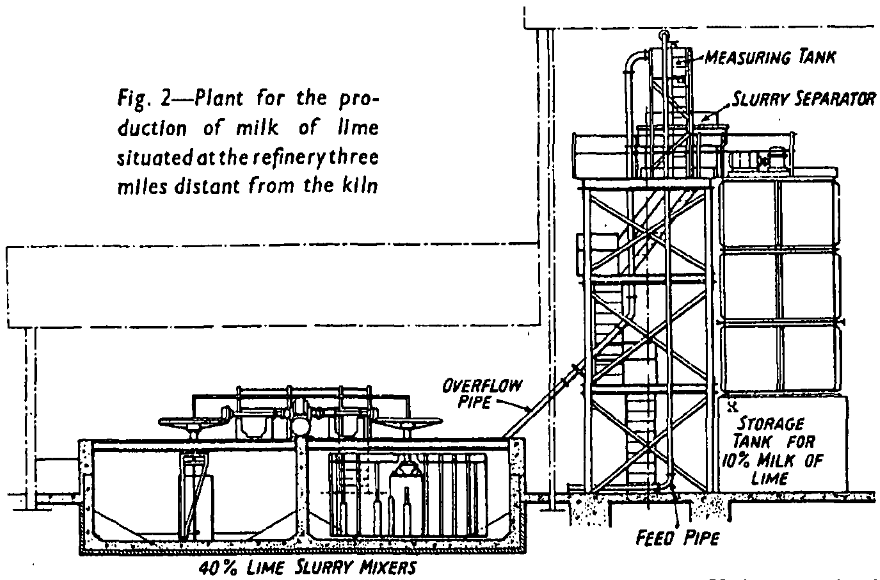

Fig. 2—Plant for the production of milk of lime situated at the refinery three miles distant from the kiln

Hydrating Plant

The quicklime, having been discharged from the kiln, is then conveyed on a steel tray conveyor and lifted by means of a bucket elevator into a hopper over the feeder for the hydrator. The duty of the hydrator is to convert the quicklime or calcium oxide into hydrated lime, a very light and fine powder. This conversion is effected by adding about 30 per cent. of water to the quicklime. The hydrating machine is designed to the Schulthess patents. The burnt shells are extracted from the hopper and fed into the hydrator by an automatic table feeder, and are moistened with a portion of the hydrating water in the preliminary hydrating compartment. Any hard lumps and impurities are retained in this compartment. The partly slaked lime passes into the second compartment, where more water is added. The steam created and the very fine dust suspended in it pass through a condenser into the atmosphere and are washed in it before being discharged. The washing water is the water used in the hydrator.

The grading analysis of the hydrate showed that it contained a few nibs and some impurities. These would be inconvenient in the milk of lime plant and objectionable if the lime were used for building purposes. It was, therefore, decided to instal an air separator for removing the nibs and impurities.

The pure hydrate is elevated into a storage bin from which it is withdrawn as required by an extracting conveyor.

Milk of Lime Plant

The milk of lime plant is erected in the oil refinery about three miles distant for the rotary kiln. It was not practicable to pump the milk of lime this distance from the kiln plant to the refinery, but it was decided to make a lime slurry containing about 40 per cent. of water at the kiln plant, and transport it to the refinery in tank wagons for further treatment.

The tank wagons, having arrived at the plant with 40 per cent. lime slurry, are emptied, and the slurry is run into two concrete mixers equipped with mechanical stirrers and pipes for agitating by compressed air. The mixers are of ample size so that if any irregularity in the percentage of water in the various tank wagons exists, the consistency of the slurry in the mixers is practically uniform.

In order to produce 10 per cent. milk of lime, more water is added to the 40 per cent. slurry. For this purpose it is pumped by a centrifugal pump into a measuring tank with V-notch and overflow for surplus slurry.

The V-notch is adjustable and allows a determined volume of slurry to flow out, and any surplus is returned to the mixers. Water is added in metered quantity to the slurry flowing over the V-notch from the measuring tank to make 10 per cent. milk of lime, and both liquids are run into a Clark's slurry separator which retains any impurities that may have found its way into the slurry and at the same time effects thorough mixing. The finished 10 per cent. milk of lime is run into a storage tank, where it is kept in suspension by mechanical stirring.

The plant is well equipped with instruments for the control of the temperature, where this is necessary. Unfortunately, there is no instrument on the market by means of which the calcining temperature can be indicated or recorded. The method adopted at Abadan is to measure the burnt lime as it falls out of the kiln by means of an optical pyrometer through a hole in the discharge hood. This temperature is in fairly close relationship to the calcining temperature, and the fuel supply is adjusted according to the reading. A great asset to the plant is the oil for firing. The ease of temperature control, and the speed with which adjustments can be made, make it possible to produce continuously well burnt lime of uniform quality, and it has been proved that a temperature maintained within narrow limits is necessary for maximum conversion of the lime to soluble hydrate. Such close temperature control is only possible in a rotary kiln and with oil firing this is comparatively easy. Another adjustable factor in the calcining process is the speed of rotation of the kiln, although alterations in this direction are not often necessary.

Control of Hydration

The hydrating process also is controlled by temperature of the hydrate discharged from the machine. It has been found that if the water supply be adjusted in accordance with the temperature of the hydrate discharged, the percentage of water is about correct. Normally the temperature is about 100° C.

One foreman is in charge of the plant and a staff engineer calls once every shift to take readings of the various instruments. Close watch is also kept on the kiln waste gases, the temperature is measured, and the chemical analysis checked for carbon dioxide and oxygen. The least volume of excess air, which would increase the fuel consumption, is allowed to enter the kiln.

DETECTION OF ANILINE VAPOUR

IN the series of leaflets describing methods of detecting toxic gases in industry, a new publication is No. 11, which describes a method whereby concentrations of aniline vapour ranging from 1 part in 5,000 to 1 part in 200,000 may rapidly be estimated by a refinement of the bleaching powder test. This test has been made quantitative by comparing the colours obtained at low concentrations with a series of standard colours prepared from a dye. This leaflet, and a pamphlet describing the complete series of gases and vapours to be covered, can be obtained from the Department of Scientific and Industrial Research.