mass, thoroughly disintegrated in all its parts, and capable of a more complete mixture. Frost has no chemical action on lime; it is the water that freezes. But when on the wall freshly laid and largely composed of water, the frost comes along, swells and expands the mortar, the result is different. This expansion prevents the lime from cementing with the sand, and the work is destroyed-if partially dry, perhaps only the face is destroyed. In two-coat work this face may be dusted off, well damped and finished, but for three-coat work no

chances should be taken of having the first coat frozen. Mr. Wickson: You think there is nothing in the statement sometimes made that it is all right to freeze plaster dry?

Mr. Hynes : Did you ever see an icicle freeze dry? Water is one of the things you can freeze. If it is frozen how can it be lost? It must thaw before the water can leave it. I know that mortar gets hard and imperceptibly dries, but I cannot understand how it can freeze dry. Many have claimed that work that has frozen dry was the best and hardest. This, I think, was because a greater time was allowed for the necessary chemical action of the lime and sand to form carbonates and silicates before drying. I think there were either mistakes about it being frozen, or else it was frozen when very little water was in the wall-when it was partially dry, and not enough moisture in the work to allow the frost to expand its particles.

Mr. Dick : We had a very good instance of the drying power of frost the other day on the streets. Weall know the condition Yonge street was in after the rain a few days ago, principally with horse dung—everything was literally soaked; but it froze hard during the night, and the next morning, when there was a high wind blowing, the particles of manure and dust were flying all over the street. Now, if it wasn't the frost that dried it I would like to know what it was. Every housekeeper will tell you when it is freezing hard that they keep their washing out on the line and let it get thoroughly frozen, and it will dry.

Mr. Pearson: What is the action of frost on the lime? Does it prevent the setting if it is frozen?

Mr. Hynes : I never found it so. Mr. Pearson : Well, how is it that it rubs off and falls to pieces?

Mr. Hynes : Because the water is swollen out.

Mr. Pearson : Then that does not affect the lime?

Mr. Hynes : No, I do not think it affects the lime a particle.

Mr. Pearson : It is the water between that freezes and leaves it free, the lime forms the best cementing of the particles of sand together, and then the moisture between freezes and expands and leaves it free; that is the way it rubs off.

Mr. Hynes : Yes, that is the idea.

Mr. Gregg: I don't know whether Mr. Hynes heard the example given by Mr. Dick of the clothes freezing dry on the line, but I think he answered that by saying that if a wall can be left long enough to imperceptibly dry it would be all right, but it is the sudden changes that cause the trouble.

Mr. Hynes : That is it, exactly. If a wall has sufficient water to allow the frost to expand, it is destroyed, but if the water is not there in a sufficient quantity to allow the frost to swell, it is not going to hurt it. It must the must thaw before it can dry, that is sure, but it may do so imperceptibly.

Mr. Baker: The tensile strength of plaster is increased by the hair, I suppose. I was wondering if the expansion would not have a tendency to shorten the hair, and to separate it in places. I have much

pleasure in seconding the vote of thanks to Mr. Hynes. Mr. Harkness (School of Practical Science) : It is a fact that ice will evaporate; that is a well known physical fact physical fact, and I imagine that plaster frozen on a wall in the wall in the early winter, if it were allowed to stand for some considerable time, would dry. The ice in it would considerable time, would dry. would gradually evaporate the same as any other ice will but will, but, of course, I am not able to say whether it would damage the plaster; I would not attempt to pose as an authority regarding that.

Mr. Hynes: I am inclined to think it would not. The more opportunity lime has to form back into its natural state the better. I have heard numbers of plas-terers say there is no work so good as that you let freeze dry, but you must not let it freeze when you put it on first.

Mr. Siddall : I would like to ask Mr. Hynes if he has had much experience in mixing colored ingredients with plaster, and what is the mechanical effect on the plaster?

Mr. Hynes : I cannot speak from experience on that. The only experience I have had was in a little hall of the Bishop Strachan School, where we mixed yellow ochre with it. I was very much surprised when I saw it four or five months after to find that the color had almost entirely disappeared. I know it can be done, but you must reckon on the lime destroying a certain amount of While I am on my feet, I would like to tell the color. you that there is a work published in England by Mr. William Miller, a practical plasterer, which I think is the grandest work on plastering conceivable, and if there is any question you want answered you will find it there ; in fact, you will find almost every conceivable inquiry answered. I think the use of coloring matter is quite feasible, but it must be handled with care, and a sufficient quantity made to avoid joinings.

Mr. Gregg: Is there not trouble in getting it on without being clouded and patchy afterwards if it is broken?

Mr. Hynes : Patching afterwards presents a difficulty that cannot be overcome, and there is undoubtedly danger of clouding. You see, lime is a most soluble compound, and when you water trowel or scour the work it brings the lime forward, and that is what gives it the cloudy effect. That can be avoided by having your work underneath sufficiently damp to admit of finish without using water.

Mr. Langton : I was going over the cathedral, and I liked particularly the color of the mouldings of the arches, and I was told that that was due to their being worked with a vertical tool, which kept the same from flowing out evenly. Do you not think it would improve the sand finished surface if the sand were not floated so easily? Is there any way in which we can get a flat surface?

Mr. Hynes: These arches were run with a mould, which cut off the material at right angles, or vertically, as you express it. A large amount of sand was used in the putty with which those mouldings were formed, and the result somewhat approached the effect of sandstone.

The President : Mr. Hynes spoke in his paper of the benefit that would arise by the substitution of staff for the metallic ceiling usually applied in situations where it is subject to great vibration. I would like to know what is the safest kind of plastering to apply where great vibration has to be provided against.

Mr. Hynes: Staff ceilings are most suitable for such plans. Staff is a compound of plaster in which a great amount of fibre or canvas is incorporated, and, being fixed in position by heavy galvanized nails, cannot possibly be dislodged or disturbed by vibration. You can have it perfectly plain or of such design as you may determine. It is well to recognize the fact that there has to be joints; if plain, have them well caulked with fibrous plaster for decorated work. You can generally so design your work as to cover them with mouldings, plain or enriched.

Mr. Gregg: Would you use plaster at all where there is great vibration?

Mr. Hynes : Yes, you may safely use staff ; it can be nailed on every bearing so as to be perfectly solid. The only point in which there is any danger is that of having joints improperly stopped in plain work. If not well done joinings are liable to show, but it is perfectly sound and solid. Asbestos plaster, so far as yet offered, is simply the waste product of the asbestos mine, consisting of both fibre and ground rock. It is chiefly mixed with lime only. I have never used any except samples. It never gets very hard, but has a very nice quality in that it may be dinged without fracture. Lately it is offered in connection with Paristone. This ought to be a good compound, but I do not recommend unless from