

sured that if we could discover any particular town or district whose sanitary machinery was in perfect working order the vicissitudes of climate would there be found to be perfectly harmless in the production of the disease.

I have arrived at the following conclusions with respect to the weather conditions that seem to influence diarrhoea mortality, after a careful tabulation of the meteorological conditions and diarrhoea mortality experienced during the summer months of each year since 1866. The prevalence of the disease appears to be governed by three weather conditions—viz., temperature, atmospheric humidity, and rainfall, and these follow in the order of their importance. The combination of these that seems most potent for evil is high degrees of heat, great atmospheric dryness, with little or no rainfall. This combination was experienced throughout July of 1868, and the diarrhoea mortality was greater than has ever since been recorded.

In reference to *subsoil temperature*, when temperatures of 56° F. and over are once established in sewers, putrid fermentation sets in, and the process goes on with a rapidity that is directly proportionate to the increase of temperature attained in the sewer. Sewers in this heated state afford the very conditions (heat, air, and moisture) for the rapid putrefaction of all the putrescible liquids and animal excreta that may be retained in them, for the air of a sewer, if not sufficiently ventilated, is always at the point of *complete saturation*.

ON THE ORIGIN OF THE DISEASE.—My observations, during the last eighteen months, upon the microscopic organisms contained in ordinary air and that of sewers, are much too numerous to mention in this already too lengthy paper; I will therefore, only draw attention briefly to what I have observed, and the conclusions I have drawn therefrom.

(1) During the summer months, the liquid portion of sewage derived from sewers of deposit will be found, upon microscopic examination, to contain great numbers of living forms, including (*a*) several genera of bacteria, such as micrococcus, bacterium termo (free and in the zoogloea form), bacillus, and vibrio; (*b*) rapidly-moving infusoria, flagellate and ciliated, belonging to several kinds of common protozoa, as monadina, euglenia, alyscum, trichodina, paramecium, kerna, &c.; and (*c*) microscopic hirudinea. The above living forms are always accompanied with variable quantities of the spores, spore-cases, and mycelium of fungi.

(2) The *moist air* in ill-ventilated and non-cleansing sewers, when the temperature of the latter is above 57° F., contains bacteria of the genera micrococcus and bacterium termo, the numbers present being in direct ratio to the increase of temperature from 57° to 69.5° (the highest temperature observed).

(3) The same organisms are to be found in the confined air of cesspools, and here their numbers increase with the atmospheric temperature.

(4) The trapping water of all gully-grates and stench-traps, when connected with sewers of deposit, contains great numbers of both kinds of bacteria, derived in great measure from the air within.