

In hopes the experiment here recited may be taken in this view, as tending, in conjunction with a variety of others, to illustrate an important point, I beg leave to present it to your Lordship; and am

My Lord,

Your Lordship's

most obedient

and devoted

humble servant,

St. Helena,
July 30, 1761.

Nevil Maskelyne.

LXVII. *Observations upon some Gems similar to the Tourmalin; by Mr. Benjamin Wilson, F. R. S.*

Read Jan. 28, 1762. **T**HE honour I received from the Royal Society, in consequence of my late papers on electricity, and which principally respected the Tourmalin, is a pleasing motive for embracing the first opportunity to communicate farther enquiries, that tend to throw more light upon this curious subject.

In September last, I met with several gems of different sizes and colours, that resemble the Tourmalin, in regard to electric experiments. The most beautiful
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of them are something like the ruby, others are more pale, and there is one inclining to the orange colour. In point of hardness and lustre, they are nearly the same with the topaz.

Six of these gems are cut brilliant fashion, and three retain their natural shape. Of the six, when heated properly, and whilst they are cooling, three are electrified *plus*, and two *minus*, at the table surface, and at the collet, or opposite surface, the three are electrified *minus*, and the two *plus*. The sixth, which is the largest, and of an oblong shape, appears to be electrified *plus* near one end, and at the other end, in the opposite part, *minus*.

These instances are farther proofs of the law observed in the Tourmalin, viz. that the electric fluid flows to or fro, *in one invariable line*, according to the circumstances attending the experiment. See the Letter to Dr. Heberden, Philosophical Transactions, Vol. LI.

From the contrary appearances happening with gems of the same shape, it is now abundantly evident, that the direction of the fluid does not depend upon the external figure of the gem, but upon some particular internal make or constitution thereof. And that there is some such natural disposition in all gems affording these appearances, may be collected from another curious specimen of the Tourmalin kind; that is green, and formed in long slender crystals with several sides, many of which are found sticking together, and are brought from South America.

Mr. Emanuel Mendez da Costa, member of this Society, and well known for his skill in natural history, furnished me with a parcel of these uncommon crystals

crystals the 12th of November last, and desired I would try whether they afforded the electric effects of the Tourmalin. They were examined the same evening, when I was agreeably surprized to find them, not only like Tourmalins in regard to electric appearances, but that the direction of the electric fluid moving therein, *is always along the grain or shootings of the crystals*; one end thereof being electrified *plus*, and the other end *minus*. And that the fluid is more disposed to pass in that direction than in any other, may be further collected from what has been observed upon the grain of the loadstone by Dr. Knight; for though the magnetic poles, of a natural loadstone, may be varied in any direction, yet the same loadstone does admit of being made much more magnetic along the grain, than across it.

Now, as several of the above gems have different electric poles independent of their shape, and I have not yet been able to vary the direction of the fluid in any one of them, though various methods have been tried, and some of a violent nature; and since the green crystal, or chrysolite, above described, hath likewise the same electric poles, but with this difference only, that the fluid moves always along the slender threads or columns, which is the grain thereof, and without suffering any change from that direction; it seems by analogy, that the electric fluid flowing through all of them, moves in that direction in which the grain happens to lie. And the reason appears to be this, that the resistance the fluid meets with in passing through the gem, is less in that direction, than in any other.

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The natural history of these chrysolites, so far as Mr. Da Costa has been able to collect it, is, “ that
 “ they were given him by the name of Brazilian
 “ emeralds, that they are a kind of crystals shooting
 “ into columns of no regular sides or angles, but
 “ canaliculated, or striated lengthwise. That as they
 “ are all fragments, he suspects, they do not shoot
 “ in vacuities of stones, or fissures of rocks, like
 “ other crystals; but lie always closely imbedded in
 “ the hard rocks (quartz) and are washed from their
 “ said beds by the torrents, in like manner as the
 “ Brazil and Guinea gold is; which is the reason of
 “ their being in such fragments.” He adds, “ that
 “ the crystals, black, analogous to these, and im-
 “ bedded in quartz, or hard rocks, are found in our
 “ mines in Cornwall, and in other parts of Europe;
 “ specimens of such are in the British museum, and
 “ in other cabinets. The Swedes call these bodies
 “ *lapides cornei crystallisati*, and Wallerius has a
 “ *corneus crystallifatus viridis*, which likely is this
 “ kind. The miners of Germany vulgarly call them
 “ Schirl, and sometimes our English miners name
 “ them Cockle and Call. The ranging of this crystal,
 “ Mr. Da Costa says, as a *lapis corneus*, is not only
 “ erroneous, but ridiculous; as it is truly a kind of
 “ crystal, and might with propriety be synonymed
 “ *Crystallus viridis columnaris lateribus inordinatis*.”

I shall conclude this paper with a passage in the Optics of Sir Isaac Newton, which is one instance, among many of the wonderful sagacity of that great man; as it corresponds very well with what we now understand of the electric fluid, which, by the continual motion of its parts, is so principally concerned
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in the various operations of nature. It is in consequence of such a motion, arising from a certain degree of heat, that the Tourmalin, and the other gems, are rendered strongly electric: and this plainly shews, that a less degree, even that which accompanies them where they are found, may make them also electric; but with the difference of making them less sensibly so. Accordingly, having explained what he means by the word attraction, he says, “ The attraction of
 “ gravity, magnetism, and electricity, reach to very
 “ sensible distances, and so have been observed by
 “ vulgar eyes; and there may be others which reach
 “ to so small distances as hitherto escape observation,
 “ and perhaps electrical attraction may reach to such
 “ small distances, *even without being excited by friction.*”

London,
 December 23, 1761.

LXVIII. *Observations on the Tides in the Straits of Gibraltar; by Henry More, Esq;*

Read Jan. 28,
 1762.

AS every attempt made, whether attended with success or not, towards illustrating what is already known, or drawing from obscurity for want of sufficient observation, or scouring off the rust of error from reality, either through curiosity or order, has always met with the candid countenance of your most honourable Society;

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