

Written for this Paper.

TALK TO BOYS.

III.—TOBACCO AND THE ORGANS OF RESPIRATION.

The organs of respiration are the air passages and the lungs, and the thorax or chest. The passages which lead to the lungs begin with the mouth and the nostrils, hence the parts directly affected along those passages will be included in consideration here.

The office of the lungs as one of the respiratory or breathing organs is to take oxygen from the air, giving it to the blood, and receiving in return carbonic acid gas, and water foul with waste matter which the blood has picked up to its circulation through the body. In this process of cleansing the blood is changed in color from purple to red. The purified blood, laden with the inspiring oxygen, is conveyed to the heart, and goes bounding through the system, while the exhaled air carries off the impurities. Analysis of the expired air shows that it has lost about one-fourth of its oxygen, and gained an equal amount of carbonic acid gas, besides organic impurities. The process of respiration, therefore, may be said really to consist in the inhalation, circulation, and assimilation of oxygen, without which the whole vital machinery stops, and the circulation of the lungs and exhalation of carbonic acid and organic matter.

It has been learned that one of the chief constituents of tobacco smoke is this carbonic acid—a gas as fatal to life as it is to a flame. An instance of breathing air laden with it, without the opportunity for circulation and purification, may be found in the awful experience of the Black Hole of Calcutta. There one hundred and forty-six prisoners were shut up in a room eighteen feet square, with only two small openings on one side; before midnight many were dead, and at six o'clock in the morning only twenty-six persons still breathed, lying in an unconscious condition when rescued; the poisonous carbonic acid did the work. One more illustration of inhaling this poison in the air: After the battle of Austerlitz three hundred Russian prisoners were confined in a cavern, where two hundred and sixty of them perished in a few hours. These are instances of re-breathing air, which serve to illustrate the danger of breathing tobacco smoke even in small quantities, not only by smokers but by non-smokers, as its poison is conveyed to the lungs, a quantity of the life-giving oxygen is excluded, and the blood is rendered unhealthy by the gas mingling with it the same as it does from re-breathed air.

There is also in tobacco smoke as heavy percentage of the deadly nicotine. This being taken by the breath into the lungs is thereby conveyed to the blood to increase its fluidity, and to operate as a rank poison in affecting all the tissues of the body. The breath of the tobacco-user, as it comes from his lungs, is evidence of the polluted state of his body. His brain, nerves, muscles—all the tissues—are flavored with nicotine. His blood is loaded, his body saturated with the poison, the offensive odor of which hangs on his breath for hours and sometimes for days after his last cigar or pipe.

The capacity of the lungs for a man of medium height is about three hundred and twenty-five cubic inches of air. After taking an ordinary breath, by a vigorous effort in expanding the lungs about one hundred cubic inches more may be inhaled than is usually taken, and by a strong effort after breathing about one hundred cubic inches more may be expelled than goes out in the ordinary operation; besides this about one hundred cubic inches cannot be expelled by a voluntary effort, and this, added to the twenty-five cubic inches inhaled in an ordinary breath, makes up the total lung capacity as stated, or about eleven pints. Less than this capacity of necessity brings a weakened constitution and premature decay.

In the light of these facts the recent tests at Amherst College, Massachusetts, are instructive. The graduating class presented a marked difference in favor of non-smokers, who considerably exceeded the tobacco-users in lung capacity; the non-smokers had also gained in weight 24 per cent over the smokers, and in height 37 per cent. The record made at Yale, covering a period of eight successive years, establishes a similar condition; the non-smokers were 20 per cent taller, 25 per cent heavier, and had 60 per cent more lung capacity than the smokers.

By this it is shown conclusively that through tobacco-smoking the students lost three-eighths of their lung capacity. Instead of three hundred and twenty-five cubic inches as given for an average man, they had only two hundred and three cubic inches total capacity; and in place of being able to regularly breathe twenty-five cubic inches, they inhaled less than twenty-one. It is no wonder that the latest scientific investigation has been able to trace directly to tobacco-smoking consumption and other fatal lung diseases. Even if this were not done, the taking in of but five-eighths of the amount of air necessary to the complete work of the lungs in blood purification, itself tells the tale of a life shortened with as much certainty as by the suicide's crime; while every person who respire the smoke of a cigar or pipe, willingly or unwillingly, must have his blood more or less impregnated with poison therefrom.

The irritating effects of tobacco smoke on the lung membrane also are characteristic of its influence on the nose and throat. Smoking is especially productive of disease of the nose. In this regard the cigarette is even worse than the cigar or pipe, for the reason that valerian, tincture of opium, and other injurious compounds are used in their manufacture; Havana flavoring, as it is called, is made from the tonka bean, which contains a deadly poison called melilotin, seven grains of which will kill a dog; the irritating smoke of the paper covering is carried into the lungs along with the poison fumes of tobacco. This special objection to cigarette smoking is not lessened by thoughts of the filthy materials, refuse cigar-stumps, etc., used in the manufacture of cigarettes, which so many of the boys suck at with as much avidity as if they had delicious confectionery in their mouths.

The loss of the useful sense of smell has been frequently traced to tobacco

smoking; and this sense is greatly offended in persons who do not defile themselves with the filthy weed. Says the eminent physiological writer, Dr. J. H. Kellogg: "No one whose ideas are not greatly perverted will be willing to saturate himself with a vile-smelling drug, against which nature seeks to protect herself by destroying his sense of smell, but which makes him a nuisance to everybody else not in the same condition as himself."

In being drawn through the air passages by the process of inspiration, tobacco smoke passes directly into the mouth, where its effects are immediately noticeable. Of the smoke, Dr. Richardson, the great English authority on this subject, says: "In the mucous membrane of the mouth it produces enlargement and soreness of the tonsils—smoker's sore throat—redness, dryness, and occasional peeling of the membrane, and either unnatural firmness and contraction, or sponginess of the gums; and, where the pipe rests on the lips, oftentimes epithelial cancer."

One reason why the mouth and throat are injured even more by smoking than by chewing is because the smoke conveys the noxious principle in a more concentrated form to the delicate lining; in chewing, the mouth frequently grows lopsided by carrying the quid mostly on one side, but this distortion of the countenance also follows carrying the cigar or pipe in the same position. Occasionally pipes are made with small reservoirs under the bowl, in which some of the poisonous vapor is condensed, to be emptied out periodically; if two drops of this oil were to be taken into the stomach at one dose it would result in almost certain death. In using the cigar and cigarette, and the pipe without a reservoir, this oil is drawn into the mouth.

At first, smoking produces dryness and unnatural thirst, which frequently proves an inducement to indulge in alcoholic drinks. In time, chronic inflammation attends smoking, resulting in smoker's sore throat. This disease is absolutely incurable so long as the use of tobacco is continued, and often causes deafness, by extension of the disease to the ears. Sometimes a small blister appears in the mouth, and by the continued irritation of the acrid matter becomes an ulcer, and finally assumes a cancerous character. This class of disease often occurs among heavy smokers. An effect of tobacco in the mouth is to benumb the sense of taste. A man who chews or smokes cannot distinguish delicate flavors. This numbing influence on the nerves is a good illustration of the poisonous influence which is exerted upon all living cells and upon every tissue and structure of the body.

Tobacco cancer is an affection of the lips, tongue or throat. Nearly every surgeon of experience has met cases of this dreadful disease arising from tobacco smoking. Cancer rarely occurs in these parts of the body from any other cause. It is wholly incurable, and works slow, painful and certain death. Cancer of the lip has been observed as a frequent occurrence in Europe, caused by the pressure and heat of the pipe or cigar, in connection with the irritation of the acrid oil.

Here are noted some of the effects of the tobacco habit, any one of which is