

General View of Quarry and Plant

Limestone Quarry and Lime Plant at Cave Hill, Vic.

The Cave Hill limestone quarry at Lilydale, Vic., 27 miles from Melbourne, has been worked continuously for many years. The owners, the David Mitchell Estate, recently decided to remodel the plant, and a description of the main features cannot fail to interest many engineers

Fig. 1 is a general view of the quarry floor and faces from the top of which the overburden has to be removed in order that the wonderful limestone deposits may be worked.

The plant as it now operates can be best illustrated by the flow sheet in Fig. 2. This indicates how three separate primary products are extracted from the quarry faces, and, by mechanical handling, crushing, screening and other processes, the following saleable materials are produced:—Sugarstone, used for the treatment of beet sugar; fluxstone, for the metallurgical industries; road metal, of any required size (the sizes indicated on the diagram are those specified for general use by the country roads board of Victoria); kilnstone, supplied to the kilns is converted to burnt lime. This product is now hand-picked and sold as lump lime. However, an extension to the lime-producing plant is under construction and, when brought into operation, this department will produce ground agricultural lime, lump lime, and hydrated lime.

By the adoption of a carefully designed layout the crushing plant is able to dispose of all of the product taken from the quarry. The small amount of overburden and waste material is deposited in the waste bin. This is done by reversing the apron feeder.

Fig. 3 has been taken at the face of the overburden, and illustrates a No. 30-B bucyrus crude oil-driven $\frac{3}{4}$ yd. dipper shovel operating and dumping into side-tipping dump trucks, the latter being trailed to the dump by an electric mule.

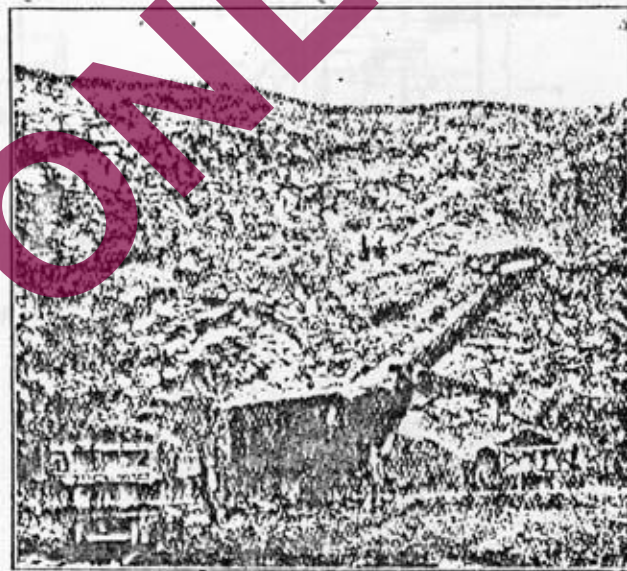
Fig. 1 shows in addition to the quarry floor lay-out, the main and arterial truck lines to the various faces, and also illustrates the manually-propelled V-body tipping trucks, of 1 c. yd. capacity, carrying stone to the loading hopper at the foot of the hoisting incline.



Fig. 1. General View of Quarry Floor

for not only are the production methods unusual, but the novelty of design attracts the attention of all who have studied this plant and its operation.

The lime plants in America to-day are increasing their annual output equivalent to the same rate of increase as is occurring in the cement industry in that country, and for that reason it is pleasing to note that this plant, which is one of the oldest established in the Commonwealth.



is about to lead off and adopt modern methods, not only that the industry as a whole may be saved, but also that the constructional fields of this country will have the benefit of increasing the use of lime for the many purposes in which it is the best known material for particular use.

The whole of the design, together with the supervision during construction, was carried out by Messrs. Gilbert, McAuliffe Pty. Ltd., consulting engineers, Melbourne.

that the lime industry of Australia has been slowly declining over the past decade, very few realise that an equivalent decline was occurring

The deposit is composed of strata of very pure limestone, which is ideal for fluxstone and burning lime, and a low-calcium high-silica stratum which, being extremely hard, makes a first-class road metal and concrete aggregate. The strata vary in thickness from 18 in. to 12 ft. and the

water to be kept at a constant level below the quarry floor.

The lower section of the pit acts as a sump for the intermittent discharge of the water by a small motor-driven centrifugal pump. The motor house of this pump is built of heavy

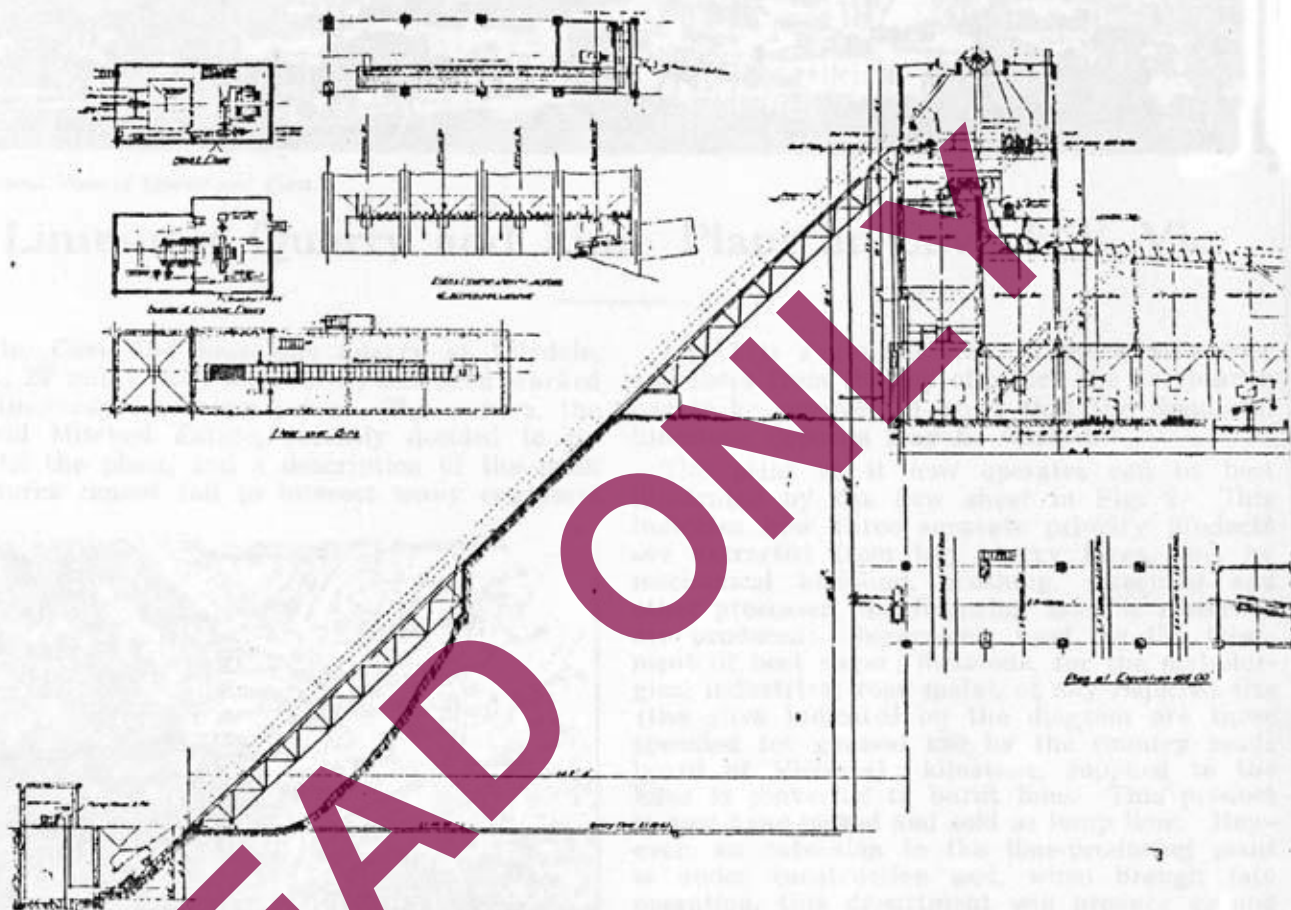


Fig. 4. General Arrangement of Crushing Plant

ratio of limestone to road metal is approximately 1 to 1. Due to volcanic disturbances, this deposit lies on an angle of about 80 deg. to the horizontal, and has a definite plane of bedding as seen in Fig. 1. Due to the peculiarities of the formation, hand loading is necessary. Small shots are placed into Jackhammer-drilled holes, and spawling to one-man size stone only is necessary.

The limestone, road metal and waste are all taken from the quarry floor and trucked to the loading hopper at the foot of the hoisting incline and passed through the crushing department. The loading hopper is erected over a pit for the reception of the hoisting skips and is a part of the drainage sump which permits ground

reinforced-concrete roof and walls to afford protection to the men when blasting.

Fig. 4 is a cross sectional elevation of the main crushing plant. This figure together with the flow sheet of Fig. 2 shows clearly the methods adopted. It also indicates the hoist incline and the method of hoisting to the crushing plant by means of two balanced skips having a capacity of 5 tons each.

A double-drum skip hoist 60 in. diameter, grooved for 1 in. cable and driven through a worm gear by a 30 h.p. motor, is used to elevate the material from the quarry floor to the crushing plant, the braking being controlled by a solenoid, and also a hand brake for emergency purposes.