suitable media, *e.g.*, moist linen, beef tea and potato. Stagnant water forms a very suitable culture ground. Fortunately it is easily killed. Koch found that 1 in 5,000 solutions of quinine and 1 in 100,000 solutions of perchloride of mercury killed it. SO_2 does also, but it is evident that the agent used must be different according to the media in which it exists.

Let us consider briefly the characteristics of organisms in general. The extremes of temperature at which growth is possible are 11°F. and 100°F. Do not understand me to say that they are killed at these temperatures. Growth is prevented. The most favorable temperature for development is 82°F. Other favorable conditions for growth are the presence of moisture and organic matter of a slightly alkaline or neutral re-action, and the absence of sunlight. But these conditions are not essential to life. They have been known to live for years in a dry state. They have been frozen in blocks of ice, and yet when restored to warmth have regained their vitality. Fresh air and sunlight seem destructive to them in length of time, varying with the organism from a few days to several months. When nutrition fails some of the varieties enter on the spore stage of existence in which they will live an indefinite length of time. The varieties which form spores so far as known are the bacillus of anthrax and of tubercle, and Welch says of diphtheria. In this state no evidence of life is given, but as soon as conditions favorable to life are renewed, the spore develops again into the same kind of a cell as that from which it originally came. I fear that a popular misapprehension exists as to the nature of these spores. We are apt to think of their namesakes on the back of the leaf of a fern. Our bacterial spore is entirely different. In its formation the original cell disappears, the cell wall falls away and the protoplasmic contents gather into a globular body in the centre of the old cell. Under the high power of the microscope it seems to have a delicate lining membrane.

Let us now enquire what the effect is of our different disinfectants on these growths. And first in regard to sterilization by dry and moist heat. In experimental work anthrax spores have been taken because they are the most difficult to kill. Dr. Parson's experiments made some years ago and published in a local Government report show that anthrax spores need four hours' exposure to dry heat at 212° F., or one hour's exposure at 245° F.; but were destroyed by from ten minutes to half an hour exposure to boiling water or steam at 212° F. Ordinary bacterial life is destroyed at a temperature of 140° F.

Dry heat lacks in penetrative power. Steam on the contrary penetrates quickly into the interstices of any fabric. The reason is as follows: As steam penetrates into the colder parts it condenses and occupies a very small fraction of its former volume, viz., $\frac{1}{1300}$, more steam rushes forward to supply its place and thus the fabric is soon saturated and sterilization occurs. Dry hot air, on the other hand, contracts in volume only $\frac{1}{7}$, and thus longer time and a higher temperature is required to produce the same result. Take, therefore, for example a mattress which has been exposed to the germs of anthrax. With dry heat at a temperature of 212° F. at the end of four hours the outside would have been sterilized; but a higher degree would be needed before the inside would be disinfected; result, the mattress would be destroyed by the excessive heat. And even with germs less resistant, needing a temperature of 140° F., the outside would need to be about 300° F. before the temperature in the centre would be high enough. These facts show us that dry heat is of very limited utility compared with moist heat in the shape of steam or boiling water.

Dr. Abbot, of Johns Hopkins, recommends a method which he calls intermittent sterilization. It is based on the idea that the spores are not killed unless germination has commenced. The fabric is to be exposed to a moist T. of 212° F. for fifteen minutes on each of three successive days, and during the interval to be kept at a temperature of from 53° F. to 60° F. to allow germination to proceed.

Neither moist nor dry heat should ever exceed 250° F., as scorching occurs, and even that is too high for white woollen goods. Steam causes a certain amount of shrinking in textile material and cannot be used in the case of leather. Dyed articles may have their color altered, and many substances are rendered brittle by over-heating.

Of all disinfectants, that most commonly used is SO_2, produced by the combustion of sulphur in free air. This gas has been used from the earliest times. It is recorded that the ancient Egyp-