# THE STORAGE OF RICE IN STEEL DRUMS

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CEYLON is dangerously dependent on imported rice. For reasons obvious to all who have tried growing foodstuffs on tea and rubber estates it is impossible to make good even a small part of the deficiency, and, under normal conditions of storage, not more than three, or at the most four, months consumption can be kept on estates without deterioration. Storage in the Colombo granaries is limited, and concentration of a large and vital proportion of the Island's food supply at one point is dangerous. Such considerations led to investigating the possibility of establishing an " iron ration " on estates, a quantity which would help to tide over a period of interruption of supplies and which would keep indefinitely.

A note on this inquiry and its results may be of interest.

Rice may be damaged or lost by attacks of rats, weevils, microscopic insects, or moulds. Rats can be dealt with in any properly built store, the others make long storage in ordinary conditions impossible. They could, however, be controlled if dry rice could be stored in a dry chamber, or in the presence of a harmless gas which supports no forms of life. The possibility of building a gas-proof dry store was investigated, with a view to flooding it periodically with either a poisonous gas, such as cyanide, or carbon monoxide generated from the exhaust of a car, or with a heavy gas such as $CO_2$ which would present fewer difficulties and would " stay put " longer. Mr. L. P. Gapp and Mr. G. R. Whitby of the B. C. C. became interested and the latter gentleman offered a solution as to the " store ". The British Ceylon Corporation could offer steel " dumpy " drums costing Rs. 13 which would hold 8 bushels. The drums would have a return value of about Rs. 8 if in good order. Room for a number of these could be found in most factories. It was thought that some poison gas, such as cyanide would have to be introduced. Mr. W. R. Thomson of Messrs. Shaw Wallace & Co., kindly worked out the amount of cyanogas required for drums of this size. On this basis some bottles were filled with weevilly rice " doped " with the proportionate amount. All weevils were dead in a few minutes. Another bottle was filled with weevil-infected rice but without other treatment.

Within three days these were dead, having exhausted the oxygen. Subsequent microscopic examination showed no growth of other parasites or fungi.

Thus encouraged, 44 drums were ordered. Each was filled with 8 bushels of rice, previously well sun-dried, and into the bottom of each drum ¼ oz. of cyanogas had been placed, tied up in fine cloth with a long string attached so that it could be fished for and removed before returning the drums, and would not directly contaminate the rice. Later tests proved that the cyanogas is unnecessary if the rice has been well dried, the drums fully filled and the screw bungs made airtight with rubber washers. Separate lots of 8 bushels were thinly exposed to the sun on jute hessian for about 2 hours and turned over. While still hot, the rice was put into the drums, with a specially made funnel. The drums had to be rocked and the rice poked with a stick in order to get in the full amount. The bungs were then screwed home and a seal applied to detect theft. The dates of filling were painted on. The labour of drying and filling requires some organization, otherwise much time is wasted. The first 2 were filled on August 20, 1940, and the last 9 were filled on September 27, 1940.

A drum filled on August 31, 1940, was opened for inspection on May 3, 1941, *i. e.*, 9 months later. The rice was found in perfect condition. It had lost about 6 measures through drying, but this was made good by exposing the rice to normal atmospheric conditions for 3 days before issue. One drum was purposely filled with weevil infected rice. When opened the weevils were dead and the rice was undamaged.

Between June 28, 1940, and July 13, *i.e.*, after some 10 to 11 months storage, 13 drums (104 bushels) were opened and the rice issued, also in perfect condition. These drums were re-filled with sun-dried rice but without cyanogas.

| | Rs. c. |
|---|---|
| Cost of rice per bushel on estate .. | 4 76 |
| Filling, without the cost of steel drums .. | 0 7 |
| | 4 83 per bushel. |

If the drums were used once only and subsequently sold for Rs. 8 an additional cost of 62½ cents would have to be added, bringing the total cost to Rs. 5·45½ per bushel. The present price of rice shows a small profit, but the main thing is that this estate has an "iron ration" of 352 bushels, or enough to keep the labour for two months should supplies be temporarily cut off. Before rice control is enforced it would seem to be a wise measure for the Controller to announce that rice stored by some such permanent means should not be forced into immediate issue after control is introduced. With so large a population dependent on imported food in time of war it seems an elementary precaution to encourage the establishment of widely distributed and permanently stored rice.