whether we use the poisons of the bacteria or the bacteria themselves, weakened by growing in a cow or by over-heating, or by merely drying—as Pasteur did the rabid dogs' virus – to protect against the disease—the result is the same. It is the poisons of the bacteria that cause and protect against the disease.

Our control over diseases, however, is very much limited by the great, and, I might say insurmountable difficulties that have to be overcome in isolating the bacteria, and cultivating them so as to obtain their poison. The poisons can, as we have seen, protect against the acute infectious diseases caused by the bacteria, but when the disease has set in, the poison cannot be used as a remedial agent in the disease. Anti-toxins are then used in a few diseases with some advantage.

Bacteria, although vegetable organisms, live like bees in colonies, and the individuals act in the interest of the colony. It is numbers that make them formidable. If a bee stings it dies, and if a bacterium secretes poison it dies in secreting it. Both lose their lives in defence of the colony. A bacterium can multiply and a bee sometimes tries to mu tiply but fails. The bacteria grow and multiply for some time before they commence secreting poison, and this explains the nearly uniform periods of incubation connected with most infectious diseases. The incubation period of hydrophobia varies to a great extent.

The nicotine bacteria did not grow in the smoking boy. Bacteria will not grow unless the surroundings are favorable. Parasitic fungi will not grow in strong and healthy plants, but will readily in weak plants, and the tubercle bacilli will not grow in strong animals, but will readily in the weak. When the bacteria are unable to poison and paralyse the animal cells, the white blood corpuscles and tissue cells (Metschnikoff's Phagocytes) eat them, and when the tissue cells become resistant to the bacteria poison they quickly dispose of the bacteria. We find therefore that the attendants on the sick in small-pox, consumption, and fever hospitals are more secure from the diseases than if less exposed to them. The exposure strengthens the resistance and preserves the immunity of the disease.

The animal cells know on the first touch of the bacteria whether they are dangerous or not, as one bee knows on the touch of another whether it is from a queenless colony or not. The dangerous bacteria are of small size, and may be known to some extent in that way. If we inoculate a person with small-pox virus, and at the same time vaccinate with vaccine virus, the vaccine virus will commence growing four or five days sooner than the small pox virus and will protect wholly or partially from the small-pox virus. This is the same kind of protection by which we proposed to save the boy, and the same that Pasteur used in hydrophobia. It is simply inducing a mild form of the disease during the incubation period to protect against the fatal form at the end of it. The animal cells offer less resistance to the growth of the bacteria producing the milder poison.

I have stated as briefly as possible the action of bacteria in causing and protecting against diseases, to show that we cannot make us of the bacteria or their poison in curing or preventing foul brood. That all parasitic bacteria, however, are continually increasing the resistance of animals to bacterial diseases, is evident—the acquired resistance is transmitted and becomes hereditary