

THE FIRST MENTION OF PLUS AND MINUS

To Peter Collinson:

Philadelphia, 11 July 1747

Dear Sir:

1. A person standing on wax and rubbing a glass tube, and another person on wax drawing the fire, they, will both of them (provided they do not stand so as to touch one another) appear to be electrized to a person standing on the floor: that is, he will perceive a spark on approaching each of them with his knuckle.
2. But if the persons on wax touch one another during the exciting of the tube, neither of them will appear to be electrized.
3. If they touch one another after exciting the tube, and drawing the fire as aforesaid, there will be a stronger spark between them than was between either of them and the person on the floor.
4. After such strong spark neither of them discover any electricity.

These appearances we attempt to account for thus. We suppose, as aforesaid, that electrical fire is a common element, of which every one of the three persons above mentioned has his equal share, before any operation is begun with the tube. A, who stands on wax and rubs the tube, collects the electrical fire from himself into the glass; and, his communication with the common stock being cut off by the wax, his body is not immediately supplied. B (who stands on wax likewise), passing his knuckle along near the tube, receives the fire which was collected by the glass from A; and his communication with the common stock being likewise cut off, he retains the additional quantity received. To C, standing on the floor, both appear to be electrized; for he, having only the middlequantity of electrical fire receives a spark upon approaching B, who has an over quantity; but gives one to A who has an underquantity. If A and B approach to touch each other, the spark is stronger, because the difference between them is greater. After such touch there is no spark between either of them and C, because the electrical fire in all is reduced to the original equality. If they touch while electrizing, the equality is never destroyed, the fire only circulating. Hence, have arisen some new terms among us: we say B (and bodies like circumstanced) is electrized positive; A, negatively. Or rather, B is electrized plus; A, minus.

B. Franklin