## CORRESPONDENCE.

### 3395 MR. WALLACE AND *THE ZETETIC*.

Gentlemen,—Your paragraph in the *The Zetetic* of this month about my prosecution of Mr. Hampden is a gross and wilful mis-statement of the facts. The case is *not yet* disposed of. I did not *press for an apology* to *be made*; on the contrary I refused to accept one till *most strongly pressed* by Mr. Hampden's friends.

You may correct this mis-statement; or leave it uncorrected, as it is most congenial to the character of your paper.

ALFRED R. WALLACE.

Dec. 11th, 1872.

[In one respect, we admit, Mr. Wallace is correct. Until he submits his proceedings to a proper tribunal "the case," assuredly, *shall not* be disposed of. As regards his accepting an apology "under pressure," we do not believe such "pressure" would have been borne. If in any way unpalatable. The concluding sentence of his letter unmistakeably proves that, among Mr. Wallace's many good qualities, that of the grossest impertinence is by no means the least prominent.—EDS. ZETETIC.]

## SOLUTION OF THE MATHEMATICAL PROBLEM

In the October issue of *The Zetetic*, I propounded a mathematical problem, bearing upon the question of the figure of the Earth. It is stated that the Light on the centre pier at Great Grimsby can be seen from an elevation of 10 feet, at a distance of 60 nautical, or 70 statute, miles, and the question was then asked, "What is the altitude of the Light?"

As the advocates of rotundity are evidently fearful of the logical sequences of their theory, it becomes necessary, "if the mountian will *not* come to Mahomet, for Mahomet to go to the mountain." Hence I present the following solution of my problem, which I trust will render both itself and its consequences intelligible even to the most unadvanced of inquirers.

An elevation of 10 feet would make the distance of the horizon from the observer, in round numbers, 4 miles. The square of the remaining 66 miles multiplied by 8 inches will give a depression of 2,904 feet, which represents what the altitude of the Light must have been to render it visible, if the present doctrine of rotundity be correct. But what is really the "true state of the case"? So far from having an altitude of 2,904 feet, the Light has only an elevation of 300 feet. Hence it follows that, when visible, it should have been 2,604 feet *below the horizon*! That this is not singular the three following instances sufficiently show. They are selected from a work on "Lighthouses of the World," by A. G. Findlay, F.R.G.S., specially prepared, for the guidance of mariners, by order of the Admiralty.

The Light on Cape Bonavista, Newfoundland, is 150 feet above high water, and is visible, from an elevation of 10 feet (p. 101), 35 statute miles. By deducting 4 miles for the altitude of the observer, squaring the remaining 31 miles, and multiplying the product by 8 inches, we obtain a depression of 640 feet. When 150 feet (the altitude of the Light) is deducted from this amount, there remains 490 feet as the distance which the Light should have been *below the horizon!*

The Cordonnan Light, on the river Gironde, West Coast of France, possesses an altitude of 207 feet, and is visible from an elevation of 10 feet, 31 statute miles (p. 78). If we make the requisite calculation we obtain as the result the fact that the Light, at that distance, should be depressed 279 feet *below the horizon!*

The Light on the Esplanade at Madras is 133 feet in height, and is visible from an elevation of 10 feet, 28 statute miles (p. 104). By "construction" it will be found that at that distance it ought to be 250 feet *below the horizon!*

The only explanation which has ever been offered of the preceding phenomenon is *refraction*. But refraction is an apparent distortion of the visual ray produced by its passage from one medium into a comparatively *denser* one; and the lighthouses and observers are both in the *same* medium, viz., the lowest stratum of the Earth's atmosphere, the *unequal* densities of which are *self-compensating*. Again the Admiralty, it must be remembered, confess that "cloudy weather is always assumed": hence the lights would not be so visible as on ordinary occasions! This, surely, counterbalances "refraction." Moreover the *Encyclopædia Brittanica* states that an allowance for refraction "will often lead to a greater error than that which it was intended to obviate." But assuming the validity of the plea, and waiving all objections, let us allow "the fifteenth" for refraction, or let us allow "the twelfth," which surveyors consider sufficient; or "the seventh," which the authority I have quoted considers a mean; or Mr. Proctor's "sixth," or even a fifth, and still we have the fact that the Lighthouses were visible when they should have been far depressed *below the horizon*—produced by the "convexity" of Earth!

The fact that, when the weather is clear, the surface of the sea in an unrippled state, and the objects distinctly illuminated, lighthouses are seen at distances utterly incompatible with the doctrine of rotundity is sufficient to demonstrate to unprejudiced inquirers that the Earth *is not convex*, has no degree of convexity, but is "to all intents and purposes" A PLANE.

3396 INQUIRER.

## THE NON-CONVEXITY OF WATER.

### A REPLY TO MR. WALLACE. BY B. CHAS. BROUGH.

### I.—Introductory.

During the month of December, 1871, the appearance of a pamphlet by Mr. A. R. Wallace, "in reply to Mr. Hampden," was announced in several of the journals. Failing to obtain the production elsewhere, I inquired from the author "whence it could be obtained?" In a few days I was favoured with a copy, and, shortly afterwards, with the following letter:—

"Holly House, Barking, E.,
"January 6th, 1872.

"Dear Sir,—May I beg you to state precisely what there is in the experiment exhibited by me on the Bedford Canal

that is consistent with a *plane* earth and inconsistent with a globular one.

"Of course you must allow that this is purely a matter of geometrical measurement, and can therefore only be decided by *figures or diagrams* accurately drawn. Also you must admit that the properties of the *circle* (as radically differing from those of the *straight line*) are exhibited on any scale or proportion,—that is, that a circle of an *inch radius* differs from a straight line in exactly the same way as a circle of a *mile* or *at four thousand miles* radius, only in a *different degree*. If you bear this in mind and show me *by accurately drawn diagrams* how you think my experiments are inconsistent with a spherical surface of the water or consistent with a plane surface,—I think I can convince you of your error and show you how to make experiments *in a room*, that will demonstrate the error to any one really anxious to arrive at truth.

"You may take the diagrams in Carpenter's "Water not Convex" as substantially correct.

"Yours very truly,

"ALFRED R. WALLACE."

Owing to Mr. Wallace having abruptly quitted the above residence, without leaving behind him his future address, my subsequent letters were returned to me, but dilligent inquiries at length unabled me to resume the correspondence. [About this time Mr. Hampden had commenced to institute proceedings for the recovery of his £500, but no-one would insinuate, for a moment, that this was the cause of Mr. Wallace's exodus, any more than he would attribute the "journey" of discretionary French patriots, during the late Franco-German war, to the most distant sea-ports, to any fear, however remote, of the fortunes of war.] A desire I then, for obvious reasons, expressed, that the discussion should be public was considered in the following manner:—

"The Dell, Grays, Essex,

"May 22nd, 1872.

"Dear Sir,—I offered to reply to any arguments you might adduce to prove that my Bedford Canal experiments were consistent with a flat or inconsistent with a convex surface, and it matters not to me whether your communication be in writing or in print. You may also print my reply. But if you do so it must be clearly understood that you do not admit replies to *me* from such men as Hampden or Carpenter who are absolutely incapable of arguing the subject from want of the rudiments of mathematical knowledge, and from their constantly declining to test their *assertions* by *experiment* when asked to do so. I will however discuss the matter with *you* if you will agree to be guided by the demonstrations of geometry and to accept the test of *experiment* as to the accuracy of many of the assertions of "Parallax." Carpenter, and Hampden. But I will not enter into a discussion with all the incapable fools (*educated* or not) who would rush in and take a part in such a controversy.

"I must also stipulate that your objections be *separately* and distinctly stated, and numbered consecutively, and, that whenever diagrams are required they must if possible be drawn accurately and to scale: also that you will make any simple experiments (such as can be made at home with little trouble and no expense) when we differ as to matters of fact that can be decided by such experiments; and lastly that you will state as to each point separately whether my replies are satisfactory or in what respect they are deficient.

"These are the only conditions that at present occur to me and I think you will admit them to be fair and reasonable.

"I remain, Dear Sir,

"Yours very faithfully,

"B. Chas. Brough, Esq." "ALFRED R. WALLACE."

To reply *in extenso* to the foregoing challenge will be the object of subsequent chapters.

*(To be continued.)*

## COMETIC FICTIONS.

The only argument, of a tangible nature, which the Newtonian philosophists can offer in support of their theory is the alleged accuracy with which their "predictions" are attended In the case of comets, however, whose courses are run despite the law of gravitation, this accuracy is not always preserved, as will be evident from the following quotation:—

"Another great comet which appeared in 1556 is supposed so to have excited the superstitious fears of Charles V., Emperor of Germany, as to have influenced him in his abdication. The return of this comet in 1848 was predicted by Mr. Hind from elaborate calculations, but it falsified prediction."—Main's *Rudimentary Astronomy*.

During the past months another instance has been furnished of the instability of this "argument" by the non-appearance of "Beila's Comet." In explanation of this it has been suggested that the defaulter has met with an untimely end. This hypothesis has been cleverly handled by a writer in the *Pall Mall Gazette* who says that—

"The news which reaches us from America of the decease of "Biela's Comet" will not fail to affect many of us who had no scientific acquaintance with the departed phenomenon. The unfortunate heavenly body had, it appears, been long ailing, and for the last six weeks its supposed state had given the greatest anxiety to its friends. The first signs of approaching dissolution showed themselves in 1846, when the comet was seen to divide in two parts. No body, heavenly or otherwise, would be expected to survive such a shock as this; and when at their next return, in 1852, the two portions were seen to be 1,250,000 miles apart, it was felt that the case was hopeless. Since that time neither portion of the comet has been seen, though their third passage of the node should have occurred six weeks ago. Astronomers have been suspecting that the comet was rapidly breaking up, and that it would not again be seen, and its actual dissolution seems to have taken place at about half-past seven o'clock on the evening of the 24th of November, when it finally quitted our system in the form of about 250 shooting stars. Its loss will be felt on this planet perhaps more acutely than it deserves. It may indeed be said of Biela's comet that we could have better spared a better member of the celestial system. The regularity of planets in the performance of their duties, and their scrupulous punctuality to their engagements (weather permitting), are worthy of all respect; but their characters are not altogether free from the dullness which is the Nemesis of respectability. To the feelings thus inspired by them our comets afford us an agreable relief; and notwithstanding the extreme irregularity of their habits and the neglect of us which they manifest by the infrequency of their visits, we cannot help regretting the loss of one of them."

As a satire the foregoing paragraph is excellent. It clearly exhibits the true nature of the "dissolving" hypo-