alternations of dry and damp, because the clay acts like pug, and such motion as is well known would have a forward direction, because the cohesiveness of the clay would not draw itself uphill again, but extend in one downhill direction.

2868. Supposing the water to be drained out of that would not that stop it?—I cannot speak from an engineering point of view, but, speaking as a mineralogist, I do not think you can drain water out of clay.

2869. Do you think you can drain water out of clay?—You can gradually dry clay if you put all the drains right down to the surface of the under-ground, so as to cut off all access of water to the clay, but putting drains into clay soil without ploughing it or digging it is notoriously of no use.

2870. Supposing the surface-water had access to the foundation-trenches—trenches of the foundation—would that, in your opinion, render the ground more unstable to carry a weight?—I think so; it would get the clay into a more plastic condition.

2871. I asked that question because, in digging the trenches, we found the water standing half way up the foundation-walls?—The foundation-walls should have had drainage right at the bottom. The clay should have been taken out I should have said. As far as I can trust my memory the instability arose from the fact that the clay is liable to extension and contraction, owing to the alternate moistening and drying—never drying perfectly, and never getting saturated, and that this clay was resting upon an unequal slope of the under-ground of greensand formation, which, as it is a water-bearing bed, would tend to bleed in this line of junction, and therefore keep it in a condition favourable for slipping, and then the alternate extension and contraction of the clay, loaded as it is with large boulder stones, would in the end most certainly have an onward progression down the slope at the junction surface.

2872. Do you think a movement sufficient to move the building 16in.—for that is one of the theories put forward, to move it bodily 16in.—could occur without being visible on the surface in the shape of a crack?—I expect there would be no surface cracks in the clay any more than in moist pug. It would move like any other plastic stuff; it would move almost with molecular motion—certainly what might be termed an interstatial motion, motion of particle on particle. Of course it might make cracks, but I do not think they would be a necessary result of the motion.

2873. Of course that is one of the theories put forward, that the ground has slipped and carried the building with it. The bulk of the building is standing apparently where it was built, and on the surface there is nothing particular to be seen?—Not in the building even?

The Chairman: In the building of course there are cracks, but there is no shearing; the one portion has not moved forward in advance of the other.

Mr. Lawson: It would be of great advantage that Sir James Hector should see it. I think in the interests of his science alone it would be advisable that he should see this building. Having propounded a theory of such a nature as this, as he has done, it would be a most interesting thing for himself now to see what the results of that theory which he propounded are, and how his original report has worked out.

2874. *The Chairman.*] That is a view of the front part of that portion of the building. The red marks show the cracks?—Whereabouts is the tower?

2875. That is only a narrow portion where the ambulatory is. I will not ask you for an opinion as to what the cause of the cracks was?—It would take some time to study this.

Mr. Lawson: I really think that, under the circumstances, Sir James Hector should have an opportunity of seeing the building for himself.

2876. *The Chairman.*] We do not intend to ask Dr. Hector the cause of these cracks, because he has not had time to go into the matter. We wanted to get a little information as to what the nature of this boulder-clay was, and what the effect of draining it would be?—The suggestion of a deep-trench excavation round the back of the building was to cut off the foundation from the surrounding clay formation, and isolate it from the effect of any motion to which that formation is subject. This is stated in my report.

2877. In that case an open trench would be liable to fill up?—I take it that by the clause following; by an open trench, I meant that it must be cut from the surface through the boulder-clay, because I say, "The trench and the drain would, of course, be filled with coarse rubble," as such rubble would not transmit the motion—at least, that was the idea at the time. I may have been mistaken, though I do not think so. It is clear I had not only drainage in my mind at the time.

2878. *Mr. Skinner.*] Sir James, would you give us an idea how far down the stratum, or the upper stratum, is likely to be, and if it is on the upper stratum that the building would be likely to move. That [document produced] is a bit of a sketch which has been put in?—Is this the pit I saw put in?

2879. *Mr. Blair.*] No; that is another pit that has been put down. The one you saw was near the tower; that pit is put down opposite the middle of the north wing?—I suppose by papa-clay is meant the greensand.

Mr. Blair: No, rock.

Sir James Hector: "Caversham sandstone?" It is not really Caversham sand; it is a lower stratum, but looks like it. That is the bottom rock. It is all right, except that it has layers of marl in it, that will shoot water; the line of greatest motion will be on the top of this brick, or where it joins the blue clay. There is a curious feature in this section. Do these black lines show stones and blue clay, as it almost looks as if this blue clay was from a lower formation? Here is drawn a distinct line of unconformity, indicating that this bed has been excavated out, and fresh material deposited in the place of it. All this boulder-clay, as it is called—it is really decomposed bluestone and clay arising from the decomposition. That is laid in layer after layer. It is a sub-aerial formation, and can hardly, I think, have during its deposit erroded the surface of any previous deposit of the same age. At any rate, that is very unlikely, and I have never seen any evidence of it. If these lines had been carried out it would have led me to suspect that these