building of the amphitheater, the University of California had no structure large enough to accommodate its own students, much less the multitudes which at certain periods throng to the various commendatory exercises of the scholastic year.

Construction began in the middle of February, 1903, and progressed so rapidly that in May the President of the United States delivered from the stage an address that excited the rapt attention of an audience of over 8,000 people. In the following September the amphitheater was completed to its present stage, the "Birds" of Aristophanes being performed in the original tongue by a company of students.

The building is composed of two unconnected parts, the auditorium, or theatron, of the Greeks and the stage.

The auditorium is a great semi-circle, 254 feet 8 inches in diameter, with two tiers of seats. The center is a level circle, 50 feet 8 inches in diameter, and 5 feet 5 inches below the stage floor. It is distant from the stage 7 feet. The circle corresponds to the orchestra of the ancient Greek theater, the part appropriated to the chorus. Surrounding this circle rise twelve steps each 3 feet in width and having a rise of 5 inches. Upon these steps 1,600 chairs may be placed. Between the lower tier and the upper sections of seats an aisle, the diazoma, extends 9 feet in width, on an exact level with the stage floor as well as of the side entrances between the auditorium and the stage. On the outer circle of the diazoma, or aisle, is a wall 10 inches thick and 5 feet high. A bench at the foot of the inner base of the wall will seat 160 persons. Above the wall, at an incline of 30 degrees, so as to afford spectators a perfect view of the stage, rise the main seats of the auditorium arranged in nineteen rows of steps each having a width of 30 inches and an 18-inch rise. Eleven aisles lead from the lower wall and divide the seats into ten sections, the steps in the aisles being 15 inches wide and 9 inches high. A wall, two feet high and pierced by nine openings, surrounds the outer circumference. Each end of the auditorium is flanked by a retaining wall rising 3 feet above the steps and 10 inches in thickness at the top. The walls step out under the seats in 1-foot ledges to a total width of 10 feet at the foundation.

The stage of the amphitheater is the only portion of the edifice in which the simplicity of the design has permitted the introduction by the architect of a certain amount of well-judged ornamentation. The inclosing wall is faced by sixteen fluted Doric columns which support a classic cornice with triglyphs and metopes, enriched by bosses. The end walls terminate in massive pylons. There are five entrances—one at each end and one on each side of the great central door opening in the rear wall of the stage. The height of the stage floor corresponds with the elevation of the diazoma or aisle surrounding the central circle and the paradoi or entrances on each side between the stage and auditorium. The total length of the stage is 134 feet. The paneled wall on the back and ends is 42 feet high. The inside wall, following the ancient types, is designed to represent a castle or temple, and is purely classical.

The original design of the architect calls for an open parapet with clustered columns and bronze ornamentation on top of the stage wall while an encircling colonnade and covered promenade will surround the top of the auditorium. It is also in contemplation to cover the concrete work of the auditorium with stone, marble or other permanent material.

The amphitheater, as it stands, is a work of distinction. Its architectural features deserve high encomium, but the chief merit of the structure consists in the fine use of material and the success with which concrete has been employed for so complicated a purpose. The courage to undertake and erect so noted a building of concrete has been justified. The architect has scored a triumph and the builders immense credit, but the achievement would have been impossible but for the remarkable quality of the material furnished by the makers of the cement. The writer lately carefully inspected the work, going over those portions where the wear of the elements would most likely be shown, but no evidences of disintegration were to be observed. The flutings of the columns and the outlines of ornaments of the stage were as sharp and perfect as when molded. Some little subsidence was seen in the upper tiers of the auditorium, but so slight was the effect as to be hardly noticeable. The great structure looked as though it might last for centuries.

The amphitheater was the gift of Hon. William Randolph Hearst, who contributed $42,000 for its erection.

South Corner During Construction.—Form for Concrete Columns for Stage.

THE CONCRETE AMPHITHEATER AT BERKELEY, CAL.

Observations with the Portable Astrolabe.—M. Driancourt, engineer, has tested the Claude astrolabe in Madagascar, and confirms the high precision which won for it a prize in France. The determinations did not exhibit an error of more than half a second. Tests at the observatory at Montsouris tend to show that it furnishes results as precise as those of the fixed instruments of the observatories.

Chemical Reactions at Extremely High Temperatures.

Very high temperatures may be attained by the burning of aluminium in air or oxygen. According to Prof. C. Zenghalis, in the Elektrotechnische Zeitschrift, Goldschmidt succeeded in obtaining a temperature of 3,000 deg. C. through the direct burning of aluminium by means of combined oxygen. The theoretical calculation for the burning of aluminium in free oxygen permits us to expect temperatures far exceeding this, in fact the astonishing figure of 19,062 deg. C. should be reached. The experiment was carried on in this wise: The aluminium was placed in a highly-heated crucible, and burned while passing through it a stream of oxygen. The collected data resulted in the following findings: The temperature reached is not below that of the electric arc light; platinum, lime, and magnesia melted and volatilized immediately, while the lime and magnesia further combined to form aluminates. The unconsumed aluminium took on a spherical shape. Another interesting circumstance is this: When a mixture of either powdered graphite or soot and aluminium was burned together, the result was aluminium carbide. When, instead of oxygen, nitrogen was supplied, as much as 38.57 per cent of the aluminium could be converted into a nitrite. In the presence of carbon dioxide and carbon protoxide, aluminium burnt violently at a temperature of over 1,000 deg. C., the burning of the carbon went forward without incident, and aluminium oxide or carbide was formed. N_2O and NO will react equally as violently with aluminium under like conditions, that is always presupposing a very high temperature.

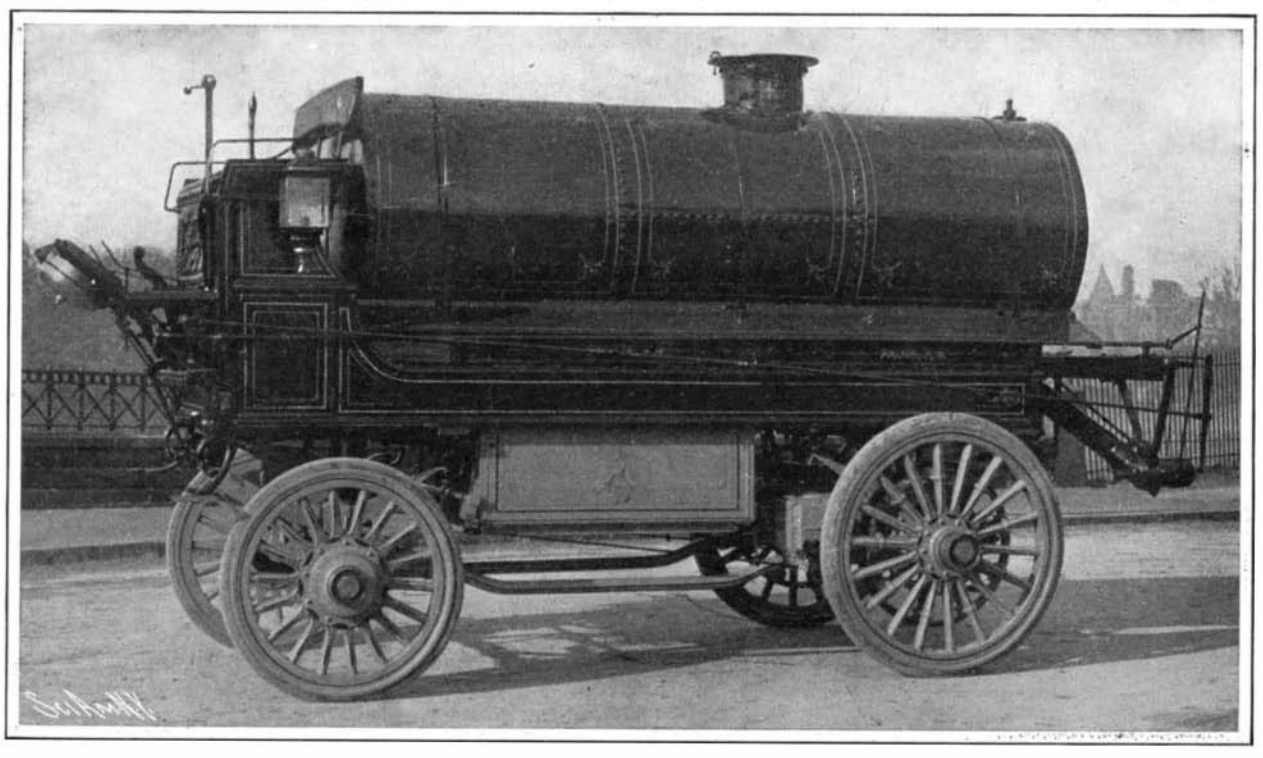
AN ELECTRIC STREET SPRINKLER.

A few weeks ago the Edward Balf Company, street sprinkling contractors, of Hartford, Conn., placed an order with the Electric Vehicle Company for an electric sprinkler. The machine was delivered last week and immediately put into commission. It is pronounced a complete success and has attracted a great deal of attention in daily use on Hartford's principal thoroughfares.

In general style the sprinkler resembles the ordinary build of horse-drawn sprinkler. The iron water tank is of the usual boiler pattern and has a capacity of 600 gallons. This tank is mounted on a medium-weight truck chassis, power being derived from an underslung Exide battery of 44 cells. There are two motors, normally rated at from eight to ten horse-power, and the normal speed is six miles per hour.

The machine covers from 30 to 40 miles daily in actual use, or about twice the mileage of a two-horse sprinkler with one change of horses; in other words, the machine does double the work of four horses.

As this is the first attempt to substitute automobiles for horses in street sprinkling, the outcome of the experiment will be watched with a great deal of interest. From present indications it will be thoroughly successful. One obvious advantage is that at times when the sprinkler cannot be used on account of the season of wet weather, the owner is not obliged to maintain horses in idleness. The maintenance of the storage battery should cost but little in the present case, as the service it has to perform is light.



AN ELECTRIC STREET SPRINKLER IN USE IN HARTFORD, CONN.