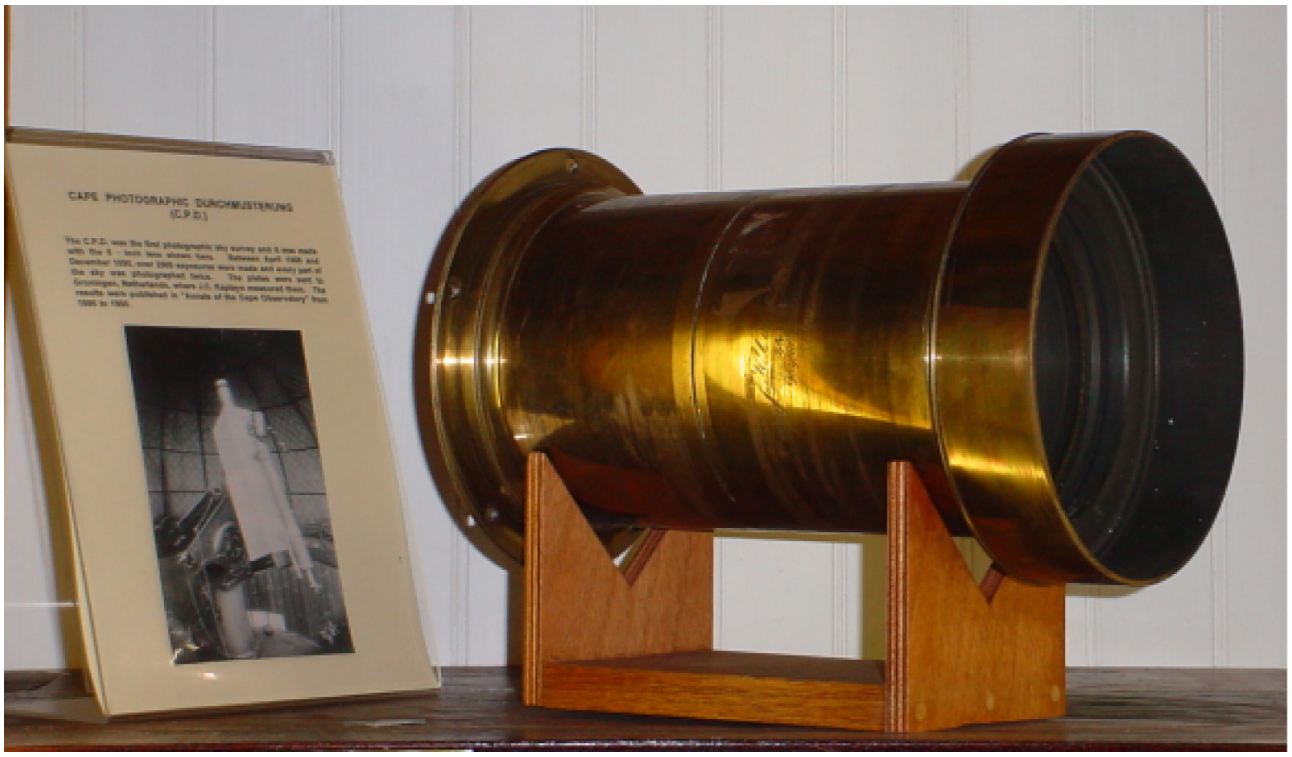

Figure 22.3: *6-inch (15 cm) Dallmeyer portrait lens, around 1884, used by Gill to produce the Cape Photographic Durchmusterung*

22.12 Environmental Study

Currently, an *Observatory Baseline Information Study* has been commissioned to better analyse the natural and urban environment of the site and better characterise its unique properties, with a view to preserving them.

22.13 Outreach

For many decades there has been a public outreach programme. Open nights are held monthly or more often, in which members of the public are given free of charge an introduction to the Observatory, a lecture on an astronomical topic and sky-viewing opportunities. In addition, many school and other groups tour the establishment during the daytime.

22.14 Bibliography

Gill, David: *History and Description of the Royal Observatory Cape of Good Hope.* London: H. M. Stationer Off. 1913.

Warner, Brian: *Astronomers at the Royal Observatory, Cape of Good Hope: A History with Emphasis on the Nineteenth Century.* Cape Town and Rotterdam: A. A. Balkema 1979.

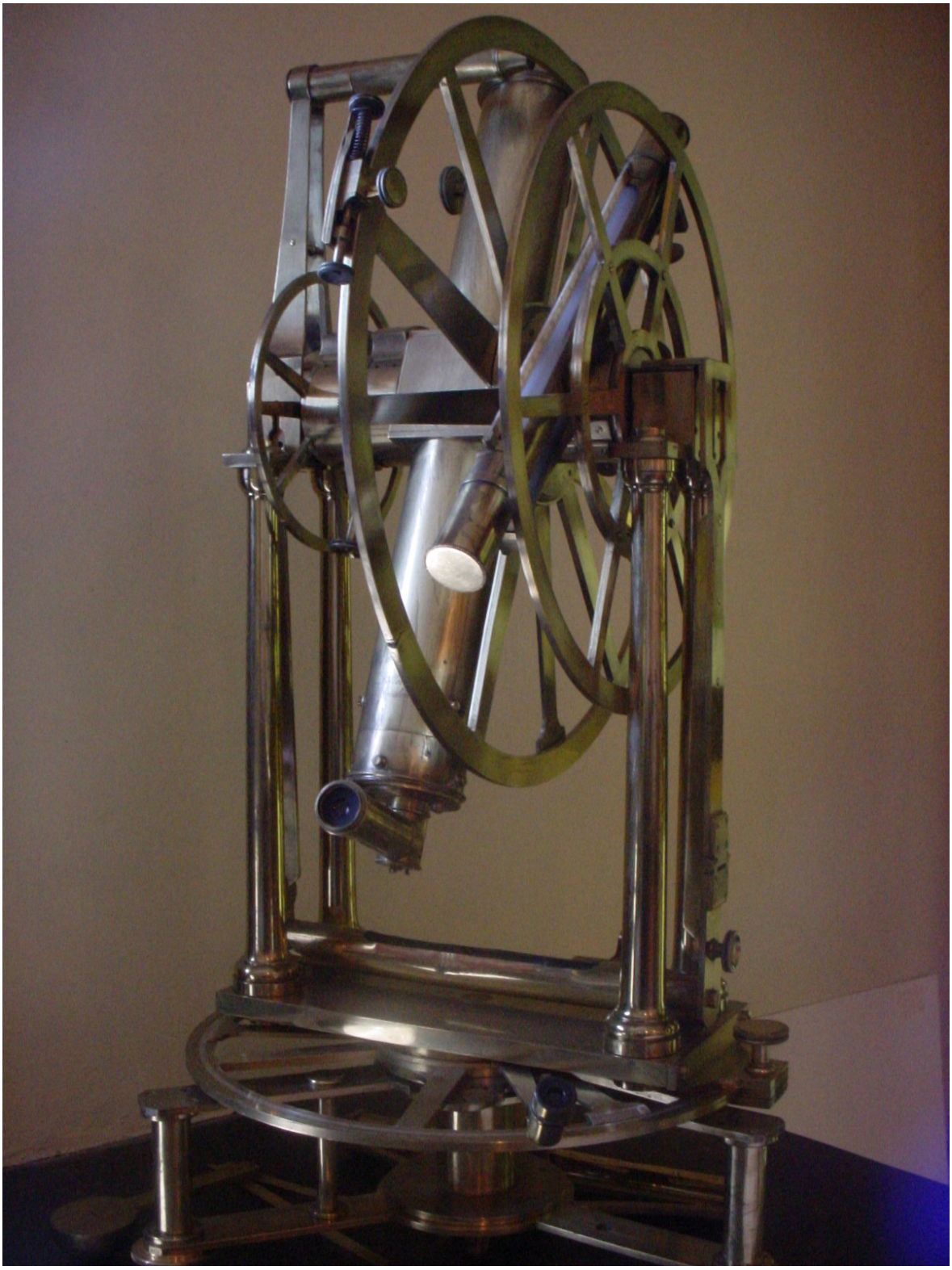

Figure 22.4: *Repeating Circle by George Dollond that was completed in January 1819 and was used by the director of the Royal Observatory before the main observatory was ready. (It is described in a paper "The Description of a Repeating Instrument upon a new construction" by G. Dollond. In: Memoirs of the Astronomical Society of London* **1** *(1822), p. 55–58)*