number, size, location and general application of the mechanical ventilators. With a correctly designed system and proper equipment, good diffusion will be effected if the frequency of air change in the room ventilated is equivalent to five or more volumes per hour but the extent to which the desirable effect of air motion is present will be governed both by the frequency of air change and the ceiling height.

On the same principle that underlies the necessary distribution of direct radiation there is a limit to the amount of air which can be distributed from a single point in ventilation work if good results are to be expected. Practical experiments seem to indicate that this limit is about 1500 cu. ft. per min. with this type of apparatus, for this reason mechanical unit ventilators are not built with capacities greater than 1500 cu. ft. per min. and should never be used except in rooms with very

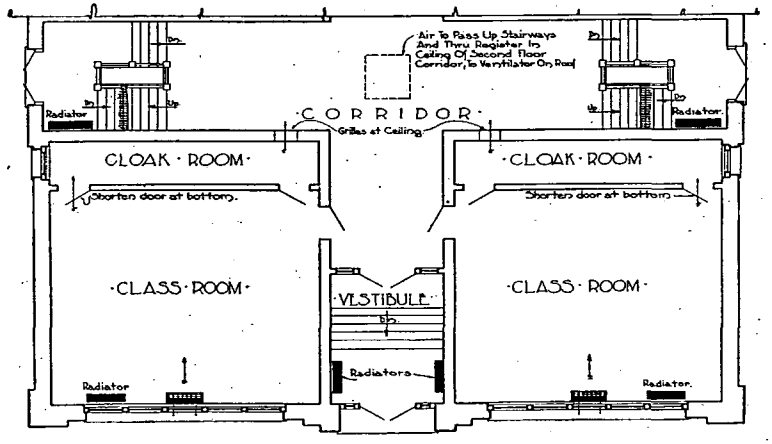

FIG. 76. SCHOOL ROOM PLAN SHOWING LOCATION OF UNITS

high ceilings. In a practical way this determines the number of ventilators to be used in a given case. Where the very best results are desired it is recommended that the capacity of any single machine be limited to 100 cu. ft. per min. per foot of ceiling height.

Mechanical unit ventilators should be centrally located on the outside wall of the room which they serve. Corner locations are liable to result in inefficient and unbalanced distribution. In fact, under adverse conditions, drafts may result from such a location.

Unit ventilators may be recessed but they should never be enclosed or concealed. Not only are enclosures liable to affect the jet action but from a practical standpoint they interfere with proper care and attention by rendering the machine inaccessible. Moreover, there is a certain psychological value to an exposed machine. The occupants quickly learn its purpose and operation with the result that they appreciate its value and see that it is operated and properly cared for.

No single mechanical unit ventilator should be made to serve more than one room by the extension of ducts from the outlet since this is contrary to all the basic principles of the system. Adjacent rooms, if not sufficient in size and importance to be equipped with individual ventilating systems probably do not require any ventilation.

Where the total B.t.u. required for heating and ventilating is in excess of the rated capacity of the unit, the unit must be supplemented by direct radiation. Otherwise, the unit can be used for both heating and ventilating without direct radiation.

No special treatment of vent flues is required by this system, the vitiated air being discharged from the building in the same manner, as all other mechanical systems. It has been found that the best results have been obtained where the cross sectional area of the vent flue did not exceed 20 sq. in. per 100 cu. ft. of air.

Industrial Service

Unit heaters for industrial work consist of a heating element over which air is forced or drawn by means of a power driven fan which also distributed this heated air to the space to be heated. The area that can be served by one unit varies according to the type of unit and the location of the unit within the building. If the unit could always be located in the center of the area, which is the most ideal location from a standpoint of distribution, then one unit would most generally be capable of heating an area from 50 ft. square up to an area 150 ft. square.

Unit heaters may be divided into two classes: Namely, the Direct Fired Type and the Heating Coil Type.

The Direct Fired Type is constructed very much along the lines of the pipeless furnace used in house heating and burns coal, coke, wood, oil or gas fuel. A power driven fan connected to the base of the heater creates

TABLE 100. B.T.U. CONSTANTS FOR VARIOUS STEAM PRESSURES AND TEMPERATURES OF ENTERING AIR

STEAM PRESSURE LBS.	TEMPERATURE OF AIR ENTERING HEATER												
	−10°	0°	10	20°	30°	40°	45°	50°	55°	60°	65°	70°	75°
0	0.975	0.93	0.89	0.84	0.80	0.76	0.73	0.71	0.69	0.67	0.64	0.62	0.60
2	1.01	0.96	0.92	0.87	0.83	0.79	0.76	0.74	0.72	0.70	0.68	0.65	0.63
5	1.04	1.00	0.96	0.91	0.87	0.82	0.80	0.78	0.76	0.74	0.71	0.69	0.67
10	1.06	1.05	1.01	0.97	0.92	0.88	0.85	0.83	0.81	0.79	0.76	0.74	0.72
15	1.15	1.10	1.05	1.01	0.97	0.92	0.90	0.88	0.86	0.83	0.81	0.79	0.76
20	1.18	1.14	1.09	1.05	1.00	0.96	0.94	0.92	0.89	0.87	0.85	0.83	0.81
30	1.25	1.21	1.16	1.12	1.08	1.03	1.01	0.98	0.96	0.94	0.92	0.90	0.88
40	1.30	1.26	1.22	1.17	1.12	1.08	1.06	1.04	1.02	1.00	0.97	0.95	0.93
50	1.35	1.31	1.27	1.22	1.18	1.13	1.11	1.09	1.07	1.04	1.02	1.00	0.98
60	1.39	1.35	1.31	1.26	1.22	1.18	1.16	1.13	1.11	1.09	1.07	1.05	1.03
80	1.49	1.43	1.38	1.34	1.29	1.25	1.23	1.20	1.18	1.16	1.14	1.12	1.10
100	1.53	1.49	1.44	1.40	1.35	1.31	1.29	1.26	1.24	1.22	1.20	1.18	1.16
125	1.59	1.56	1.51	1.46	1.42	1.37	1.36	1.33	1.31	1.29	1.27	1.24	1.22
135	1.61	1.57	1.53	1.48	1.44	1.39	1.37	1.35	1.33	1.30	1.28	1.26	1.24
140	1.62	1.58	1.54	1.49	1.45	1.41	1.38	1.36	1.34	1.32	1.29	1.27	1.25
150	1.64	1.60	1.55	1.51	1.46	1.42	1.40	1.38	1.35	1.33	1.31	1.28	1.26

Note.—To get B.t.u.'s at any steam pressure and entering temperature, multiply constant from table by rated B.t.u.'s at 0 deg. entering and 5 lb. pressure.