

### Substitute Feeding.

The last of the series of lectures on Babies, delivered at the Infants' Hospital, Vincent Square, S.W., was given by Dr. Ralph Vincent on Substitute Feeding.

In explanation of the term, Dr. Vincent said that the term artificial feeding was reserved at the Infants' Hospital for methods in which the food given was not comparable in constitution to mother's milk. It was essential in order to have a substitute food that the fluid given should be in a raw state; if cooked it was not included in the term "substitute," but became an artificial food.

Only two methods of substitute feeding should be recognised.

1. By a wet nurse.

2. By raw cow's milk modified under certain conditions to meet the requirements of the individual infant. The adoption of the latter method is due to the genius of Dr. Thomas M. Welsh, of the University of Harvard, the lasting value of whose work consists in the fact that it involved the abolition of traditional methods, and founded infant feeding on a system in accordance with scientific methods. As a substitute food modified cow's milk is very preferable to that of a wet nurse, who is very difficult to obtain, and whose milk, when she is obtained, does not compare favourably with that secured by the precise modification of cow's milk.

The important point is, of course, to procure a pure milk supply, and this Dr. Vincent set himself to obtain, and the Walker-Gordon Farm at Sudbury designed by him in conjunction with a colleague, was founded in 1902 to attain this end. At this farm the cows are carefully tended and carefully cleansed, and are kept in well lighted and ventilated sheds, under which no drainage is allowed. They are groomed and washed like well groomed horses. The udders are washed before they are milked, and a sheet is thrown over the cow at milking time so that hairs may not get into the milk. Before each milking the vessels into which the milk is drawn are sterilised. They are of a special form, with a narrow opening into which a lid fits tightly, and they are closed directly the milking is over. A separate pail is kept for each cow.

The diet of the cows is of the greatest importance, and is a point which as a rule has far too little consideration. Everyone knows the importance of a suitable diet for a nursing mother, and the same holds good with the cow. Most materials used for feeding cows in this country are directly pernicious to the in-

fant, as, for instance, oil cake. Some things should be excluded altogether, and the proportion of others used adjusted. Mangolds, and peas and maize meal, are admissible to a moderate extent, but when used out of proper proportion to the rest of the diet are deleterious.

As the milking of each cow is finished each covered pail is sent by an automatic railway to the refrigerating room. It should be remembered that milk is intended to be conveyed directly from the mother to the offspring. When it is handled and stored its character is changed. With the purest milk there will always be germs, but germs are beneficial as well as injurious. There is no baby's mouth or stomach which does not contain myriads of germs.

It is only when changes take place after milking that these germs become harmful. If the milk is kept at a normal temperature the germs develop and toxins are formed. The splitting up of fats and proteids follows. At a temperature of 40 degs. Fahr. the bacteria in the milk are not killed, but they cease to multiply. The problem of keeping pure milk in a suitable condition for infant feeding resolves itself into one of arresting the development and multiplication of the germs contained in it. To effect this it is necessary to reduce it in temperature to within 8 degrees of freezing point, i.e., 40 degs. Fahr., within a few minutes of milking. When once so reduced it is easy to maintain it at this temperature.

Experiments were made at first of placing the milk in tanks cooled by brine. This caused a rapid fall in temperature, but it was found that the tendency was for the temperature of the milk and the surrounding brine to become approximate. The milk remained at twenty degrees over the required temperature, and it took four hours to reduce the whole bulk to 40 degs. Fahr.

It was then found that the secret of success lay in using the whole power of the refrigerating apparatus in treating small quantities of milk at a time. Now, as each pail arrives at the cooling room, it is poured over a dome in which brine is circulating at a temperature of 32 degs. Fahr. The milk falls over the dome in a thin film, which is thus acted upon by the large mass of circulating brine, by which method it is reduced to the required temperature. It is then bottled straight away, and maintained at a temperature of 40 degs. Fahr., an easy matter, as the difficulty lies only in its speedy reduction to this temperature. It cannot be too strongly insisted that

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