

## FINAL CONTRIBUTION OF THE NEW YORK COMMISSION ON VENTILATION



THE publication in October of the final report of the New York Commission on Ventilation marked the conclusion of the research studies of this body, which have been characterized as among the most important contributions in recent years to the health and welfare of school children throughout the country. The results of the long and exhaustive investigations of the Commission, which was appointed some years ago by the Governor of the State of New York to conduct experiments to determine the best methods of ventilating school buildings, are summed up in this volume issued by the Bureau of Publications of Teachers College, Columbia University, under the title "School Ventilation: Principles and Practices." It sells at \$1.00 a copy. The report represents the joint effort of the committee as it was constituted during the latter years of the investigation, 1926 to 1929. Its members include C.-E. A. Winslow, chairman; Rufus Cole, Dwight D. Kimball, Frederic S. Lee, George T. Palmer, Earle B. Phelps, and Edward Lee Thorndike.

The results of the earlier work of the official State Commission appointed in 1913 were incorporated in an exhaustive report issued in 1923. The present volume contains the findings of the body formed to carry on the investigations of this original Commission, which was discontinued as a result of changes in the State constitution. Confirming in general the main conclusions of the earlier report, the volume just issued points out how existing building legislation in many states relative to school ventilation is based on outworn theories, and makes definite recommendations for an ideal ventilation

law which would save many hundreds of thousands of dollars annually while adequately safeguarding the health of several million school children.

The twenty states which in the opinion of the Commission retain statutes or other regulations concerning school ventilation based on disproved or antiquated theories are: Florida, Idaho, Illinois, Indiana, Maine, Massachusetts, Michigan, Montana, New Jersey, New York, North Dakota, Ohio, Oklahoma, Pennsylvania, South Dakota, Texas, Utah, Vermont, West Virginia, and Wisconsin.

The report makes clear, however, that the Commission fully recognizes the remarkable achievements of the art of mechanical ventilation and its great value in dealing with many indoor conditions. Two members of the New York Commission on Ventilation, it is pointed out, served as members, and one of them as chairman, of the special commission appointed by the federal government to draw up specifications for the ventilation of the Houses of Congress. "In that capacity," says the report, "they recommended the most elaborate type of mechanical ventilation, and the resulting system, as designed by W. H. Carrier, has been outstandingly successful.

"For auditoria holding one hundred people or more," the report continues, "for large offices and workrooms, for industrial establishments where excessive heat or moisture or dusts or poisonous fumes are produced, fan ventilation is essential. In certain schools where outdoor noise or dust or odors may make it inadvisable to keep windows open, fan ventilation will be the method of choice.

"In many classrooms, however, we are convinced that window-gravity ventilation will provide an entirely satisfactory solution of the problem of ventilation, and we believe that under such conditions this system may be preferred for





the schoolroom, as producing equally healthful and more comfortable conditions.”

The history of the whole subject of ventilation is briefly considered in the opening chapter of the present report. The conflicting theories and the prevailing uncertainty about ventilation are discussed, together with the other reasons leading to the establishment of the Commission by the Governor of the State of New York at the request of the Milbank Memorial Fund. The original body included a ventilating engineer, a physiologist, a physician, a chemist, a psychologist, and a sanitarian. Special rooms for physiological and psychological investigation of the results of various air conditions were set aside and equipped at the College of the City of New York. The results of various types of ventilation under ordinary classroom conditions were also studied in twenty schools in the City of New York, six in Springfield, Massachusetts, and one each in Fairfield, Connecticut, and Minneapolis. All this research and experimentation by the original Commission was carried on between June, 1913, and April, 1917. The war postponed the publication of the final report of the Commission's activities until 1923, after which the original Commission passed out of existence.

Three years later, however, in 1926, evidence had grown overwhelmingly strong, says the present report, that the one important essential in school ventilation was the maintenance of an atmosphere which would remove the heat produced in metabolism so as to avoid overheating, without unpleasant drafts. “It seemed obvious that such an end could be attained without a large flow of air; and experience with window-gravity ventilation in many cities had shown that such was, in fact, the case. State legislation still generally insisted, however, upon the thirty cubic-foot standard. It seemed desirable, therefore, to undertake further experi-

mental studies of the problem, to widen our base of experience and to determine whether the thermal theory of ventilation was in error, or, if not, whether such evidence could be obtained as to warrant the changing of current legal standards."

Since the original Commission could not be reconstituted as an official body in view of changes in the State constitution, it was reestablished as the New York Commission on Ventilation at the invitation of the Milbank Memorial Fund, but with the same personnel as in 1913-1923 with two exceptions. Rufus Cole replaced James Alexander Miller as its medical member and George T. Palmer, who had been chief of its investigating staff in 1913-1923, was made a member.

The newly constituted group carried on, during the years 1923-1926, practical investigations under normal schoolroom conditions in Syracuse and Cattaraugus County, New York, and in the City of New York, in conjunction with the New York Health Demonstrations, aided by the Milbank Memorial Fund in these localities. Other experimental projects made possible by grants from the Commission included special studies on body radiation, on the effect of local drafts, and on school absenteeism in relation to respiratory diseases and ventilation. These studies were carried on respectively at the Smithsonian Institution, the Yale School of Medicine, and the University of Chicago. The study of actual schoolroom conditions confirmed the findings of the original Commission that even slight overheating has a marked deleterious effect, physically and psychologically. It is the belief of the Commission that fundamental principles only should be embodied in any legislation relative to the subject of ventilation. Hygienists would approach every individual problem with the sole thought of attaining certain specified conditions of temperature, with freedom from drafts and with, perhaps, a liberal carbon dioxide standard. The engineering profession,

however, greatly prefers concrete specifications of apparatus to be provided, which can be met with certainty.

“There is very serious objection, however,” the report continues, “to the crystallization in legal form of such minute and detailed specifications as would be necessary if this plan were to be effectively carried out. The art of ventilation changes from year to year. It is subject to wide variations in its application to different buildings. It differs in its application to the same buildings at the same time in the hands of equally competent engineering experts. If regulations of the type proposed are to be effective at all, they must be very precise and definite; but to enact into law the precise and definite details which happen to appeal to a particular group of experts at a given time would not only put a stop to progress in the future but would create a condition intolerable to the engineer who desires to approach his problems of today and tomorrow with imagination and creative power.”

Another approach in framing a model law, and the one favored by the Commission, would specify the general objectives to be attained and would confer upon a small expert group the power to determine whether a given design is reasonably adequate to attain those objectives. “This is essentially the procedure involved in all modern legislation with regard to public health and industrial conditions,” the report concludes, “the principles only being embodied in the law and the details being subject to determination by a Board of Health or an Industrial Commission in the individual case.”

The recommendations of the Commission are as follows:

1. The major objectives of schoolroom ventilation shall be the elimination of heat from the body surface without the production of objectionable drafts. This means the maintenance of a room temperature of 65 degrees Fahrenheit in corridors, gymnasiums, and shops; of 75 degrees in

swimming pools and adjacent dressing rooms; and of 68 degrees in all other occupied rooms.

2. The avoidance of overheating is of primary importance for the promotion of comfort and efficiency and the maintenance of resistance against disease. Sources of direct radiation, therefore, shall be so designed or protected as to prevent overheating of persons in adjacent seats.

3. All classrooms shall have at least 15 square feet of floor space and 200 cubic feet of air space per pupil and shall have a system of heating and ventilation which shall provide means of air supply and exhaust capable of avoiding unpleasant odors and of avoiding, without chilling drafts, an increase of room temperature above 68 degrees Fahrenheit.

4. Such ventilation shall be accomplished by any means which will attain satisfactorily these specified results. For the average school, favorably located, window-gravity (open-window) ventilation seems to be the method of choice on grounds of comfort and economy.

5. Every schoolroom used for instruction, study, assembly, and physical recreation shall be provided with at least one thermometer of a grade that will give a reading accurate to within one degree Fahrenheit. The thermometer should be so located as to give a representative reading of temperature at the breathing plane of the pupils.

“Such a law,” the report states, “would permit the engineer and the architect to present any design which in their judgment would attain these objectives. Finally, it would require that the State Board of Education, the State Board of Health, or such other official agency as may be designated approve the plans as submitted. It is exactly in line with the procedure now followed with regard to water supply and waste disposal; and it appears to guarantee a maximum of protection for the public with a minimum of interference with freedom of initiative on the part of the designer.”