

try. The able French Commission say of it, in their report in 1865, after an extended examination of art and technical (industrial) education throughout France and Europe: "Among all the branches of instruction, which in different degrees, from the highest to the lowest grade, can contribute to the technical education of either sex, drawing, in all its forms and applications, has been almost unanimously regarded as the one which it is most important to make common." Then the commission advise the government that "Drawing, with all its applications to the industrial arts, should be considered as the principal means to be employed in technical instruction." We are glad to observe that the same view is rapidly gaining ground in this country. Drawing is also to be greatly esteemed for the mental discipline it confers, since it trains to accurate vision, exercises the inventive powers and the imagination, and gives a taste for the beautiful. As a discipline, or as an industrial instrument, no other study can take the place of drawing. We have now indicated the different studies, having a direct and decided bearing on the different industries, which must receive, universally, the same consideration that is given to arithmetic and geography, before the public schools can justly claim to meet the present wants of the great body of the people. They are the studies that will give to public instruction the industrial elements so much needed to-day; for the deal with the principles, scientific and artistic, which underlie all industrial pursuits, and impart much of that discipline of the faculties, so essential to one's success in these pursuits. Every person of average capacity who attends school six or eight months a year, from six to sixteen, should be well-grounded in the elements of all these studies; and we believe he can be so grounded without the slightest detriment to his training in other directions.—*N. E. Journal of Education.*

A Plea for pure Air.

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A people, to be truly great and good, should breathe pure air and drink crystal water, for they give to men strong bodies and clear minds, with true, noble and high aspirations; while impure air and turbid water lower the vitality of the body, and degrade the thoughts and hopes of the mind. It is said to be a fact that American churches, schools and homes are poorly ventilated. If this be true, and we know it to be partially so, then there is need of reform. Let us, for a moment, consider the importance of ventilation and pure air.

What do we breathe? A gas called air, composed of two elementary bodies, oxygen and hydrogen, mixed together in the proportion of one-fifth oxygen to four-fifths of nitrogen. This is a mixture, and not a compound, and surrounds the earth to a height of from fifty to five hundred miles, being very rare above two or three miles.

The oxygen is the life-sustainer of men and animals, but cannot be taken in a pure state any length of time, as it consumes the tissues too rapidly; hence in nature it is diluted with the gas nitrogen, an inert substance which cannot support life, though it is not poisonous when breathed.

Why do we breathe? Because we find it an absolute necessity. It is a law of our being, involuntarily performed, and which we cannot resist.

By what means do we breathe? Various muscles connected with the respiratory apparatus act upon the walls of the chest in such a way as to enlarge its cavity, and a partial vacuum being produced, the external air

rushes in; then, the muscles relaxing, the walls of the chest relapse, and the air is again expelled.

How often do we breathe? About twenty times a minute; 1,200 times an hour; 16,800 a day, and about 9,000,000 times a year. Children newly-born breathe forty-four times per minute; at five years, twenty-six times per minute.

How much do we breathe? About thirty cubic inches at each respiration, 500 cubic feet in twenty-four hours, and 700,000 gallons in a year.

For what purpose do we breathe? That the pure oxygen of the air may enter our lungs, and there meet and remove the impurities brought to that point by the blood.

What changes occur in the air breathed? It loses about five per cent of its oxygen, which enters into the composition of the body, the gain from this source amounting in twenty-four hours to about one and one-half pounds. The loss of oxygen to the air expired is compensated for by a gain of about five per cent. of a heavy poisonous gas, called carbonic acid gas, the total amount of which given off from the lungs in twenty-four hours amounts to about one and three-quarter pounds. In addition to the carbonic acid, the expired air bears with it vapor of water and effete animal matters. The carbonic acid can be detected by passing the expired air through lime water, when a white precipitate of carbonate of lime will be formed, and if the water be left remaining in a warm room a few hours, it will become putrid from the decomposing animal matters taken off by the water from the air passed through it. It is this decomposing animal matter that causes the horribly offensive odor in ill-ventilated cars at night, and is also perceived in bed-chambers in the morning. It is even more poisonous than the carbonic acid gas.

The air normally contains about twenty-one per cent, of oxygen; when this amount is reduced below ten per cent, it will not support human life. If the amount of carbonic acid exceeds twenty per cent, it also destroys life. Hence for man's well-being he requires an exchange of air in his habitations.

What changes occur in the blood? The blood comes to the lungs from all parts of the body, of a dark venous color, bearing carbonic acid in solution and effete animal matters. They are here set free, and the oxygen from the exterior entering the blood, changes its dark color to a bright scarlet, which goes hence, coursing through the system, giving life and strength.

What harm from breathing impure air? If the air contains too much carbonic acid, the blood cannot be cleansed and oxygenized, and the person becomes dull and stupid; in fact, is slowly poisoned. By breathing air contaminated by effete animal matters, fevers of the most dangerous type are likely to result.

What is the effect of breathing dry and heated air? If the air is too dry, it has a tendency to remove an excess of moisture from the blood through the lungs, and thus cause an unnatural dryness of the tissues, which may result in serious organic diseases. Heated air may produce similar results. Dry and heated air very frequently causes headaches.

What is the structure of the lung surface when the blood and air meet? The trachea or windpipe divides into two branches, one of which goes to each lung, and in the lung divides and subdivides into an immense number of subdivisions. The lungs are composed of lobules, and each lobule is composed of exceedingly minute cells or vesicles, called pulmonary cells. The walls of these cells are about one five-thousandth of an inch thick, and upon these walls are spread out the minute ramifications of the blood-vessels. The blood