FEDERAL HERITAGE BUILDINGS REVIEW OFFICE

BUILDING REPORTS: 92-35, 92-41, 92-42

TITLE: Dominion Observatory, South Azimouth and Photo Equitorial buildings, Ottawa, Ontario

SOURCE: Jacqueline Hucker
Architectural History Branch

INTRODUCTION

The Dominion Observatory, constructed in 1902-4, was established to aid and improve the survey work of western Canada, through the investigation and application of positional astronomy. From the outset, however, its founders saw an expanded role for the Dominion Observatory as a centre for astronomical and geophysical research. It persued both sciences with distinction until 1970, when the astronomy activities of the observatory were taken over by the National Research Council. The observatory continues its work in geophysics under the mantle of the Geological Survey of Canada, which now occupies the building (Figures l - 6).

The Dominion Observatory was designed as a laboratory and research centre. Its basement, transit house, dome and photography unit used to house telescopes, chronometers and solar cameras, to mention but a few of the sophisticated instruments that were once part of the establishment. Since 1970, the 15 inch equitorial telescope, which used to be housed beneath the dome, and all other astronomical instruments have been removed. The transit house has been converted to a library, the photographic unit has become a drafting room and the remaining laboratories converted to offices, storage and library stacks. The observatory's doae, the South Azimouth building and the Photo Equitorial building have no function at present. These latter structures were built as shelters to protect scientific equipment. In this report, therefore, they will be evaluated like the transit house as extensions to the observatory, rather than as separate buildings.

The observatory ranks among the best buildings designed by David Ewart, the Chief Architect of the Department of Public Works. Despite the removal of the astronomical instruments and the changes this has brought to the building, the Dominion Observatory has retained its original character to a remarkable degree. The observatory has been submitted to the Federal Heritage Buildings Review Office because some of its exterior stonework is in very poor condition and requires immediate attention.

HISTORICAL ASSOCIATIONS

Thematic

Following Confederation in 1867, the federal government negotiated with the Hudson's Bay Company and the British government for the acquisition of Rupert's lands and the North-West Territory. Once these lands were transferred to federal hands in 1870, they had to be surveyed before they could be settled and developed. For the next 30 years, therefore, surveyors criss-crossed the vast area, providing boundary, railway and land surveys. Their work depended upon the measurement of latitude and longitude which, in turn, required a knowledge of correct time. In those years, this could only be obtained through astronomy. The indispensable role of astronomy to the survey of western Canada, led directly to the establishment of the Dominion Observatory. The calibre of the work performed by the new observatory, won international acclaim for Canada.

The Dominion Observatory was the first of only three Canadian observatories where advanced astronomical research was carried out in the first half of the 20th century.[1] It was established by three individuals who had worked with the survey teams, Edouard Gaston Deville, William Frederick King and Otto Julius Klotz. When Deville was appointed Surveyor-General in 1885, he recommended that a permanent observatory be established in Ottawa to improve and accelerate the survey work. Five years later an observatory was built on Cliff Street on the site of the present-day Supreme Court building. That same year Deville appointed King as the "Chief Astronomert" of the department. Klotz joined the observatory a year later.[2]

King soon found the site of the observatory inadequate, among other things it had no clear view to the east and west, and he lobbied for the construction of a much larger "National Observatory" building on a better site. It was King also who recommended that the work of the Astronomy Department be expanded to include pure science, reasoning that since astronomy touched on many disciplines, the work of the department could advance and stimulate scientific investigation throughout the country. In a memo headed "Stimulus to Science throughout the Dominion," King outlined the impact he thought such research would have on the country:

> The advancement of... "pure" science . ..means public benefit in many directions, benefits which may be quite unforeseen by the scientific investigator, but which the history of industrial development shows is sure to follow. A government cannot well afford to leave its interest in this direction wholly in the hands of foreign investigators, for each country has its own special problems to solve. Hence the advancement of science is a matter of national concern, worthy of careful consideration on the part of the Government.[3]

King's persuasive reasoning won the day and he and Klotz became the co-founders of the Dominion Observatory. The decision to build a new observatory was taken in March 1899. Sifton asked the Minister of Public Works to set aside $10,075 for the building in the spending estimates, which the Department of Public Works increased to $16,000. After some delay, in June 1901 the north end of the Central Experimental Farm was chosen as the location for the institution. The construction contract was signed by the Department of Public Works and Theophile Viau of Hull on 28 August 1902. Construction of the dome was undertaken by the Warner and Swasey Co. of Cleveland, Ohio.[4] The building was completed in June 1904 at a cost of $110, 047 (Figure 7).[5] Upon completion of the main building, in May 1905 work began on the extension known as the transit house, where the meridian circle telescope and transit instruments, used for the determination of time, longitude and star positions, were to be installed. This part of the building was completed in November (Figure 8). Installation of the telescope, however, proved complicated and it did not become fully operational until 1911.

In order for the meridian circle telescope to function properly it was necessary to define the azimouth - the arc of the horizon between the north or the south point and the point where the celestial great circle, passing through a heavenly body and the zenith, cuts the horizon. Defining the azimouth, therefore, required position marks north and south of the telescope. These were placed below ground beneath two piers. A telescope, which could be seen by tha meridian circle telescope, was placed on each pier. These "meridian" piers were initially enclosed by wooden shelters, but in 1912 they were housed in small stone buildings (Figures 6 and 9). Known as the North and South Azimouth buildings, they were lined up with the prime meridian. The North Azimouth building has since been removed, a victim of the widening of Carling Avenue in the early 1960s.

The Dominion Observatory was occupied by the Astronomy Division of the Department of the Interior. The division was responsible for boundary-line survey services, time service and meridian work, all of which came under the heading of positional or fundamental astronomy, the practical aspects of the science. The observatory remained a world leader in these fields until the 1970s, by which time, time keeping was no longer determined by the stars. Geophysics was a second area of scientific work in which the observatory quickly became a national and international leader.

In the first decade of its existence, the observatory was the only Canadian centre for the study of astrophysics. Its research in this field lead to the establishment of the only other centres for astronomical research in Canada before the Second World War, the Dominion Astrophysical Observatory in Victoria, British Columbia (built in 1915-17) and the David Dunlop Observatory (built in 1933) for astrophysical research at the University of Toronto.[6]

Astrophysics involved stellar photography and in the beginning the Astrophysical Branch mounted the 15 inch equatorial telescope with an 8 inch photographic telescope. This proved to be unsatisfactory as it interfered with the other work of the telescope and it was decided to acquire a separate photographic camera, which was delivered in 1912. A special structure known as the Photo Equitorial building was constructed to house the photographic telescope. It was completed in the summer of 1914 (Figures 5 and 9).[7] On octagonal structure surmounted by a dome 14 feet in diameter, it has an interior spiral stairway to the dome and a small dark-room for loading the photographic plates.[8] In addition to the stellar camera, the observatory acquired a coelostat - a flat mirror for tracking the sun and reflecting the image - which was set up behind the observatory (Figure 9). The development of the photographic plates took place in the laboratory on the second floor, where a large north facing window permitted the plates to be developed by natural light (Figure 8). In this room, the scientists carried out experiments with a variety of colour emulsions.

The scientific interests of the Observatory have changed with time, but the basic programmes begun at the turn of the century have survived. With the establishment of the Dominion Astrophysical Observatory, research in astrophysics receded and, following the formation of a separate Geodetic Survey of Canada in 1917, practical work reasserted itself, focusing once again on geophysics, and time and positional astronomy.[9] In the 1950-s, after years of mundane practical work, the observatory under a new director became heavily involved in the undeveloped field of meteor astronomy, a subject in which it continues to be a world leader.

Astronomers remained in the building until 1970, when thanks to the continuing importance of its research, the observatory became a victim of its own success. In that year, the government consolidated astronomical research with the National Research Council. The geophysics responsibilities of the Dominion Observatory were retained in the Earth Physics Branch. A further consolidation took place in 1986, which saw Earth Physics absorbed into the Geological Survey of Canada under the Department of Energy, Mines and Resources. The work of the observatory and its surrounding associated buildings is now concentrated in the fields of seismology, gravity, geodynamics and magnetics, as well as - in the studies of ground temperature and perma frost terrains.

Person/Event

Many excellent astronomers and geophysicists have been associated with the Dominion Observatory, however, its co-founders William Frederick King (1854-1916) and Otto Julius Klotz (1852-1923), together with John Stanley Plaskett (1865-1941) who joined the team in 1903, remain its most illustrious stars.

King, a superb mathematician, worked as a land surveyor and

topographical surveyor in western Canada before being appointed Chief Astronomer of the Department of the Interior in 1890. His determination to pursue pure scientific research committed the observatory to the study of spectroscopic binaries, or stellar spectroscopic work. So good was the observatory's research on binary astronomy that, by 1910, it had become a world centre for work on double stars. Within a few short years, it outgrew the 15 inch equitorial telescope and King oversaw the acquisition of a 72 inch telescope for the Dominion Astrophysical Observatory. In addition to his work at the observatory, King was president of the Royal Society of Canada and founding president of the Ottawa centre of the Royal Astronomical Society of Canada. His outstanding contribution to astronomy has been commemorated with a plaque by the Historic Sites and Monuments Board of Canada.

Otta Julius Klotz succeeded King as Director of the Observatory. A man who thoroughly enjoyed field work, he established positions along the CPR right-of-way through British Columbia in 1885, participated on the team that determined the longitude of Montreal and in 1903-04 he extended the longitude from Vancouver across the Pacific along the new cable route, closing the link previously established from England eastward to Australia.[10]

Klotz introduced the study of geophysics to the observatory. Under his supervision, the magnetic survey of Canada was begun and completed from the observatory. In 1916, Klotz established the magnetic observatory at Meanook, Alberta, for recording compass variation, of great importance in magnetic work. Thanks to Klotz also the observatory became a leader in the measurement of Canada's gravity field. It was in seismology, however, that Klotz made his most important and lasting contribution. He produced the observatory's first recording of an earthquake in January 1906, and on April 18th of that year, he was able to send a seismographic record of the San Fransico earthquake to the Ottawa newspapers.

John Stanley Plaskett was a brilliant astronomer who began his career with the observatory by helping to design and construct' instruments. His work on spectroscopic binaries was world class. He proposed the acquisition of the 72 inch equitorial telescope, at that time the largest in the world, and he became the first Director of the Dominion Astrophysical Observatory. In recognition of Plaskett's contribution in the field of astrophysics, in 1984, a minor planet was named for him and his son, who was also an astronomer.

Local Development

The Dominion Observatory was one of four major public buildings constructed in Ottawa during the expansionist years of the Wilfrid Laurier government. When Laurier came to power in 1896, the only notable Ottawa building erected by the federal government since Confederation was the Lanegvin Building (1883-89) . The Supreme Court was then housed in an old stable, the Geological Survey in a converted hotel and the Dominion

Observatory in inadequate facilities on Cliff Street. Disliking what he saw, Laurier vowed to turn Ottawa into the "Washington of the North." Between 1900 and 1914, the city witnessed the erection of the Dominion Observatory, the Victoria Memorial Museum, the Connaught Building and the Royal Mint. These prominent government buildings announced Ottawa's metamorphosis from lumber town to capital city.[11]

King had predicted that "the erection of an observatory, provided with a good equatorial with which to reveal the wonders of the heavens to members of parliament and other visitors, would throw a certain glamour and importance on the institution." He was right. The telescope held an unending fascination for the Ottawa public and, from the time of its installation, Saturday nights became the public night for viewing the stars. This service continued for the better part of 65 years, attracting people of all ages and from all walks of life. On nights of unusual heavenly activity, the line of visitors could extend as far as the main barn of the Central Experimental Farm.

For many years, the observatory supplied the correct time to all federal government buildings. At the beginning, four insulated wires ran from the observatory to the downtown. One pair controlled the time ball on Parliament Hill, which was dropped at noon and signalled the time to fire the noon-day gun, the second pair divided into four branches and ran to clocks in the government buildings on the hill and the Langevin building. These "slave clocks" controlled time dials in offices throughout the buildings. In 1907 the time service was extended to the Mint, the Post Office and to the Archives buildings. In 1909, 276 Ottawa clocks were on the circuit. This service was initially restricted to Ottawa because time services in other parts of the country were entrusted to the meteorological service observatories. In 1941 Dominion Observatory time became the official time of the nation.[12]

ARCHITECTURE

Aesthetic Design

The Dominion Observatory splendidly cloaks the functional needs of an astronomical observatory and research centre in the early 20th century pomp and circumstance style of the Wilfrid Laurier government. A blend of Romanesque Revival and Edwardian Classicism, its style combines references to institutes of higher learning with the contemporary taste for grandiloquent classical buildings with interesting domes. This eclectic blend of styles permitted the large heavy telescope to be seamlessly integrated into the architectural composition. Because the building was originally intended to stand on Parliament Hill, the Chief Architect, David Ewart personally designed its principal facade to ensure that the observatory would harmonize with existing government buildings (Figure 10). King and Klotz, in turn, took a keen interest in planning the building's research facilities

(Figure 11).[13] The result of such careful attention was an exceptionally fine building, well suited to both its scientific activities and to the government desire for a building which would express the federal and the national nature of the institution.

The focus of the building's design is the octagonal tower, which is four-storeys high and 34 feet in diameter. The tower houses a 13 foot diameter pier, which rises from a concrete base in the basement to the base of the dome, where it used to support the 15 inch telescope. The tower also functions as the main entrance to the building. It is Banked by two wings, 49 feet square, which recede at an angle of 15 degrees from the tower. The wings terminate in projecting bays. The dome, which until 1974 formed the covering for the telescope, is hemispherical. The wings have flat roofs, where telescopes and other astronomical instruments used to be set up. Access to the roof was by way of a covered entrance behind the dome. This was removed in the 1960s and replaced by the present projecting elevator shaft (Compare Figures 2 and 8). The observatory used to have additional covered entrances at either end of the building; however, the west entrance was incorporated into the transit house extension and, in more recent times, the east entrance was converted into office space.

The building materials consist of a concrete basement, load bearing outer walls of Nepean and Sackville sandstone and a concrete roof. The interior walls are brick. The roof is reinforced with a steel frame. Elsewhere, steel beams support concrete floors.

From a design point of view, the building has two sides, a principal public facade, upon which most of the decorative detailing has been lavished, and a functional side, where such features as the skylight in the photographic laboratory and the curved projecting wall of the stairs, are a direct expression of the building's functions. The two sides are harmonized by the masonry work. The principal material is a buff coloured Nepean sandstone with a rock-face finish. It is contrasted with a smooth-faced Sackville sandstone. This red stone imposes a strong, organized pattern on the building by broadly framing the windows and doors, by running in uninterrupted string courses around the building and by emphasizing the angular geometry of the octagonal tower.

Decoration is focused on the entrance way and drum of the dome. Here the Sackville sandstone is used for the heavy voussoirs and supporting Romanesque columns which frame the door, as well as for a prominent royal coat of arms above (Figure 12). The decorative tempo increases at the level of the drum. Here the focus is on a tightly packed line of brackets, a hall-mark of Ewart designs. The brackets, in turn, draw attention to the drum and copper dome. As befits the earlier time keeping function of the observatory, at the centre of the drum is a large clock face.

It is flanked by rows of windows framed by paired attached columns with foliated capitals. The drum is encirled by a small balcony with wrought-iron railings. The concentration of the rust red sandstone in this area contrasts with the green copper of the dome and surrounding natural landscape of the farm, giving the building a vibrancy not found in other Ottawa federal buildings of this period.

The transit house, the South Azimouth building and the Photo Equitorial building were given the same elaborate exterior treatment as the observatory (Figures 3, 5 and 6). Like all the housing for the large telescopes, which require an unobstructed view of the sky and the same interior and exterior temperature, the transit house used to have a partially opened roof and slate louvres in place of glass in the window openings. Its windows were glazed and its roof sealed in the 1970s. The roof of the South Azimouth building has also been sealed, however, it still has its slate louvres.

The inspiration for the Dominion Observatory is uncertain. At a meeting in January 1899, between King, Klotz and J. Fenning Taylor of the Chief Architect's office, to discuss the design of the future observatory, Klotz noted that the building's architectural design mattered more to Ewart than did its scientific requirements:

> Taylor said [we] might make any changes in the plan of the observatory but that Mr. Ewart doesn't want any change made in the elevation - This then is primarily to be an architect's observatory, the astronomer counting for little or nothing. Where in the wide world was ever an observatory designed on these 1ines...[14]

There was more than a grain of truth in this observation, as the charming appearance of the South Azimouth and Photo Equitorial buildings illustrate. With one resembling a small "medievalt" tower and the other an English Baroque tempietto, Ewart was clearly intent on designing a picturesque group of buildings, which would harmonize with the natural setting of the site.

At the time no observatory on this scale had been built in Canada and, in 1900, Ewart took a short European tour in search of inspiration for his major Ottawa buildings, which included the Dominion Observatory.[15] It is possible that on this tour he visited the famous observatory in Paris (Figure 13) as well as the Greenwich Observatory in London (Figure 14). Undoubtedly, the design of the Dominion Observatory, in turn, influenced the the David Dunlop Observatory in Toronto (Figure 15).

Most of the changes to the building have either been in response to the removal of the instruments or to the need to insulate the building. In an effort to make it more weatherproof, for example, in the 1960s, all the windows and the main doors were replaced. Little or no care has been taken with the South

Azimouth and Photo Equitorial buildings and they are now in a poor state of repair; both inside and out.

Functional Desian

The layout of the observatory was planned with help from King and Klotz to accommodate the requirements of a small scientific department (Figure 11). The care these men brought to the exercise has meant that the building continues to function in a satisfactory manner. The removal of the meridian transit telescope provided much needed room for the overflowing library, and the original photographic laboratory has been easily converted into a pleasant drafting room. Only the drum and dome of the tower, the South Azimouth and Photo Equitorial buildings remain non-functional.

Craftsmanship and Materials

A high quality of materials is found throughout the building, but particularly on the exterior. where the Nepean and Sackville sandstone, decorative wrought iron and the green copper of the dome all combine to give the building its distinctive appearance. The workmanship is of an equally high calibre. Rock-faced Nepean sandstone laid in broken courses is carefully balanced with the smooth Sackville sandstone. The carving of the foliated capitals of the columns flanking the entrance way, the incised letters above the entrance and the Royal coat of arms are especially fine (Figure 12). Unfortunately, the Sackville sandstone is spalling in many places and several pieces have fallen off the facade. These include the original Royal insignia, which used to ornament the roof line of the projecting west pavilion and the original date stone on the projecting east pavilion. Similar problems with the stone work: are evident on the South Azimouth and the Photo Equitorial buildings. In the case of these two structures, a waterproof coating may have been used on the exterior, to the detriment of the stone. The wrought-iron is noteworthy for its intricately worked design of gothic and classical details, which was designed to match the ironwork on the Parliament buildings.

The interior of the observatory building is in excellent condition and it has retained all the character of an early federal government office building. The walls of its two storeys, each 12 feet high, are built in a functional pressed yellow brick. The two-toned, ceramic tiled floors are in very good condition. The original high, moulded base-boards and panelled wooden office doors surmounted by transom lights are all still in place. As are most of the original light fixtures. Only the construction of the elevator shaft has caused damage to the building. To install it within the curved staircase, the original wrought iron railings were removed. However, a section of the railings at the top of the stairs has been preserved. Its busy pattern fits well with the rest of the interior details. Because the elevator shaft projects through roof, it also effects the exterior appearance of the building. Built in new, mis-matching materials, it is the one jarring note in an otherwise excellent composition.

The entrence has always functioned as a public information centre. In 1956, Jean Geuer, an employee at the observatory and a talanted artist, received permission to decorate the ceiling of the entrance lobby with a mural depicting the signs of the zodiac. Painted very much in the style and taste of the 1950s, its semi-abstract design and pastel colour scheme enhances the rather functional appearance of the space.

Although the 15 inch telescope was removed to the Museum of Science and Technology, attempts by the museum to dismantle the dome were strenuously resisted by the observatory's director. This movable, retractible dome is still in good working order.

Architect

The Dominion Observatory is an important building in David Ewart's oeuvre. As Chief Architect from 1896 to 1914, with a staff of 40 or more, Ewart was responsible for the design of all federal government buildings during the expansionist years of the early 20th century.[16] Because of its specific functional and site requirements, the Dominion Observatory is smaller and less prominently sited in the city than, for example, the Victoria Memorial Museum, the Dominion Archives, the Connaught Building and the Royal Mint; however, thanks to Ewart's insistence that his design for the facade not be altered, the government acquired an excellent building, which perfectly expresses its role as the Dominion Observatory.

Site

At the time of construction, the location of the Dominion Observatory was described as being "near the north gate of the farm, about half a mile northwest of the farm offices, and two and a half miles from the Parliament Buildings."[17] Klotz and an assistant surveyed the property to obtain the precise siting and angle for the building, which was necessary for the proper working of the telescope. The crucial view was north to south, therefore, the bulk of the building runs east to west.

Today, the 2.5 hectare site is bordered on the north by Carling Avenue and on the west by Observatory drive, which runs from Carling Avenue to the centre of the Experimental Farm. The east boundary is defined by the parking lot of the John Carling building, however, the south boundary is less well defined. Early photos show that a low hedge separated the farm property from the observatory. This-had disappeared by the 1940s, when for the duration of the war the farm turned its gardens into cultivated fields (Figure 9). The observatory sits on the highest point of land on the property.

The original structures consisted of the observatory, the North and South Azimuth buildings, the Photo Eguitorial building and the transit building. Shortly after the construction of the observatory, the machine shop was moved out of the building and housed in its *own* shed on a corner of the property. The building known as the "red barn' was also an early arrival to the site.

It was built to house the standards laboratory of the Geodetic Survey and to calibrate the chaining tapes. The Director's house was erected in 1910 on a site that appears not to have been part of the original land grant. When the Geodetic Survey split from the observatory in 1917, it was housed in a new building behind the observatory (Figure 9). The Geophysics building was constructed in 1955. Until this date all changes to the site had been in keeping with the nature of an expanding institution, but in the early 1960s Carling Avenue was widened, resulting in the loss of the North Azimouth building and the truncating of the "red barn" (Figure 18).

The landscape remains much as it was when the observatory opened. At that time, the curved driveway was laid out and gardeners from the Experimental Farm planted the trees. An early photograph shows flower beds in front of the observatory tower (Figure 7), but when Klotz became director, he decided that a flowerbed sundial was the most appropriate landscape feature for the observatory. The sundial is still in place in front of the main entrance.

Setting

To use the words of the Chief Astronomer in 1902, the primary requirement of an observatory is "a clear view of the heavens." To this must be added, distance and isolation from other buildings, whose lights can interfere with the work of the astronomers. It was with this in mind that the raised site on the experimental farm was chosen. The Dominion Observatory building remains the focus of a group of harmonious buildings. The area around the observatory has been altered by the encroaching city to the north, and by the construction of the multi-storey John Carling building to the east. Nevertheless, Carling Avenue, and the Experimental Farm provide important barriers which protect and maintain the original character of the "observatory campus."

Landmark

The dome of the Dominion Observatory rises above the tree-line on the north edge of the Experimental Farm, in clear view of Carling Avenue. The building's distinctive shape and colour, as well as its long and important involvement with city life, has made it one of the most well-known and easily recognizable of Ottawa's public buildings. Thanks to the attraction of its telescope, many thousands of citizens, have passed through its doors and climbed up to its dome. Despite the fact that it no longer has its telescope, city guides continue to list the Dominion Observatory as one of most important buildings in Ottawa.

Endnotes

1. Richard A. Jarrsll, The Cold Light of Dawn: A History of Canadian Astronomy (Toronto, Buffalo, London: University of Toronto Press, 1988) (hereafter referred to as Jarrell, The Cold Light of Dawn), p.87.

2. This and all other information on the history of the building of the observatory has been taken from J. H. Hodgson, The Heavens Above and the Earth Beneath: A History of the Dominion Observatory: Part 1. to 1946, (Ottawa: The Geological Survey of Canada, 1989) (hereafter referred to as Hodgson, The Heavens Above and the Earth Beneath) and in conversation with J. H. Hodgson, who kindly gave a day of his time to the subject.

3. Ibid., p. 11.

4. Robert Hunter, "The Ottawa Buildings of David Ewart," Research Paper, Arts Department, Carleton University, 1979, p. 13.

5. Canada. National Archives, Department of Public Works, RG11, vol. 1302, p. 106.

6. Jarrell, The Cold Light of Dawn, p.88.

7. R. M. Motherwell, "The New Photographic Telescope of the Dominion Observatory," Journal, The Royal Astronomical Society of Canada, Vol. VIII, No. 5 (Sept.-Oct., 1914), p. 305.

8. Ibid., p. 306.

9. Jarrell, In The Cold Light of Time, p. 88.

10. Canadian Encyclopedia S.V. Klotz, Otto Julius.

11. s. Coutts, "Victoria Memorial Museum," Federal Heritage Buildings Review Office, Building Report 85-56, volume 16, p. 127.

12. Jarrell, In The Cold Light of Dawn, p. 90.

13. Hodgson, The Heavens Above And The Earth Beneath, p. 13.

14. Klotz's diary entry for 13 Jaunuary 1900, quoted in Hodgson, The Heavens Above And The Earth Beneath, p. 13.

15. Canada; Department of Public Works, Annual Report, 1901, p. 9.

16. s. Coutts, "Victoria Memorial Museum," Federal Heritage Buildings Review Office, Building Report 85-56, volume 16, p. 134.

17. Klotz's diary entery, June 1901, quoted in Hodgson, The Heavens Above and The Earth Beneath, p. 14.

THE DOMINION OBSERVATORY, OTTAWA, ONTARIO

1 The Dominion Observatory, Ottawa, Ontario; built 1902-04, David Ewart, architect; the principal façade. (Department of Energy, Mines and Resources, 1992.)

2 The Dominion Observatory, rear façade. (Department of Energy, Mines and Resources, 1992.)

THE DOMINION OBSERVATORY, OTTAWA, ONTARIO

3 The Dominion Observatory, showing the transit house built, 1905. (Department of Energy, Mines and Resources, 1992.)

4 The Dominion Observatory; the west wing and transit house. (Department of Energy, Mines and Resources, 1992.)

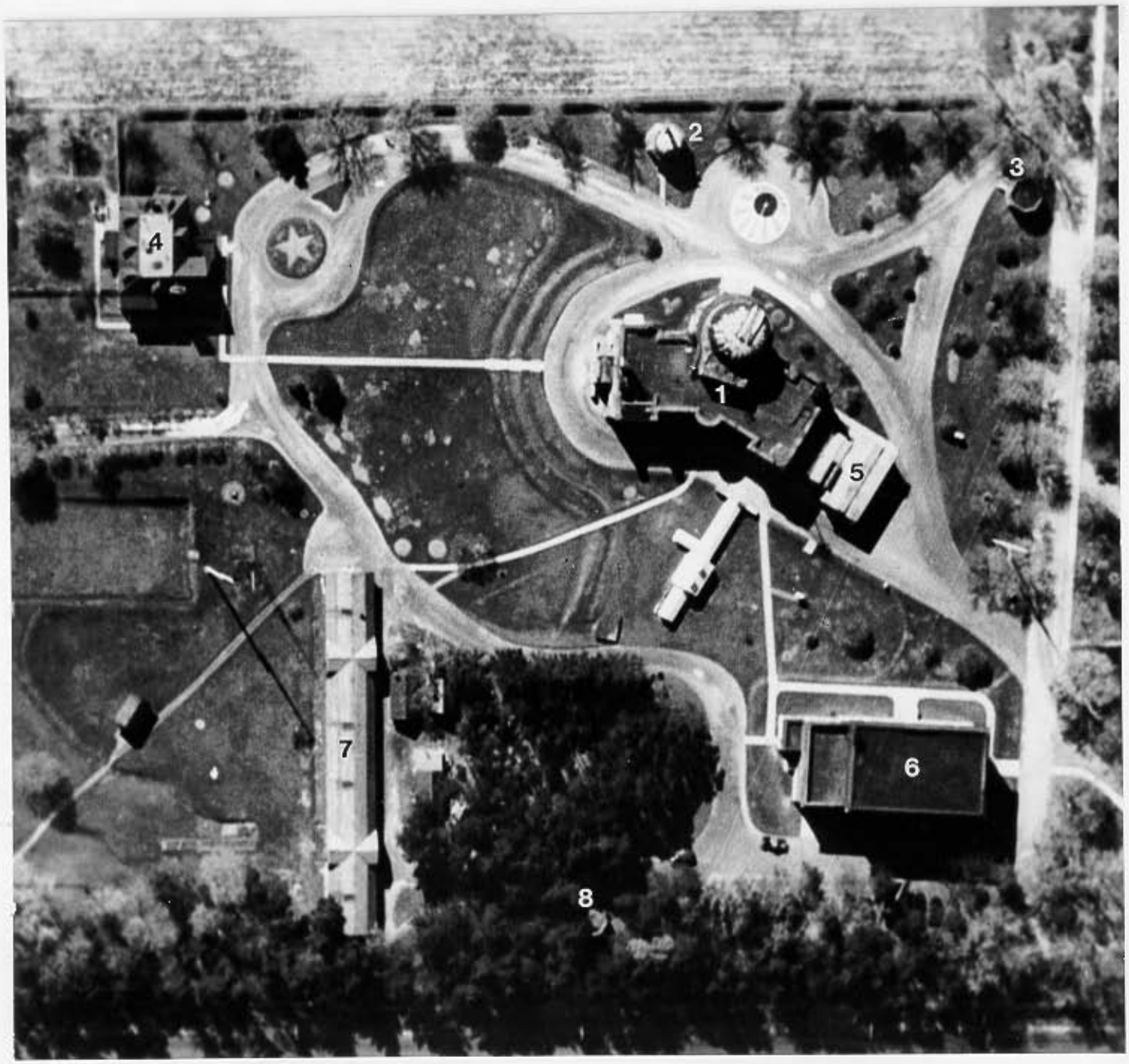
5 The Photo Equitorial Building, built 1914. (Department of Energy, Mines and Resources, 1992.)

6 The South Azimouth Building, built, 1912. (Department of Energy, Mines and Resources, 1992.)

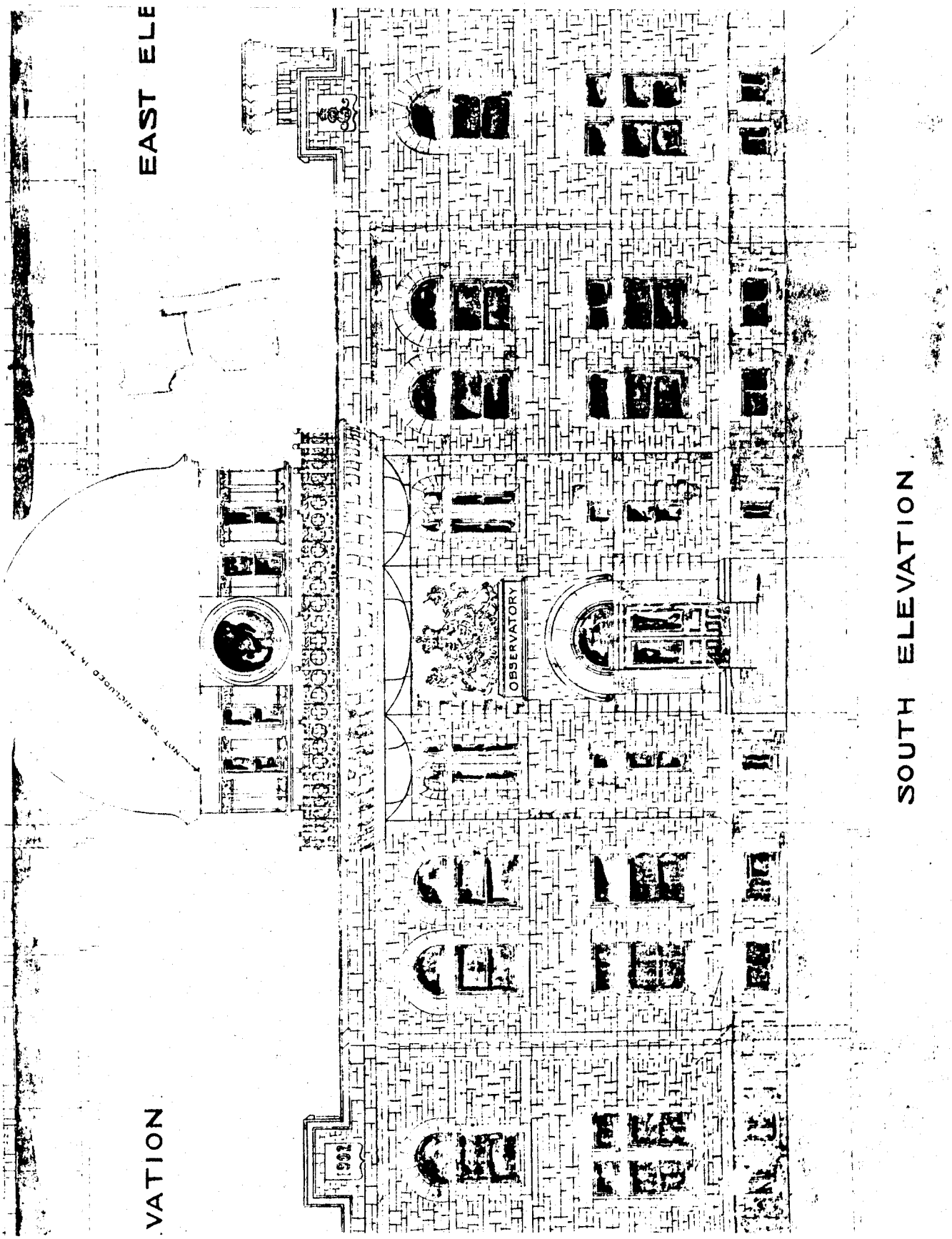
THE DOMINION OBSERVATORY, OTTAWA, ONTARIO

7 The Dominion Observatory, pre 1916. (Jarrell, The Cold Light of Day, n.p..)

8 The Dominion Observatory in 1905 showing the partially completed transit house. (Courtesy of J. H. Hodgson.)

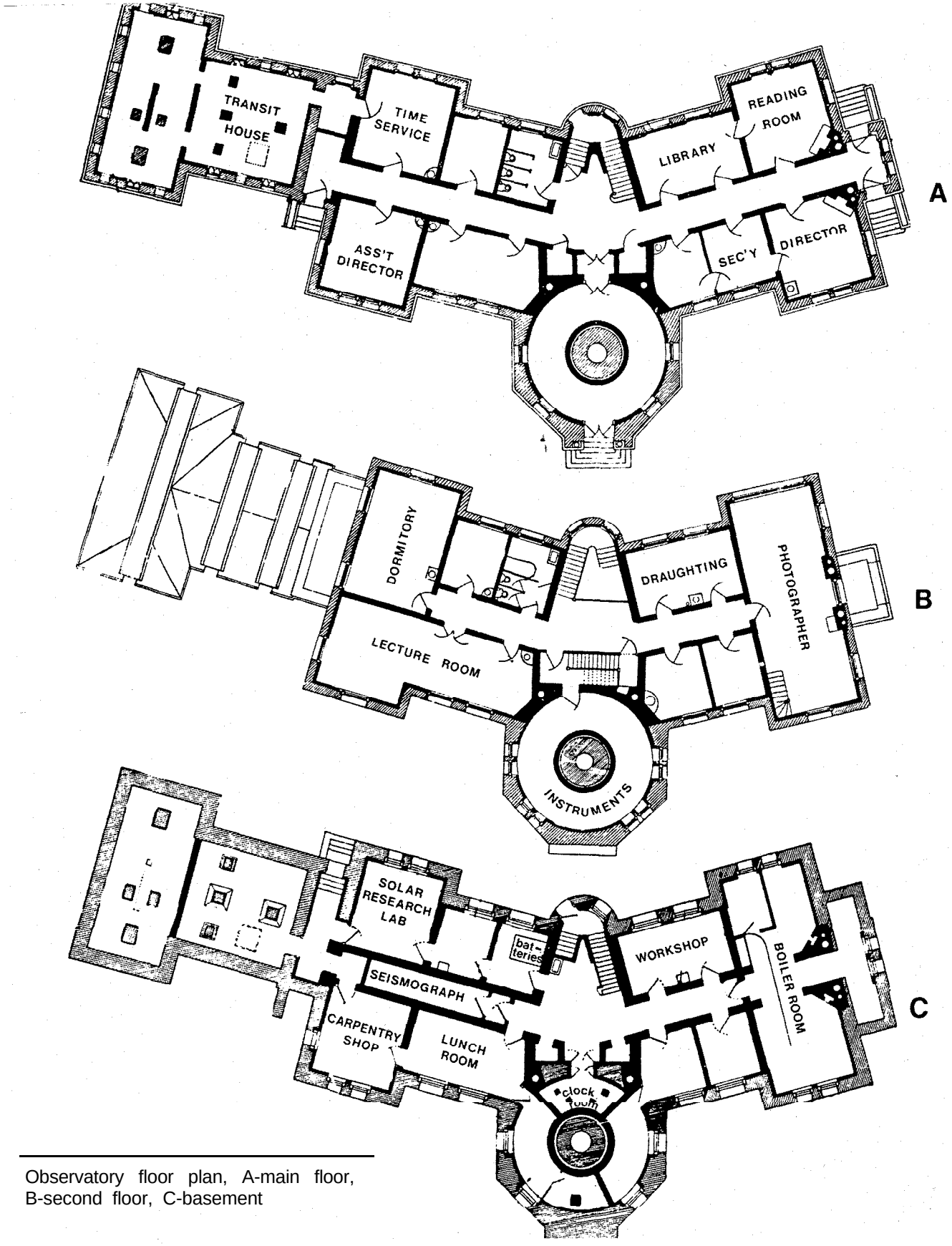


9 The Dominion Observatory and surrounding buildings in 1946: 1, Dominion Observatory, 2, Photo Equitorial building, 3, South Azimouth building, 4, Chief Astronomer's house, 5, transit house, 6, Geodetic Survey building, 7, "Red Barn", 8, North Azimouth building. (Courtesy, J. H. Hodgson.)



10 Plan of the principal façade drawn by David Ewart. (Courtesy of K. Blades.)

THE DOMINION OBSERVATORY. OTTAWA. ONTARIO

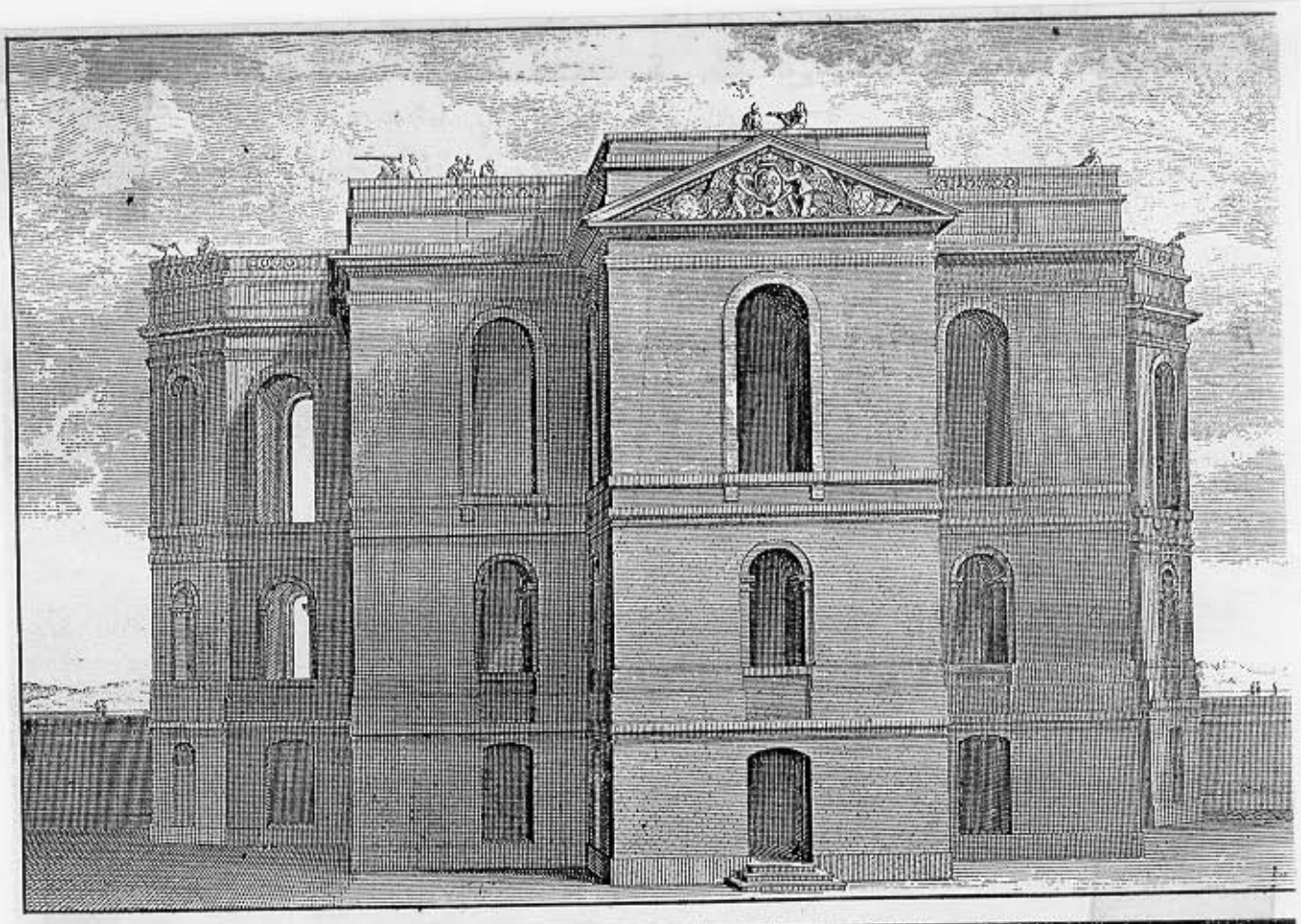


Observatory floor plan, A-main floor, B-second floor, C-basement

11 Plan of the Dominion Observatory in 1906. (Department of the Interior, Report of the Chief Astronomer, 1905, App. 1.)

THE DOMINION OBSERVATORY, OTTAWA, ONTARIO

12 The Dominion Observatory, the tower. (Department of Energy Mines and Resources, 1992.)

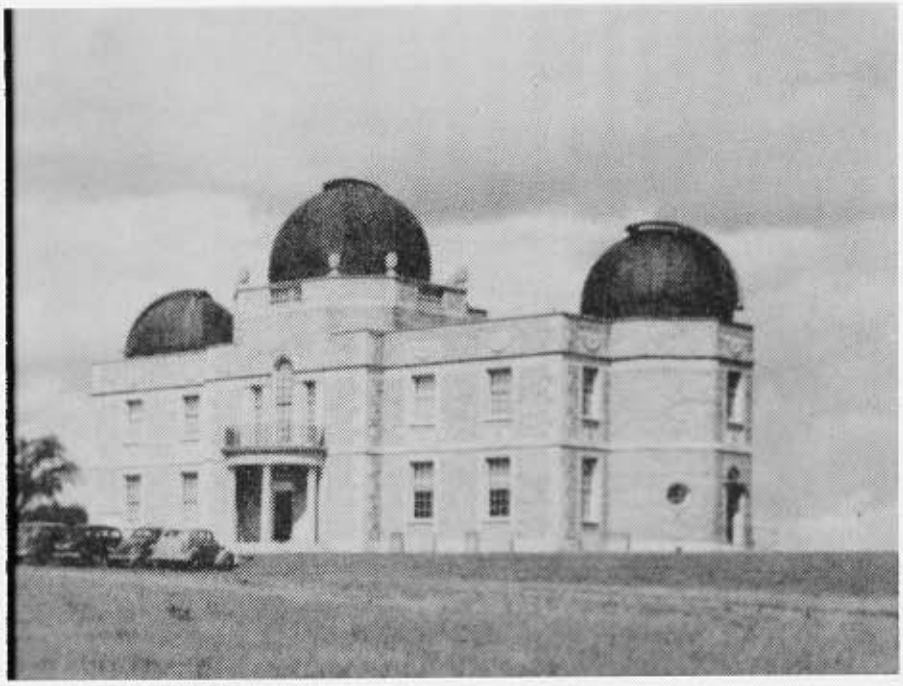


FAÇADE SEPTENTRIONALE DE L'OBSERVATOIRE.

13 The Paris Observatory. (Histoire de l'Observatoire de Paris de sa founation à 1793 [Paris: Gauthier-Villars, Imprimeur-Libraire de l'École Polytechnique du Bureau des Longitudes, 1902.)

THE DOMINION OBSERVATORY, OTTAWA, ONTARIO

14 The Greenwich Observatory, London. (The Royal Observatory, at Greenwich [London: Her Majesty's Stationary Office, 1986], n.p..)



15 The David Dunlop Observatory, Toronto; built 1933. (Jarrell, The Cold Light of Dawn, n.p..)

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16 The "Observatory Campus" in 1965 showing: 1 observatory, 2, Photo Equitorial building, 3, South Azimouth building, 4, former Dominion Astronomer's house, 5, former transit house, 6, Geodetic Survey building, 7, "Red Barn", 8, Geophysics building.