

sanitary science has developed the microbic theory; and the study of vegetable and animal infusions by the aid of the microscope, which ferrets out secrets that would otherwise be forever hidden, has manifested the truth that there exist innumerable minute germs whose fermenting growth occasions all the dissatisfactions to which the animal organization is liable. These micro-organisms, whose life is so antagonistic to our own, may be classed as the anaerobic bacteria. Their rankest development takes place in the moist and dark and hot compartments where sewage is collected. The damp walls form admirable supports to which the germs may cling, and the omnipresent ammonia is ever at hand to nourish them and make them thrive. When any means of exit is afforded, these bacteria are carried away by the wind and are implanted wherever chance may happen to throw them. If they enter the lungs or intestines, their presence will soon become known by the outcropping of some of those diseases which, for centuries past, have ravaged entire communities. The wind, no doubt, is a powerful agent in distributing these causes of infection, yet there are other ways in which disease may be spread. Refuse, in a state of putrefaction or fermentation, and still more if it contain the excreta of diseased individuals, is an exquisite source of pollution to otherwise potable waters into which it may be discharged.

Thus we see that both air and water may be polluted, and that they may convey their noxious constituents with them into the lungs or into the intestines. And since both air and water are essential to the existence of man, and since the human constitution requires them to be of a certain purity before consumption, it follows that both air and water must be supplied to communities in the necessary state of purity. Air exists in ample abundance all about us. We must keep it sweet and pure such as nature has given it to us, and we must not surcharge it with more impurities than it can take care of and convert into innocuous substances.

The air is a mixture of oxygen and nitrogen, in the proportions of one fifth of the former to four fifths of the latter.

Impurities are indeed present, but of these the most considerable is carbonic acid, which should not exceed the limit of three hundredths of one per cent according to Dr. Angus Smith. Both oxygen and nitrogen are odorless, colorless and tasteless. Oxygen is the life sustaining element; yet it can not be breathed pure without disastrous effects. It exists not only in air but constitutes also eight ninths, by weight, of water. Nitrogen is a dilutant and, of itself, can do naught but extinguish life. Carbonic acid has an acrid taste. It is the element which supplies the carbonaceous tissues of the vegetable kingdom. It might be an item of interest to quote from Professor Huxley, that each individual takes daily through his lungs about three hundred and fifty cubic feet of air, which, in its passage, changes from four to six per cent of oxygen for from four to five per cent of carbonic acid. Air receives its pollution, not only from animal breathing, but also from the secretions through living pores and from the ammoniacal gases which are engendered by organic putrefaction. Marshy soils and stagnant waters emit deathly exhalations, and the manufactural products of commerce are also fertile sources of contamination of the atmosphere. Solid impurities such as pollen, plant seeds, dust, and equine ordure, float about, adding their quota of harmfulness. The sulphuretted hydrogen, carbonic acid, and series of marsh gases, which are produced in damp and impermeable soils, are exceedingly infectious, and give rise to those inexplicable complaints which are covered by the general term "malaria." Since the engineer knows what constitutes pure air, and since he knows what elements are most prolific in destroying its purity, and since, finally, pure air is essential to the health of the community, it follows that it falls within the province of the sanitary engineer to devise means for avoiding atmospheric pollution and for maintaining a constant and uncontaminated supply for each and every individual. The mass of air which surrounds our globe is an admirable disinfectant. The oxygen, which it contains, combines with putrescible matter, and, by its action, tends to purify and convert into innocuous substances that which, if deprived of this contact, would