Allegorical print designed by Jean Honoré Fragonard

BENJAMIN FRANKLIN'S
EXPERIMENTS

A NEW EDITION OF FRANKLIN'S
Experiments and Observations on Electricity

EDITED, WITH A CRITICAL AND HISTORICAL INTRODUCTION, BY

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diameter. If the density of light, in these circumstances, be as those circles to each other, that is, as the squares of their diameters, the candle-light, when come to the eye, will be 1 027 709 337 600 times rarer than when it quitted the half-inch circle. Now the aperture of the eye, through which the light passes, does not exceed one-tenth of an inch diameter, and the portion of the lesser circle, which corresponds to this small portion of the greater circle, must be proportionably, that is, 1 027 709 337 600 times less than one-tenth of an inch; and yet this infinitely small point (if you will allow the expression) affords light enough to make it visible four miles; or, rather, affords light sufficient to affect the sight at that distance.

The smallness of the animalcula is no objection then to this conjecture; for supposing them to be ten thousand times less than the *minimum visibile*, they may, notwithstanding, emit light enough to affect the eyes, and so to cause the luminous appearance aforesaid. This conjecture I send you for want of something better.

LETTER XVII.

FROM

BENJ. FRANKLIN, *Esq*; of *Philadelphia*.

TO

Lining

Dr. L—A, at *Charles-Town, South Carolina*.

SIR, *Philadelphia, March* 18, 1755.

I SEND you enclosed a paper containing some new experiments I have made, in pursuance of those by Mr. *Canton* that are printed with my last letters. I hope these, with my explanation of them, will afford you some entertainment*.

In answer to your several enquiries. The tubes and globes we use here, are chiefly made here. The glass has a greenish cast, but is clear and hard, and, I think, better for electrical experiments than the white glass in *London*, which is not so hard. There are certainly great differences in glass. A white globe I had made here some years since, would never, by any means, be excited. Two of my friends tried it, as well as myself, without success. At length putting it on an electric stand, a chain from the prime-conductor being in contact with it, I found it had the properties of a non-electric; for I could draw sparks from any part of it, though it was very clean and dry.

* See p. 302, for the paper here mentioned.

the same myself, receiving, by accident, an equal stroke through my head, that struck me down, without hurting me: And I had seen a young woman that was about to be electrified through the feet, (for some indisposition) receive a greater charge through the head, by inadvertently stooping forward to look at the placing of her feet, till her forehead (as she was very tall) came too near my prime-conductor: She dropt, but instantly got up again, complaining of nothing. A person so struck, sinks down doubled, or folded together as it were, the joints losing their strength and stiffness at once, so that he drops on the spot where he stood, instantly, and there is no previous staggering, nor does he ever fall lengthwise. Too great a charge might, indeed, kill a man, but I have not yet seen any hurt done by it. It would certainly, as you observe, be the easiest of all deaths.

The experiment you have heard so imperfect an account of, is merely this. – – – I electrified a silver pint cann, on an electric stand, and then lowered into it a cork-ball, of about an inch diameter, hanging by a silk string, till the cork touched the bottom of the cann. The cork was not attracted to the inside of the cann as it would have been to the outside, and though it touched the bottom, yet, when drawn out, it was not found to be electrified by that touch, as it would have been by touching the outside. The fact is singular. You require the reason; I do not know it. Perhaps you may discover it, and then you will be so good as to communicate it to me*. I find a frank acknowledgment of one's ignorance is not only the easiest way to get rid of a difficulty, but the likeliest way to obtain information, and therefore I practice it: I think it an honest policy. Those who affect to be thought to know every thing, and

* Mr. *F.* has since thought, that, possibly, the mutual repulsion of the inner opposite sides of the electrised cann, may prevent the accumulating an electric atmosphere upon them, and occasion it to stand chiefly on the outside. But recommends it to the farther examination of the curious.

to undertake to explain every thing, often remain long ignorant of many things that others could and would instruct them in, if they appeared less conceited.

The treatment your friend has met with is so common, that no man who knows what the world is, and ever has been, should expect to escape it. There are every where a number of people, who, being totally destitute of any inventive faculty themselves, do not readily conceive that others may possess it: They think of inventions as of miracles; there might be such formerly, but they are ceased. With these, every one who offers a new invention is deemed a pretender: He had it from some other country, or from some book: A man of *their own acquaintance*; one who has no more sense than themselves, could not possibly, in their opinion, have been the inventer of any thing. They are confirmed, too, in these sentiments, by the frequent instances of pretensions to invention, which vanity is daily producing. That vanity too, though an incitement to invention, is, at the same time, the pest of inventors. Jealousy and Envy deny the merit or the novelty of your invention; but Vanity, when the novelty and merit are established, claims it for its own. The smaller your invention is, the more mortification you receive in having the credit of it disputed with you by a rival, whom the jealousy and envy of others are ready to support against you, at least so far as to make the point doubtful. It is not in itself of importance enough for a dispute; no one would think your proofs and reasons worth their attention: And yet if you do not dispute the point, and demonstrate your right, you not only lose the credit of being in that instance *ingenious*, but you suffer the disgrace of not being *ingenuous*; not only of being a plagiary but of being a plagiary for trifles. Had the invention been greater it would have disgraced you less; for men have not so comtemptible an idea of him that robs for gold on the highway, as of him that can pick pockets for half-pence and farthings. Thus

through Envy, Jealousy, and the Vanity of competitors for Fame, the origin of many of the most extraordinary inventions, though produced within but a few centuries past, is involved in doubt and uncertainty. We scarce know to whom we are indebted for the *compass*, and for *spectacles*, nor have even *paper* and *printing*, that record every thing else, been able to preserve with certainty the name and reputation of their inventors. One would not, therefore, of all faculties, or qualities of the mind, wish, for a friend, or a child, that he should have that of invention. For his attempts to benefit mankind in that way, however well imagined, if they do not succeed, expose him, though very unjustly, to general ridicule and contempt; and, if they do succeed, to envy, robbery, and abuse.

I am, &c.

B. F.

LETTER XVIII.

FROM

BENJ. FRANKLIN, *Esq*; of *Philadelphia*,

TO

Dr. *L*——, at *Charles-Town, South-Carolina.*

SIR, *New-York, April* 14, 1757.

IT IS a long time since I had the pleasure of a line from you; and, indeed, the troubles of our country, with the hurry of business I have been engaged in on that account, have made me so bad a correspondent, that I ought not to expect punctuality in others.

But being about to embark for *England*, I could not quit the Continent without paying my respects to you, and, at the same time, taking leave to introduce to your acquaintance a Gentleman of learning and merit, Colonel *Henry Bouquet*, who does me the favour to present you this letter, and with whom I am sure you will be much pleased.

Professor *Simpson*, of *Glasgow*, lately communicated to me some curious experiments of a physician of his acquaintance, by which it appeared, that an extraordinary degree of cold, even to freezing, might be produced by evaporation. I have not had leisure to repeat and examine more than the first and easiest of them, *viz.* – – – Wet the ball of a thermometer by a feather dipt in spirit of wine, which has been kept in the same room, and has, of course, the