diameter. I let this piece of lighted candle down to the bottom of the jar, and you see it continues to burn as briskly as ever. I now breathe through a tube into the jar, delivering the breath near the bottom, so as to not blow out the flame. You see the flame soon becomes dim and goes out. Flame dies out when the proportion of oxygen is reduced to 18½ parts in every 100 parts of air, instead of 21 parts, the normal quantity.

In this bottle I have lime water which you see is quite clear. I now blow air from the lungs through the lime water by means of a tube, and you notice the water becomes milky in appearance. The milkiness shows that the carbonic acid of the breath has united with the lime in the water, forming chalk, and the formation of so much chalk shows that the carbonic acid must have been present in excessive quantity; because had I blown air into the limewater from a bee-smoker, no perceptible change would have taken place.

But it may be said that these experiments have been made with the human breath. Have we any evidence that the breath of bees is so impure that it is injurious to bee-life? The maximum amount of impurity admissible in an apartment occupied by people is 6 parts in 10,ooo parts of air. Mr. Cheshire has ascertained that for bees not more than 5 parts of impurity ' in 10,000 are admissible, and to keep the air in this state of purity, he finds that all the air in the hive must be changed every half hour, assuming the bees to be so dormant that they consume less than one pound of stores per month, and that the air contained in the hive does not exceed half a cubic foot. Mr. Cheshire's statements might be confirmed by those of other authorities and by facts observed by practical As our time is limited I shall not bee-keepers. discuss any further the necessity for hive ventilation, but shall proceed at once to consider the means by which it may be best accomplished.

We have already seen that a lighted candle will continue to burn in the jar when its mouth is open full size. I now insert a perforated cork so as to reduce the opening to a diameter of about one inch, and again introduce the lighted candle, the jar being in an inclined position ; but you see the flame soon dies out. After emptying the jar I again introduce the lighted candle, and at the same time I insert a piece of cardboard into the mouth of the jar, dividing the opening horizontally, You see as a result. that instead of going out, the candle continues to burn. I remove the cardboard, and at once the flame becomes sickly; I insert it again and it brightens up, and these changes can be repeated as often as I choose to take out and put in

the cardboard. If while the cardboard is, in place, I cause a little smoke to rise close to the lower edge of the opening you will see that it is drawn into the jar by an ingoing current of air. By holding the hand above the cardboard the warm outgoing current is distinctly felt.

A friend informs me that in one of the mining districts a horizontal tunnel was run into a mountain side. After going some distance the air became so warm and foul that work had to be suspended. A trench one foot deep and onefoot wide was cut in the bottom of the tunnel, and was covered with plank. A current of fresh air set in through this channel and drove out the warm impure air from the tunnel.

A difference in the temperature of two bodies causes a difference in their density, and a difference of density causes currents, if the bodies of air are free to change places, just as certainly as oil rises to the surface of water. How is it then that currents did not take place in the tunnel until the channel was made in its bottom? The reason seems to be that the friction between the ingoing and outgoing currents counteracted their force, and there was no ventilation except by slow diffusion; but when the covered passage was made at the bottom, the retarding effect of one current on the other was removed and ventilation took place. In the case of the jar the piece of cardboard separated the currents and ventilation took place there also. I shall show presently that hives fail to be well ventilated, for the same reason, when there is only a single entrance and that a narrow horizontal one at the bottom.

We have now learnt something about air which has been breathed. We have learnt that a candle will not continue to burn in a jar unless a constant supply of fresh air is kept up; we have learnt that two currents of air going in opposite directions, will not readily pass each other through a small opening, and we have learnt that they may be made to pass each other by inserting a partition to keep the currents from interfering with each other.

I have here an eight frame Langstroth hive, covered by a solid board, and having a rim two inches deep. The top. body, rim and bottom board are all clamped together with Vandusen clamps, all the joints being made air tight with rubber packing. You see the entrance was originally the full length of the front of the hive and half an inch deep; but for the purposes of these experiments I have reduced it to four inches in length. This we shall call entrance No. 1. I have a similar entrance directly below it, cut out of the lower edge of the rim. This is entrance No. 2. I have another of the same