

level are liable to catch a good many cinders and much smoke. The pounding of the cars raises a good deal of track dust. The Pennsylvania Railroad takes in its air above the roof of the car and uses screens to keep out cinders.

"3. In the case of elevated trains the ducts are advantageously located in the floor of the car and take air from below the floor line. The question of the location of the ducts in surface street cars is somewhat more difficult. The short ducts, when the inlets are below the floor level, present great advantages. The only disadvantage is the dust. The swirl of dust raised by a street car can be seen to hang a little in the rear of the car except when it is stopping. The dust at the floor line of the car is far less than superficial observation would indicate.

"3. The keynote of car ventilation is warming the air as it is taken in. A street car jammed with passengers will have only ten cubic feet of air per passenger. If, then, 2,000 cubic feet of air per passenger per hour is furnished the air must be changed 200 times per hour, or, say, three times per minute. No passenger will allow such a volume of air on a cold day without the air having been previously warmed.

"On the other hand, the radiation in the car is usually placed under the seats or in out-of-the-way corners of the car. The result of this is that the seats are usually scorching hot and the remainder of the car is uncomfortably cold. The proper solution is to introduce the fresh air into the car through the radiation. In this way the air is warmed to a point where the passengers will tolerate ventilation. The radiation is cooled and the cold parts of the car are warmed; the car temperature is made more nearly uniform; the efficiency of the radiation is increased.

"4 and 5. In the installations commonly in use, the air is theoretically taken in through the deck sash. The most efficient intakes we have found in such installations are the leaks around doors, windows and joints.

"Deck sashes will sometimes act as inlets, sometimes as outlets, and sometimes as neither, according to the direction and force of the wind, and according as the car is gaining speed, speeding, or losing

speed. The great volume of air which comes in through those sash openings which are acting as inlets will flow straight across and out of other sash openings acting as inlets.

"Now, cold air must be heated by something. The heating agencies in a car are the passengers and the radiation. Putting the air in at the deck sash and having the heat of the car heat it before it reaches the passenger, may add to the passenger's comfort. It does not save any in the expense of heating. If the fresh air is warmed enough to keep it from being uncomfortable and is then discharged into the car below the seat level and the foul air is taken out through ducts around ceiling lights, a somewhat uniform upward flow of air is maintained in the car. The partial separation of the fresh from the foul air makes it possible to reduce the volume of air required for each passenger.

"With such an arrangement of inlets and outlets, the Chicago Department of Health thinks it is safe to reduce the air requirements to 400 cubic feet per passenger per hour, and has had ordinances drawn along these lines."

Open Air Schools.

Three years ago the first open air school on this continent was established in Providence, R.I. It was modeled after similar institutions in Europe, and it was then predicted that the idea would one day get a good hold here. While the progress has not been rapid it has been highly satisfactory. In Orange, N.J., such a school is run under the joint auspices of the Board of Education, the Health Department and the Associated Charities. These supply respectively the teacher, medical inspection and supervision of the special diet. A somewhat similar plan is considered for Philadelphia. There are twenty-seven open air schools in America at present, some fifteen or sixteen cities have adopted them as a feature of their educational system and a dozen others are about to take the step.

A gratifying report comes from Chicago, where such a school was opened last year. Its report says that there are now forty-one bright youngsters, who went in as weaklings, and who represent an average gain in weight of four pounds each. The transformation is said to be remarkable in