of absolutely correct and uniform composition is presented to the kiln for calcination, and it will be readily understood that, although the cement industry as a whole has not until recently thought it necessary to provide such intermediate storage of prepared raw material, how important it is, before the material is submitted to an expensive chemical process of calculation, in which the desired results are so adversely affected by any irregularity, either in the material or the temperature at which the operation is conducted, that this correcting process should be installed. It is not possible to get perfect chemical combination of the lime with the silicates and aluminates of the clay or shale unless the materials have been reduced to a very fine state of subdivision, and have been thoroughly amalgamated.

Chemical Process.—The calcining or clinkering is carried out in rotary kilns, which with modern practice are increasing in size, now averaging from 150 to 200 feet in length, and from 7 to 10 feet in diameter, being set at an angle to the horizontal of ½ inch to the foot. The raw material is fed into the upper end of the revolving kiln, while the fuel for raising the temperature within the kiln is introduced at the lower end, the raw material passing successively through the three operations of drying, calcining, and clinkering, on its passage down the kiln, the clinker leaving the kiln at red heat. This heat is removed by passing it through rotary coolers, and is used for heating the air for combustion passing into the kiln.

The cool clinker is now ready for the final grinding operation, but before being submitted to this the clinker is stored and mixed under cover in large bulk, so that again any small irregularities of the calcining operations are spread over the product of several days, and thus tend towards uniformity of the finished product.

Final Process.—After cooling and mixing, the clinker, which is material of hard and refractory character, is reduced to a fine powder with the aid of very powerful crushing and grinding machinery, details of which will be explained with the aid of lantern slides. The importance of very fine grinding was not realized until recent years, but its value will be understood when it is known that it is only the impalpable powder of the cement which has any cementituous properties—the coarser particles present being of no more value than their equivalent bulk of sand or crushed rock. It is common practice at the present time to so reduce the clinker that 85% will pass through a sieve having 32,400 holes per square inch, but at the new works at Bamberton, machinery has been installed to enable the cement to be so ground that 95% will pass through this sieve if required. This extra fineness materially increases the cost of production, but adds considerably to the cementituous value of the material. Using this fine ground cement a much richer and stronger concrete is obtained, by reason of the larger quantity of cementituous material present in the very finely ground cement, or on the other hand economies in cost of construction can be obtained by reason of the larger amount of aggregate which such fine ground cement will carry, to produce equal results.

During the process of grinding provision is made for the regulation of the setting time of the cement. Cement clinker ground without any such provision is always very quick setting. The method adopted at the Bamberton works is similar to that now almost universally employed in England, and consists of injecting steam into the tube mills during the final process of grinding together with the addition of a much reduced proportion of gypsum, which is used as a retarder. The effect of this process is to hydrate and thus remove the expansive properties of any loosely combined lime compounds which have resulted from any slight defects which have passed the earlier processes uncorrected, and thus produce a cement which is safe to use immediately after manufacture, even if taken hot from the mill, and by means of this process the setting time of cement can be regulated to suit all requirements.

Extraction of Heat.—The difficulty often experienced by engineers, however, in using hot cement is being provided against by the introduction, at the Bamberton works, of a separate cooling plant, through which all cement as it leaves the grinding mill is passed. This special plant extracts the heat from the cement, reducing it to atmospheric temperature before storage. This is a very important addition to the methods of modern manufacture and, although used largely in English plants, is being introduced for the first time into Canada, or indeed on the American continent, at the plant now being installed. After the cement has been submitted to the process described, it is stored, and mixed in large bulk at atmospheric temperature, before being placed on the market, and it is hoped that the provision which has been made at the new works to produce cement of absolutely uniform quality, will be appreciated by engineers and contractors throughout the western provinces of Canada.

The works at Bamberton are now just commencing manufacturing operations, and will be producing full output of 2,000 barrels per day before the end of June. The works were designed by the Associated Cement Company's own staff, and practically the whole of the machinery was manufactured in England. The work of construction was entrusted to Messrs. McAlpine, Robertson & Company, of Vancouver, under the supervision of the Associated Company's resident engineer's staff; the power for the plant being supplied by the British Columbia Electric Railway Company.

The lecture was illustrated by many interesting pictures of the machinery and plant used in the process of manufacture, all of which were most successfully explained by the lecturer.

PROPOSED FLOATING DOCK FOR VALENCIA, SPAIN.

The contract having been awarded for completing the harbor works of the port of Valencia, the Board of Harbor Works is now giving attention to the matter of docking facilities for the cleaning and repair of vessels, says the United States Consul at Valencia. About three months ago the board proposed to the Government the erection of a small shipyard to accommodate vessels of less than 300 tons. The latest project is a floating dock for handling sea-going ships up to 3,500 tons displacment. Harbor space is too limited to permit of a large dock at this time, according to the system employed at Kiel, Hamburg, Cardiff, Genoa, Barcelona, etc. The tentative plans, therefore, propose the construction on a smaller scale according to the most approved system, but in such a manner as to later permit it to be dismounted and used as a constituent part of the proposed floating dock of 8,000 tons capacity provided for in the approved scheme of port facilities. The details and specifications of the work have not been published, but the preliminary project as submitted to the Ministry of Fomento calls for an expenditure of about £55,000, the dock to be completed in two years. It is hoped that the plans will be speedily approved by the Government, in order to call for bids and award the contract. Engineers and others desiring to learn more about this project can address the Director de la Junta de Obras del Puerto, Sr. Don José Marie Fuster, Valencia.