

plant for which Rs. 50,000 were placed at his disposal ; against this grant, Rs. 44,802 only were spent.

7.—

Amphitheatre.

Lord Lytton was the first Viceroy in English times who inaugurated an Imperial Durbar to solemnize the assumption of the title of Empress of India by Her late Majesty Queen Victoria in January 1877. The amphitheatre then designed was in the form of a double crescent. This shape served its purpose very well at the time, but was unsuited to the present occasion for two reasons, firstly, that the present Durbar was to be on a much larger scale ; secondly, because it was decided that His Excellency the Viceroy and His Royal Highness the Duke were to personally receive the congratulations of Native princes, which was not the case in the Durbar of 1877, when the ceremony consisted of merely reading out a proclamation. A new shape had therefore to be devised and the idea of a horse-shoe plan originated with His Excellency himself who entrusted Colonel Jacob (now Sir Swinton Jacob) with the preparation of designs. This he prepared accordingly, but His Excellency did not accord his approval to the plan till he determined on his visit, on 18th April 1902, the exact dimensions, and this he decided by actual measurements on the ground as to how far his voice could reach. The plan having thus been decided upon, the next thing to consider was the elevation. Sir Swinton Jacob suggested a light canopy with the exterior in alternate stripes of white and blue, stretched over a series of rail posts about 10 feet apart with an elevation resemble a facade of saracenic design broken at every 13 feet by a cupola of oriental design and the ridge surmounted by emblematic banners, representing the Star of India and other devices. His Excellency gave his general approval to the design, and he entrusted the execution of the engineering details to Rai Bahadur Ganga Ram and the decorative details to Bhai Ram Singh of the School of Arts, Lahore. A model was hence prepared by his command and sent for his approval and the result was a complete change, both structural as well as ornamental. From the structural point of view, a simple truss was designed to cover the whole width of the arena 52 feet wide, subsequently extended at the back with a smaller truss to over the terreplein, thus roofing in the entire frontal space of the arena amounting to 90,000 square feet. This change was made to secure a clear view of the ceremony for every one seated in the arena.

The next thing to consider was the structure of roof covering, and one paramount consideration in the engineer's mind was to be prepared for a heavy shower of rain or a heavy gale of wind, things not at all unusual in Delhi during Christmas week. To get over this difficulty, combined with His Excellency's command that the exterior was to look like marble, the roof was designed of plain thin sheet iron laid with an overlap longitudinally, the edges rolled and beaten down transversely, each sheet being held by S. clips of thin sheet iron.

These sheets were thus nailed on boarding, resting on common rafters. The surface was then neatly painted dull-cream-white and a cream white ceiling of cloth was stretched on the underside of the rafters. The trusses and pillars being also painted cream white, the whole arena looked most effective from roof to floor, as if made of marble throughout. All flags, banners, etc. were omitted, thus presenting a most solemn yet gorgeous spectacle of oriental architecture. In designing pillars and in finishing off the ends, precautions were taken to provide against a heavy gale of wind and the entire structure was well secured by struts, wind ties and holding-down bolts.

The centre of this amphitheatre coincided with the centre of the Dais of 1877 and the bearing of the centre line passing through the Dais was 18 N. N. E.

The inner line at the first row of seats was described by a radius of 180', leaving an opening on the north side 220 feet wide, with the ends rounded off. The width of the Viceregal platform was determined by His Excellency on the spot.

The platform of the arena of the amphitheatre at first seat was 2 feet above ground level and the Dais platform 4 feet above ground level. The canopy of the Dais had a plinth of 2 feet above the platform and the design of the canopy was purely oriental, with four pillars surmounted by a dome, and the interior worked out in gypsum in a series of pendentive arches interlaced in pure Moghul style. The Imperial flagstaff was 100 feet high above ground level placed in the centre of the arena, while the Viceregal flagstaff was erected at the back of the Dais with a height of 70 feet above the platform. Round the Imperial flagstaff the ground was turfed right upto the edge of the driving road, and the massed bands took up their position just behind the Imperial standard. The terreplein of the amphitheatre was 12 feet above ground or 10 feet above the front terrace ; thus giving a six inch tier to each row, total number of rows being 20 ; the width of each of the first four rows was 3 feet to admit of chairs being placed for Native Chiefs with their European officers and ministers ; the rest were 2½ feet wide with cushioned benches. On the terreplein there were 3 rows of benches, each row being 6 inches above the other, and thus the total seating accommodation was 2,500 in chairs and 10,931 in benches. To this add standing room for 2,569 on terreplein, thus giving total accommodation for 16,000.

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The gross cost of the amphitheatre is Rs. 3,37,994, out of which Rs. 29,748 have been already realised upto the end of March 1903 and Rs. 35,117 more are estimated to be realised before the accounts are closed, leaving a nett cost of Rs. 2,73,129.

This includes several items of which a part might reasonably have been charged to other works. Such items are:—

	Rs.
Hutting accommodation for labour	17,500
Cost of importing labour	10,000
Chairs and benches which were also used in other functions, such as those in the fort, Polo club, Arts Exhibition, seating for State entry, &c	29,000
Total ...	56,500

We may add to this—	Rs.
Cost of roads	10,500
Gravel	11,620
Turfing	5,405
Viceregal Dais	9,414
Total ...	93,439

or with contingencies and petty establishment upon this item, say in round numbers one lakh. The nett balance on the amphitheatre proper is Rs. 1,75,000, which on an area of 90,000 s. ft. works out to less than Rs. 2 per s. ft.

8.—Additions to buildings in the Fort.

For the two important functions of the Investiture and the State Ball, His Excellency the Viceroy selected the two famous buildings in the Fort, the Diwan-i-Am or the public audience hall and the Diwan-i-Khas or the private audience hall—

It will perhaps not be out of place to briefly quote here the remarks on these two buildings by Fergusson in his History of architecture.

“The great audience hall is very similar in design to that at Agra but more magnificent. In its centre is a highly ornamental Niche, in which on a platform of marble richly inlaid with precious stones and directly facing the entrance, once stood the celebrated peacock throne, the most gorgeous example of its class that perhaps even the East could boast of.”

“The celebrated Diwan-i-Khas or private audience hall is not the most beautiful, certainly the most highly ornamental of all Shahjehan’s buildings. It is larger certainly and far richer in ornament than that at Agra, though hardly so elegant in design, but nothing can exceed the beauty of the inlay of precious stones with which it is adorned, or the general purity of the design. It is round the roof of this hall that the famous inscription runs:—If there is a heaven on earth it is this, it is this, which may safely be rendered into the sobriest English assertion that no place now existing in the world possesses an apartment of such singular elegance as this.”

Diwan-i-Am.—The Diwan-i-Am is built of red sand stone on a plinth 6 feet high and the great hall is sub-divided into 27 compartments by pillars carrying scalloped arches turned longitudinally as well as transversely and roofed with slabs laid flat on a deep coved cornice. The pillars, arches, and roof are all constructed of red sand stone.

The clear height from the floor to the underside of the roofing slabs is 25 feet. The wall behind the throne is veneered with marble and inlaid with beautiful mosaic and recessed 6 feet, with a door leading to the private apartments.

In the front and the two ends the scalloped arches rest on double pillars of the same section as the inner ones and have a deep corbelled cornice projecting 6 feet from the wall counter-balanced by a heavy parapet with domed turrets at each end of the facade.

The Diwan-i-Khas or court of private audience stands about 500 feet north-west of the Diwan-i-Am. It is a pure white marble hall about 90 feet long by 67 feet wide constructed on a marble terrace raised 4 feet above ground. The court consists of an inner hall 48 feet by 27 feet with a beautifully scalloped arch-opening resting on marble pillars 4 feet square, each pillar has panels profusely decorated with patterns in mosaic inlaid with precious stones most of which have been abstracted and their places filled in with inferior material. An open verandah or gallery about 10 feet wide of the same height, with arches and pillars of a similar design and decorated in the same manner, runs all round the inner hall. The ceiling is of wood ornamented with oriental fret work patterns with gilt edges. The total height of the building is about 20 feet from the plinth level to the underside of the ceiling.

The marble terrace extends about 46 feet on both sides of the hall to the "Hummams" or Imperial baths on the north side and to the ladies private apartments on the south, which are all of white marble and contain some beautiful marble screens."

The Diwan-i-Am was selected for the Investiture ceremony and the Diwan-i-Khas for refreshment and sitting out purposes, but neither of the buildings being sufficiently spacious, temporary additions had to be made, which were designed according to the following instructions from His Excellency :—

- (a) The Diwan-i-Am to be trebled in size; the middle third to be without pillars so as to afford a clear space for the seats of those invited to attend the Investiture ceremony, and for dancing on the 6th January.
- (b) The accommodation in the Diwan-i-Khas to be increased by covering in the open spaces and all archways and windows to be closed.
- (c) The Diwan-i-Am and Diwan-i-Khas to be connected by a covered way 20 feet wide.
- (d) A covered way 8 feet wide to be made between the Diwan-i-Am and the temporary railway station at Selimgarh for the use of guests arriving by special trains from the Central and military camps.
- (e) Both the Diwan-i-Am and Diwan-i-Khas to be heated by hot water-pipes.
- (f) No injury to be done on any account to the existing structures.

Diwan-i-Am—The clear dimensions for the ball-room were 167' 6" x 52' 3", the floor level being 5" below that of the Diwan i-Am. The pillars at either end were made of brick plastered over to resemble red sand stone, but in the construction of the double row of pillars in the longitudinal wall, careful consideration had to be paid to the fact that the arches were not to be interlaced as in the Diwan-i-Am and that they had to support the weight of a roof of 52' 6" span. Masonry pillars, whether of brick or stone, were unsuitable because the time available was too short to allow masonry to set and because, unless elaborate steps were taken to turn inverted arches to spread the superincumbent load, the weight on the soil would have been nearly 2 tons per square feet, which would have been unsafe. Hence it was decided to construct them of *sal* wood posts 10' x 10" strongly braced. The appearance of stone pillars with cusped arches of sand stone was achieved by means of lath and plaster laid on skeleton frames of wood nailed on to the pillars and cross braces.

The roof was made of 24 B. W. G. corrugated sheets laid with a good overlap of 1 foot, with a slope of 1 in 30 from east to west. These sheets were supported on metre guage rails placed 3 feet apart on trussed girders constructed in the Roorkee workshops. As the girders had to be laid perfectly level to obviate any danger of their causing horizontal thrust to the row of wooden pillars, and as the rails had to be laid at a slope of 1 in 30, an intermediate frame of wood was introduced which gave the required slope and permitted of rails and girders being well secured by bolts and clamps.

Various suggestions were made for the ceiling, and it was finally decided on the occasion of His Excellency's last visit on the 4th December that it should be made to resemble as closely as possible the ceiling of the Diwan-i-Am. This was successfully completed in a very short time by bolting on to the wooden struts of the undertrussed girders wooden frames representing the outlines of the coved cornice and by nailing laths on to these frames, from which painted cloth was stretched. The effect was all that could be desired. The roof had the appearance of being supported on substantial stone beams with intervening panels of red sand stone, thus presenting an exact fac-simile of the ceiling of the Diwan-i-Am. The fret work in the centre of each panel was even reproduced and was used for ventilation and for the passage of wire frames to which the electric lamps were hung.

The floor of the Ball room proved excellent for dancing, and was very moderate in cost. Walls 4 feet high of bricks in mud were constructed across the room at intervals of 10½ feet. Over these walls, sleepers of Indian pine were laid to form continuous bed plates on which metre guage rails each 23 feet long were placed, each rail spanning two wall openings. These rails were boxed with wood on to which was screwed 1½" boarding of pine and over this thin teak boards measuring 3" x ½" were fixed with butt joints only, by small iron brads. The teak surface was then carefully planed and polished.

At each end of the Ball room there was a band gallery on columns 12 feet above the floor, and with access from outside.

The remainder of the temporary structure was an exact reproduction of the Diwan-i-Am both in shape and size, except that the columns were made a little thinner to economise space, and was used as a Buffet. Four cloak rooms were constructed outside.

The covered way from the Selimgarh platform to the Ball room was 1,800 feet in length and 8 feet wide except at the terminal portions close to the Ball room where it was 50 x 20. The covered way between the Diwan-i-Khas and the Diwan-i-Am was 445 feet long by 20 wide. The walls and ceiling were covered with tent cloth of a pale buff shade.

Diwan-i-Khas.—The same idea of the reproduction of old work was followed in making the temporary additions to this building. The open spaces on either side were roofed with similar materials as described for the Ball room, but the ceiling was made flat over the entire area of the room, of dull cream colour with arabic designs stencilled in gilt and coloured similar to one in the Zenana apartments. The square part of the open archways was enclosed with glazed wood work in exact reproduction of the existing work on either side, and the spaces above the archways were closed in with boarding covered on both sides with cream coloured cloth so as to resemble marble. On the inside this cloth covering was decorated with floral designs similar to those on an old covered-in archway. The reproduction of ceilings, spandrils of archways, and screens was so carefully carried out that it was difficult to say where the original buildings ended and the additions commenced. A channel already existed under the floor and was utilised for the heating pipes.

The two buildings with their annexes and covered ways were lighted throughout by incandescent electric lamps. The light softened the tone of the red sand stone buildings and showed every detail in bold relief.

Cost.—The total nett cost of all works in the Fort, exclusive of electric light but inclusive of heating arrangements and covered way, has been about Rs. 150,000.

9.—Clearing Central Camp.

The site for the principal camps, namely, that of His Excellency the Viceroy, the Governors of Bombay and Madras, the Commander-in-Chief, the Lieutenant-Governors and Local administrations was the site of the old cantonments situated between the ridge and the Najafgarh canal. The following camps were pitched on this site:—

- (1) Camp of His Excellency the Viceroy in which suitable accommodation was provided for the Royal guests.
- (2) Camp of His Excellency the Commander-in-Chief.
- (3) Camps of the Lieutenant-Generals Commanding Bengal, Bombay, Madras and Punjab.
- (4) Camp of His Excellency the Governor of Bombay.
- (5) „ of His Excellency the Governor of Madras.
- (6) „ of His Honour the Lieutenant-Governor of the Punjab.
- (7) „ of His Honour the Lieutenant-Governor of Bengal.
- (8) „ of His Honour the Lieutenant-Governor of Burma.
- (9) „ of His Honour the Lieutenant-Governor of the United Provinces of Agra and Oudh.
- (10) „ of Chief Commissioner, Assam.
- (11) „ of Chief Commissioner, Central Provinces.
- (12) „ of Chief Commissioner, North-West Frontier Province.
- (13) „ of Resident of Hyderabad.
- (14) „ of Resident of Mysore.
- (15) „ of Resident, Baroda.
- (16) „ of Agent to the Governor-General in Rajputana.
- (17) „ of Agent to the Governor-General in Central India.
- (18) „ of Agent to the Governor-General in Baluchistan.
- (19) Foreign and Press camp.
- (20) Camp of Director General of Telegraphs in India.
- (21) „ „ „ Post Offices.
- (22) Central Post office.
- (23) Central Telegraph office.
- (24) Electric Light Department.
- (25) Visitors' Camp, No 3.
- (26) Hospital, Native troops.
- (27) Mutiny veterans camp.

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The site of the Central Camp was uneven and there were no proper roads and drains. Hence the works as detailed below were executed under this estimate :—

- (a) Levelling and clearing of different camps, which consisted of removing the ruins of old structures and of general levelling of the ground. The actual cost of this item was Rs. 12,487.
- (b) Constructing roads between several camps. 7.5 miles of 12 feet road and 3.2 miles of 16 feet road were constructed for Rs. 28,035 and Rs. 15,208 respectively.
- (c) 28 new culverts of two feet span were constructed at a cost of Rs 2,936, the average cost of one culvert being thus Rs. 106.

Total cost of the work was Rs. 58,666. The original rough estimate as approved by the Central Committee in their meeting of 10th June 1902 was Rs 30,000 and the excess was due chiefly to extra roads and drains required. Some of these roads, notably the Lansdowne road, had to be metalled twice with extra width of metal owing to very heavy traffic.

10.—*Interior Roads of His Excellency the Viceroy's Camp.*

The cost of the main roads was charged to the estimate of Central Camp (work No. 9). For the minor roads an estimate amounting to Rs. 5,775 was approved by the Military Secretary to His Excellency the Viceroy, but the actual cost came to Rs. 12,229, owing to additional requirements.

11.—*Polo Club and ground.*

The chief social meeting place during the Durbar was the club house built in chalet style on the polo ground.

The plinth was 8 feet, thus giving a good view of the ground. As additional accommodation for spectators there were extensive terraces approached by flights of steps and two elevated blocks, each with 2,000 chairs. One of these blocks was reserved for native gentlemen.

On the other side of the Polo ground were the band stand for the massed bands and blocks for soldiers.

The cost of the buildings and the cost of laying out, preparing and maintaining the polo grounds amounted in all to about Rs. 62,000 and was more than covered by the receipts.

12.—*Spectators Stand.*

For the use of the Indian public who could not get tickets for admission to the amphitheatre, a stand was constructed, facing the amphitheatre, from which a good view of the Durbar ceremony was obtainable.

The stand was made 12 feet high with a terre plein of 20 feet and a slope of 1 in 2 at the back and of 1 in 5 in the front. The terre plein and the front slope were used for standing room.

The stand itself was 970 feet long with a width of 65 feet and afforded seating accommodation for nominally 14,400. But the crowd began to collect early in the morning of the 1st January, and the numbers on the stand and its approaches were much greater than the estimate.

13.—*Grand Stand on the Review Ground.*

An estimate amounting to Rs. 1,804 for constructing an open stand without a roof was approved in the proceedings of a meeting of the Central Committee held on the 16th May 1902.

The question of providing a covered roof was then considered and an estimate amounting to Rs. 6,253 was framed on the basis that the covering of six compartments would be transferred from the amphitheatre. This idea had to be abandoned, however, and it was decided to construct the roof independently. For this purpose, trusses 35 feet span were bought from the North-Western Railway and put up on the shed which consisted of 11 bays of 10 feet each on either side of a central passage, the length covered on each side being thus 110 feet.

The roof covering over the steps consisted of single country tiling laid on bamboo thatch which directly rested on the trusses, while the terreplein was covered with country tiling similarly laid on rafters, in continuation of the same slope. Longitudinal and cross-struts were provided to stiffen the whole structure.

The total cost of construction came to Rs. 12,298, the amount realized from sale of materials amounted to Rs. 2,142-12-9; hence the total nett cost came to Rs. 10,155-3-7.

The trusses have been returned to the North-Western Railway at the original cost.

14.—*Central Telegraph Office.*

For the Telegraph Department only one building was built for the Central Office, the branch offices being located in tents. This main building was built on the Alipur road exactly opposite the Central Post Office and cost Rs. 5,800 nett.