

Being a wife and mother is a profession which has no legal holidays. Under Mrs. Pember Reeves's scheme of mothers' helps, this would be changed. The details of training such women, their pay, and other matters, she leaves for later consideration. But the principle of the poor woman's right to leisure, even for an occasional half-day away from her children and the constant cares of her home, is one she thinks ought to be recognized.

Perhaps the scheme might start, as many State schemes have originally done, on a private and voluntary basis. Tired women with a growing brood of badly needed citizens would welcome it under any ægis. Many people have expressed approval of the idea—as a pious opinion. It remains to put it into practical concrete form.

OUR PRIZE COMPETITION.

WHAT ARE BACTERIA? HOW DO THEY GROW?

We have pleasure in awarding the prize this week to Miss J. G. Gilchrist, Gillespie Crescent, Edinburgh.

PRIZE PAPER.

Bacteria are intermediate bodies between the animal and vegetable kingdom. They are extremely minute in size, and can only be recognized by powerful magnification. Their structure is difficult to ascertain; they are apparently composed of little masses of protoplasm enclosed within an envelope. Unless stained, they are practically invisible. They stain well with aniline dyes, and in a peculiarly characteristic way known to scientists.

Bacteria are usually classified according to their shape, thus (a) Round or cocci; (b) rod-shaped or bacilli; (c) spiral, wavy, or spirilla.

(a) The Cocci are an extremely large family. Tiny round cells which may be arranged singly, or in pairs, quartettes, chains, or groups. The pairs are called diplococci; quartettes, tetrococci; chains, streptococci; groups, staphylococci. The strepto and staphylococci are very common, as they are found in practically all abscesses, and are the cause of the suppurative or septic diseases.

(b) The bacilli or rod-shaped bodies are usually larger than the cocci, and many have tails or flagellæ, by which the little organisms can move rapidly. In typhoid, for instance, the flagellæ are very numerous, so that the bacteria move freely about. The bacilli, like the cocci,

may be arranged in groups, chains, or bundles.

(c) The spirilla formation is less common. The spirillum may be quite short, as in cholera; sometimes long, the end being lost to view as in the organism of relapsing fever.

Multiplication or growth of organisms is extraordinarily rapid. There are two methods:

(1) By a simple fissure or cleavage, by which the single organism is split into two. This occurs when conditions are most suitable for development. Within 48 hours a single organism may give rise to vast numbers of more or less mature organisms.

(2) By sporulation, when conditions are less suitable. Spores are round or oval bodies seen inside the body of the organism. There are three forms: the best-known is that of the "bacilli tetanus." These spores are enclosed within dense capsules which protect them from external danger. As a result, they can be blown by the wind thousands of miles and thereby spread disease; can be frozen for long periods and become active when thawed; may withstand a high dry temperature, in some cases, without danger to themselves.

Bacteria, like all living things, have certain necessities for growth. These are:—(1) Food; (2) moisture; (3) air; (4) light.

(1) The food may be *dead* or *living*. Those preferring the former are termed saprophytes. They have no power to attack the living tissues of the body, but may cause disease in a secondary way from contaminated food. Those who thrive on the living food are termed parasites, and cause disease by poisoning the tissues of the body. Some organisms can live on either dead or living hosts, and are termed facultative.

(2) Bacteria must have moisture. Drying arrests their action but does not necessarily kill them, and they will develop again in favourable conditions. That is one reason why dry soil and atmosphere are beneficial to those having bacterial lesions.

(3) Some require air, and are called aerobic, others do not, and are called anaerobic. A few can do either with or without (facultative anaerobes).

(4) Light may be essential to growth. Generally speaking, light hinders bacterial growth, and in some cases direct sunlight will completely arrest development. Hence the value of sun baths and artificial baths by electric light.

Temperature influences the growth of bacteria. Those causing disease in human beings thrive best at the temperature of the body—98° to 100° Fahr. Other types vary in

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