hand and body, by that atmoſphere, and the finger becomes, as well as the threads, negatively electriſed, and ſo repels, and is repelled by them. To confirm this, hold a ſlender light lock of cotton, two or three inches long, near a prime conductor, that is electrified by a glaſs globe, or tube. You will ſee the cotton ſtretch itſelf out towards the prime conductor. Attempt to touch it with the finger of the other hand, and it will be repelled by the finger. Approach it with a poſitively charged wire of a bottle, and it will fly to the wire. Bring near it a negatively charged wire of a bottle, it will recede from that wire in the ſame manner, that it did from the finger; which demonſtrates the finger to be negatively electriſed, as well as the lock of cotton ſo ſituated.

LII. *Extract of a Letter concerning Electricity, from Mr.* B. Franklin *to Monſ.* Delibard, *incloſed in a Letter to Mr.* Peter Collinſon, *F. R. S.*

Philadelphia, June 29, 1755.

Read Dec. 18, 1755. YOU deſire my opinion of Pere Beccaria's Italian book. I have read it with much pleaſure, and think it one of the beſt pieces on the ſubject, that I have ſeen in any language. Yet as to the article of water-ſpouts, I am not at preſent of his ſentiments; though I muſt own with you, that he has handled it very ingeniouſly. Mr. Collinſon has my opinion of whirlwinds and

waterſpouts at large, written ſome time ſince. I know not whether they will be publiſhed; if not, I will get them tranſcribed for your peruſal. It does not appear to me, that Pere Beccaria doubts of the *abſolute impermeability of glaſs* in the ſenſe I meant it; for the inſtances he gives of holes made through glaſs by the electric ſtroke are ſuch, as we have all experienced, and only ſhew, that the electric fluid could not paſs without making a hole. In the ſame manner we ſay, glaſs is impermeable to water, and yet a ſtream from a fire-engine will force through the ſtrongeſt panes of a window. As to the effect of points in drawing the electric matter from clouds, and thereby ſecuring buildings, *&c.* which, you ſay, he ſeems to doubt, I muſt own I think he only ſpeaks modeſtly and judiciouſly. I find I have been but partly underſtood in that matter. I have mentioned it in ſeveral of my letters, and except once, always in the *alternative*, *viz.* that pointed rods erected on buildings, and communicating with the moiſt earth, would either *prevent* a ſtroke, *or*, if not prevented, would *conduct* it, ſo as that the building ſhould ſuffer no damage. Yet whenever my opinion is examined in Europe, nothing is conſidered but the probability of thoſe rods *preventing* a ſtroke, or exploſion; which is only a *part* of the uſe I propoſed from them; and the other part, their conducting a ſtroke, which they may happen not to prevent, ſeems to be totally forgotten, tho' of equal importance and advantage.

I thank you for communicating M. de Buffon's relation of the effect of lightning at Dijon, on the 7th of June laſt. In return give me leave to relate an inſtance I lately ſaw of the ſame kind. Being in the

the town of Newbury in New England, in November laſt, I was ſhewn the effect of lightning on their church, which had been ſtruck a few months before. The ſteeple was a ſquare tower of wood, reaching ſeventy feet up from the ground to the place where the bell hung, over which roſe a taper ſpire, of wood likewiſe, reaching ſeventy feet higher, to the vane or weather-cock. Near the bell was fixed an iron hammer to ſtrike the hours; and from the tail of the hammer a wire went down through a ſmall gimlet-hole in the floor that the bell ſtood upon, and thro' a ſecond floor in like manner; then horizontally under and near the plaiſtered cieling of that ſecond floor, till it came near a plaiſtered wall; then down by the ſide of that wall to a clock, which ſtood about twenty feet below the bell. The wire was not bigger than a common knitting needle. The ſpire was ſplit all to pieces by the lightning, and the parts flung in all directions over the ſquare, in which the church ſtood, ſo that nothing remained above the bell.

The lightning paſſed between the hammer and the clock in the above-mentioned wire, without hurting either of the floors, or having any effect upon them, except making the gimlet-holes, through which the wire paſſed, a little bigger, and without hurting the plaiſtered wall, or any part of the building, ſo far as the aforeſaid wire and the pendulum wire of the clock extended; which latter wire was about the thickneſs of a gooſe quill. From the end of the pendulum down quite to the ground the building was exceedingly rent and damaged, and ſome ſtones in the foundation-wall torn out, and thrown to the diſtance

of twenty or thirty feet. No part of the aforementioned long ſmall wire, between the clock and the hammer, could be found, except about two inches, that hung to the tail of the hammer, and about as much, that was faſtened to the clock; the reſt being exploded, and its particles diſſipated in ſmoke and air, as gun-powder is by common fire, and had only left a black ſmutty track on the plaiſtering, three or four inches broad, darkeſt in the middle, and fainter towards the edges, all along the cieling, under which it paſſed, and down the wall. Theſe were the effects and appearances: on which I would only make the few following remarks; *viz.*

1. That lightning, in its paſſage through a building, will leave wood to paſs as far as it can in metal, and not enter the wood again till the conductor of metal ceaſes.

And the ſame I have obſerved in other inſtances, as to walls of brick or ſtone.

2. The quantity of lightning, that paſſed through this ſteeple, muſt have been very great by its effects on the lofty ſpire above the bell, and on the ſquare tower all below the end of the clock pendulum.

3. Great as this quantity was, it was conducted by a ſmall wire and a clock pendulum, without the leaſt damage to the building ſo far as they extended.

4. The pendulum rod being of a ſufficient thickneſs, conducted the lightning without damage to itſelf; but the ſmall wire was utterly deſtroyed.

5. Though the ſmall wire was itſelf deſtroyed, yet it had conducted the lightning with ſafety to the building.

6. And

6. And from the whole it ſeems probable, that if even ſuch a ſmall wire had been extended from the ſpindle of the vane to the earth, before the ſtorm, no damage would have been done to the ſteeple by that ſtroke of lightning, though the wire itſelf had been deſtroyed.

LIII. *A Letter concerning the Effects of Lightning at* Darking *in* Surrey, *from Mr.* William Child *to Mr.* James Pitfold. *Communicated by Mr.* Peter Collinſon, *F. R. S.*

SIR, Darking, Sept. 30, 1755.

Read Dec. 18, 1755. AFTER ſeveral diſappointments of ſending you the account I ſo long ago promiſed, you have here the beſt particulars I can obtain. The day, on which the ſtorm happened, was Monday the 16th of July 1750, about ſeven o'clock in the evening. During the preceding part of the day the air was of a very red fiery appearance, accompanied with frequent thunderings. About ſix o'clock the wind aroſe, and blew exceeding ſtrong, and in a very ſhort time the hemiſphere became uncommonly dark; the flaſhes of lightning were much ſtronger, and came in very ſhort intervals of time, and the thunder-claps long and loud, attended with a very hard rain for near half an hour, in which time came the ſtrongeſt flaſh of lightning I ever ſaw, and inſtantly with it the moſt terrible burſt of thunder.