each of the entries C, C, there is a provision t, t, t, t, for setting up umbrellas, as decribed on page 68 of this *Journal* for May.

The seats and desks in the rooms T and S are of the same dimensions, and arranged in the same manner as those in the primary School-house described at length on the 13th page of the *Journal* for January. A section of these seats and desks may be seen in Fig. 5. The small iron posts c, c, c, c, about  $2\frac{1}{2}$  inches in diameter, supporting the floor above, are placed against the ends of the seats so close as not to obstruct the passages at all. Besides the platforms P, P, 20 feet by 6 ft.,—the tables, 3 feet by 4 ft., for the Teachers, and the closets l, l, for brushes, &c.,—there are blackboards, painted upon the walls, extending from the doors D, D, to the windows, 14 ft. long by 14 ft. wide, with the lines of a stave painted on one end, to aid in giving instruction in vocal music.

These rooms are well warmed by heated air, admitted through registers r, r, (Figs. 3 and 4,) 18 inches in diameter, from the furnace below, F, (Fig. 2,) from which the tin pipes p, p, (Figs. 2 and 3,) 14 inches in diameter, convey the air to the School-room in the second story. Each room is provided with two ventilators, each 3 ft. long by 15 inches wide, opening into flues of the same dimensions, which open on a level with the floor, and leading into the attic, from which the impure air escapes at circular windows in the gables. These flues thus remove the foul air from the lower parts of the room, and cause fresh, warm air to slowly settle down upon the scholars—a very pleasant and healthful mode of ventilation.

(Fig. 4.)



PLAN OF THE SECOND STORY OF A GRAMMAR SCHOOL-HOUSE.

The School-room in the second story is large, and with an arched ceiling (see Section, Fig. 5) measuring 12 ft. to the foot of the arch and 17 ft. to its crown. It is provided with two ventilators,  $3\frac{1}{2}$  ft. in diameter, placed in the crown of the arch, about 20 ft. apart.

The entrances to the second story School-room are by two short flights of stairs on a side; from the lower entries to s, s, (Fig. 4) spaces about 3 ft. square, and thence to A, A, spaces  $3 \times 5$  feet, extending from the top of the stairs to the doors opening into the School-room.

The Master's table c, as well as the tables d, d, for the Assistants, are moveable. The large area B, B. being 14 inches above the

floor of the room, is 8 ft. by 64 ft. long, with large closets u, u, at the ends filled up with shelves, &c., for the use of the Teachers.

The School-room and the recitation-rooms  $\mathbf{R}$ ,  $\mathbf{R}$ , are warmed by heated air, admitted at the registers r, r; r, r, all of which are connected with the furnace in the cellar, by large tin pipes or conductors.

The black-boards, 4 feet wide, painted upon the hard finished walls, are indicated by the lines b, b; b, b, in the recitation-rooms, and along the walls behind the Master's table, extending on each side to the windows beyond, e, e, making in the school about 360 ft. of black-board. The long benches e, e, are used for seating *temporarily* new pupils on their entering school, until the Master can assign them regular seats; also for seating Visitors at the Quarterly Examinations. The space P, P, a broad step, 18 ft. by 2 ft. wide, is used for some class exercise on the black-boards. The passage t, t, about 15 inches wide, running the whole length of the room, affords great facility in the movements of pupils to and from the recitations and other class exercises. The Master's class generally recite in the space o, o, at the back of the room, which is 4 ft. wide by 64 **4**. long.

The windows W, W, which are hung with weights, and furnished with inside blinds, contain 12 lights each of  $10 \times 16$  in. glass. The quantity of air furnished for each scholar is a matter of no small importance. Each room in a Grammar School, intended to accommodate 200 pupils, should contain over 35,000cubic feet, deducting the space occupied by the furniture. This estimate allows every child about 150 cubic feet of air for every hour and a-half, on the supposition that no change takes place, except at the time of recess. But the rate at which warm air is constantly coming into the rooms from the furnace, increases the allowance for every child to about 300 cubic feet for every hour and a-half.



TRANSVERSE SECTION OF A GRAMMAR SCHOOL-HOUSE.

Fig. 5 exhibits a section of the building as if it were cut through the centre. It shows in an end view the projection, belfry, rooms, scats, desks, and cellar. An imperfect outline of the warming apparatus is presented, giving an outline of the plan of its construction. The smoke pipe, connected with a, the heater, coiled twice around in the air-chamber, passes off in the direction of b, b, to the chimney. The short tin pipes c, c, conduct the warm air into the lower rooms; and the long ones e, e, convey it to the rooms in the second story. On each side of the projection, over the door d, is a window, lighting the outside entry, and also the middle entry by another window over the inside door. The end view of the seats and desks do not represent the different sizes very accurately, but sufficiently so to give a correct idea of the general plan.