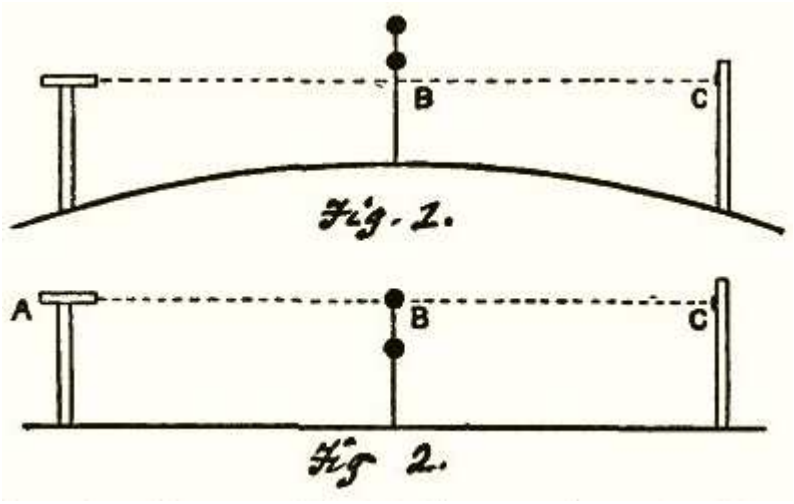
In *Scientific Opinion* of January 12, 1870, Mr. John Hampden (a relative of Bishop Hampden) challenged scientific men to prove the convexity of the surface of any inland water, offering to stake £500 on the result. It contained the following words: "He will acknowledge that he has forfeited his deposit if his opponent can exhibit, to the satisfaction of any intelligent referee, a convex railway, river, canal, or lake." Before accepting this challenge I showed it to Sir Charles Lyell, and asked him whether he thought I might accept it. He replied, "Certainly. It may stop these foolish people to have it plainly shown them." I therefore wrote accepting the offer, proposing Bala lake, in North Wales, for the experiment, and Mr. J. H. Walsh, editor of the *Field*, or any other suitable person, as referee. Mr. Hampden proposed the Old Bedford canal in Norfolk, which, near Downham Market, has a stretch of six miles quite straight between two bridges. He also proposed a Mr. William Carpenter (a journeyman printer, who had written a book upholding the "flat earth" theory) as his referee; and as Mr. Walsh could not stay away from London more than one day, which was foggy, I chose Mr. Coulcher, a surgeon and amateur astronomer, of Downham Market, to act on my behalf, Mr. Walsh being the umpire and referee.

The experiment finally agreed upon was as follows: The iron parapet of Welney bridge was thirteen feet three inches above the water of the canal. The Old Bedford bridge, about six miles off, was of brick and somewhat higher. On this bridge I fixed a large sheet of white calico, six feet long and three feet deep, with a thick black band along the centre, the lower edge of which was the same height from the water as the parapet of Welney bridge; so that the centre of it would be as high as the line of sight of the large six-inch telescope I had brought with me. At the centre point, about three miles from each bridge, I fixed up a long pole with two red discs on it, the upper one having its centre the same height above the water as the centre of the black band and of the telescope, while the second disc was four feet lower down. It is evident that if the surface of the water is a perfectly straight

line for the six miles, then the three objects—the telescope, the top disc, and the black band—being all exactly the same height above the water, the disc would be seen in the telescope projected upon the black band; whereas, if the six-mile surface of the water is convexly curved, then the top disc would appear to be decidedly higher than the black band, the amount due to the known size of the earth being five feet eight inches, which amount will be reduced a little by refraction to perhaps about five feet.



The above diagrams illustrate the experiment made. The curved line in Fig. 1, and the straight line in Fig. 2, show the surface of the canal on the two theories of a round or a flat earth. A and C are the two bridges six miles apart, while B is the pole midway with two discs on it, the upper disc, the telescope at A, and the black line on the bridge at C, being all exactly the same height above the water. If the surface of the water is truly flat, then on looking at the mark C with the telescope A, the top disc B will cover that mark. But if the surface of the water is curved, then the upper disc will appear above the black mark, and if the disc is more than four feet above the line joining the telescope and the black mark, then the lower disc will also appear above the black mark. Before the experiment was made a diagram similar to this was submitted to Mr. Hampden, his referee Mr. Carpenter, and Mr. Walsh, and all three agreed that it showed clearly what should be seen in the two cases, while

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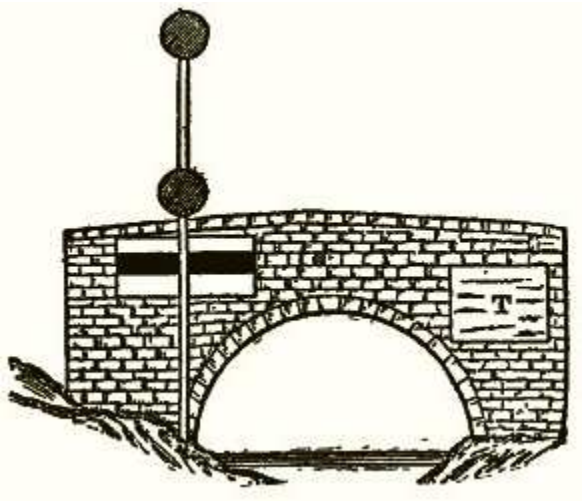
the former declared their firm belief that Fig. 2 showed what *would* be seen.

When the pole was set up and the mark put upon the bridge, Mr. Carpenter accompanied me, and saw that their heights above the water were the same as that of the telescope resting on the parapet of the bridge. What was seen in the large telescope was sketched by Mr. Coulcher and signed by Mr. Carpenter as correct, and is shown in the following diagram which was reproduced in the *Field* newspaper (March 26, 1870), and also in a pamphlet by Carpenter himself. But



"Signed by Mr. Carpenter."—*Dr. Coulcher's Report. "Signed!"*

he declared that this proved nothing, because the telescope was not levelled, and because it had no cross-hair!

At his request to have a spirit-level in order to show if there was any "fall" of the surface of water, I had been to King's Lynn and borrowed a good Troughton's level from a surveyor there. This I now set up on the bridge at exactly the same height above the water as the other telescope, and having levelled it very accurately and called Mr. Carpenter to see that the bubble was truly central and that the least movement of the screws elevating or depressing it would cause the bubble to move away, I adjusted the focus on to the distant bridge, and showing also the central staff and its two discs.

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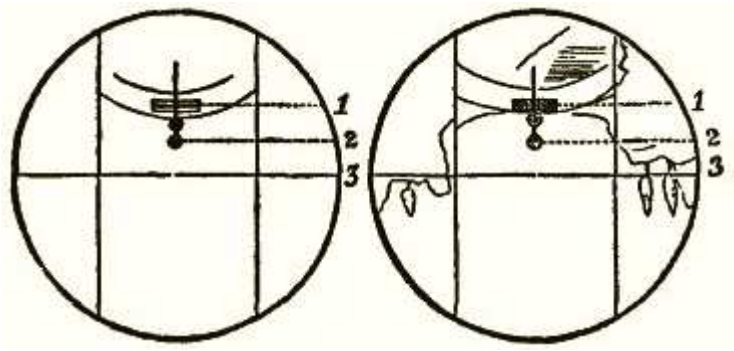
Mr. Coulcher looked at it, and then Mr. Carpenter, and the moment the latter did he said "Beautiful! Beautiful!" And on Mr. Hampden asking him if it was all right, he replied that it was perfect, and that it showed the three points in "a perfect straight line;" "as level as possible!" And he actually jumped for joy. Then I asked Mr. Coulcher and Mr. Carpenter both to make sketches, which they did. We then fixed a calico flag on the parapet to make it more

THE "BEDFORD LEVEL" SURVEY.—SKETCHES BY THE TWO REFEREES.

Copied from the *Field* for March 26, 1870.



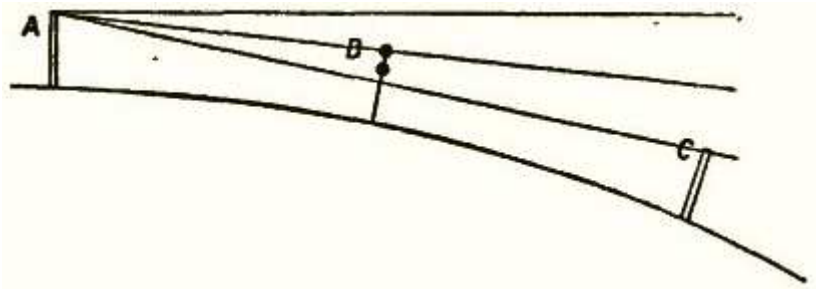
These two views, as seen by means of the *inverting* telescope, are exact representations of the sketches taken by Mr. Hampden's Referee, and attested by Dr. Coulcher as being correct in both cases: *first,* from Welney Bridge; and secondly, from the Old Bedford Bridge.

visible, and drove back with the instruments to Old Bedford bridge, where I set up the level again at the proper height above the water, and again asked both the referees to make sketches of what was seen in the level-telescope. This they did. Mr. Carpenter's was rather more accurately drawn, and Mr. Coulcher signed them as being correct, and both are reproduced here.

For those who do not understand the use of a level, it may be necessary to explain that the cross-hair in the optical axis of the telescope marks the true level of any object at a distance with regard to the telescope. Any point that is seen above the cross-hair is above the level, any point seen below the cross-hair is below the level, and in the latter case the line from the telescope to it slopes downwards. To show

this "true level" is the whole purpose of the instrument called a surveyor's level, and it does show it with wonderful accuracy. The mere fact, therefore, that the top disc on the pole was apparently more below the cross-hair than the two discs were apart, proved that the surface of the water was not flat, or continuously extended in a straight line. And again the fact that the distant signal was again about the same distance, apparently below the middle one, as that was below the telescope of the level, shows that the surface of the water did not merely slope down in a straight line, but was curved downwards with regard to its surface at the starting-point.

The following diagram will illustrate this:—



The lower curved line represents the supposed curved surface of the water. The points A B C are three points equi-distant above that surface. The top line from A is the level line shown by the cross-hair in the level-telescope. If the water surface had been truly level, the two points B and C must have been cut by the cross-hair. But even if the cross-hair did not show the true level, but pointed upwards, and the water was truly level, then the distant mark, being the same height above the water as the top disc at half the distance and the telescope, these two objects must have appeared in a straight line, the nearer one covering the more distant. It should appear on the straight line drawn from the eye at A through B, whereas it appears a long way below it, thus proving curvature, the essential point to be shown.

Thus the view in the large telescope and in the level-telescope both told exactly the same thing, and, moreover, proved that the curvature was very nearly of the amount

calculated from the known dimensions of the earth. Mr. Hampden declined to look through either telescope, saying he trusted to Mr. Carpenter; while the latter declared positively that they had won, and that we knew it; that the fact that the distant signal *appeared* below the middle one as far as the middle one did below the cross-hair, proved that the three were in a straight line, and that the earth was flat, and he rejected the view in the large telescope as proving nothing for the reasons already stated.

At first Mr. Hampden refused to appoint an umpire, because my referee, Mr. Coulcher, refused to discuss the question with Mr. Carpenter; but after a few days he agreed that Mr. Walsh should be the umpire, after receiving the reports of the two referees. He had, in fact, unbounded confidence in what Mr. Carpenter told him, and firmly believed that the experiments had demonstrated the flat earth, and that no honest man could think otherwise.

But Mr. Walsh decided without any hesitation that I had proved what I undertook to prove. He published the whole of the particulars with the reports of the referees and their sketches in the *Field* of March 18 and 26, while a considerable correspondence and discussion went on for some weeks later. At Mr. Hampden's request he allowed Mr. Carpenter to send in a long argument to show that the experiments were all in Mr. Hampden's favour, and having considered them, he wrote to Mr. Hampden that he should hand me the stakes on a certain day if he had no other reason to adduce why he should not do so. Thereupon Mr. Hampden wrote to him *demanding his money back* on the ground that the decision was unjust, and ought to have been given in his favour. In thus writing to Hampden and receiving his demand for his deposit to be returned, Mr. Walsh made a great mistake, which had serious consequences for me. The law declares that all wagers are null and void, and that money lost by betting is not recoverable at law. But the judges have decided that when a wager is given against him by the umpire, the loser can claim his money back from the stakeholder if the latter has not already paid it away to the winner.

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Hence, if a loser immediately claims his money from the stake-holder, the law will enforce the former's claim on the ground that it is *his* money, and the fact that he has lost it in a quite fair wager is beyond the cognizance of the law. Neither I nor Mr. Walsh knew of this, although he had decided and paid many wagers; but this resulted in my having to pay the money back five years later, as will be presently described.

I will now briefly state what were Hampden's proceedings for the next fifteen or sixteen years. He first began abusing Mr. Walsh in letters, post-cards, leaflets, and pamphlets, as a liar, thief, and swindler. Then he began upon me with even more virulence, writing to the presidents and secretaries of all the societies to which I belonged, and to any of my friends whose addresses he could obtain. One of his favourite statements in these letters was, "Do you know that Mr. A. R. Wallace is allowing himself to be posted all over England as a cheat and a swindler?" But he soon took more violent measures, and sent the following letter to my wife:—

"MRS. WALLACE,

"Madam—If your infernal thief of a husband is brought home some day on a hurdle, with every bone in his head smashed to pulp, you will know the reason. Do you tell him from me he is a lying infernal thief, and as sure as his name is Wallace he never dies in his bed.

"You must be a miserable wretch to be obliged to live with a convicted felon. Do not think or let him think I have done with him.

For this I brought him up before a police magistrate, and he was bound over to keep the peace for three months, suffering a week's imprisonment before he could find the necessary sureties. But as soon as the three months were up, he began again with more abuse than ever, distributing tracts and writing to small local papers all over England. I now

began to receive letters from friends, and also from perfect strangers, asking me if I knew what was said about me everywhere. I will now give a summary of the steps I was obliged to take with the results, or rather absence of results, that followed.

In 1871, Mr. Walsh prosecuted Hampden for libel. He was convicted at the Old Bailey, and bound over to keep the peace for one year.

In January, 1871, I brought an action for libel in order to give Hampden the opportunity of justifying, if he could, his language towards me. He did not defend the action, but suffered judgment to go by default, and the jury gave me a verdict with £600 damages. But whatever property he had had been transferred to his son-in-law (a solicitor), so I could not get a penny, and had to pay the costs of the suit which, though undefended, were heavy.

In October, 1872, I prosecuted him at the Old Bailey for further libels. He was respited on publicly apologizing in several newspapers.

On January 13, 1873, he was brought up again for fresh libels, and was again respited on publishing a fuller apology and complete recantation of all his charges, as follows:—

"PUBLIC APOLOGY.—I, the undersigned John Hampden, do hereby absolutely *withdraw* all libellous statements published by me, which have reflected on the character of Mr. Alfred Russel Wallace, and apologize for having published them; and I promise that I will not repeat the offence.—John Hampden."

This was published in several of the London daily papers and in various country papers in which any of his letters had appeared, and the judge gave him a serious warning that if brought up again he would be imprisoned.

Some months afterwards, however, he began again with equally foul libels, and I had him brought up under his recognizances, when he was sentenced to two months' imprisonment in Newgate.

But within a year he began again as violently as ever, and on March 6, 1875, he was indicted at Chelmsford Assizes

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for fresh libels, and on proof of his previous convictions and apologies, he was sentenced to one year's imprisonment and to keep the peace, under heavy recognizances and sureties, for two years more. (A full report is given in the *Chelmsford Chronicle*, March 12, 1875.)

Through the interest of his friends, however, he was liberated in about six months; and thereupon, in January, 1876, he brought an action against Mr. Walsh to recover his deposit of £500, and this action he won, on the grounds already stated; and as I had signed an indemnity to Mr. Walsh, I had to pay back the money, and also pay all the costs of the action, about £200 more. But as I had a judgment for £687 damages and costs in my libel suit against Hampden, I transferred this claim to Mr. Walsh as a set-off against the amount due by him. Hampden, however, had already made himself a bankrupt to prevent this claim being enforced, and had assigned all his actual or future assets to his son-in-law.

There were now legal difficulties on both sides. I was advised that the bankruptcy was *fraudulent*, and could be annulled; but to attempt this would be costly, and the result uncertain. On the other hand, it was doubtful whether my claim against Hampden would not be treated as an ordinary creditor's claim in the bankruptcy. There was, therefore, a consultation of the solicitors, and a voluntary arrangement was arrived at. I was to pay all the costs of the suit and £120, amounting to £277; while £410 still remained nominally due to me from Hampden.

These terms were formally agreed to by Hampden and his son-in-law, and were duly carried out. Of course I had also to pay Mr. Walsh's costs in the action and my own lawyer's bill for the settlement, as well as those of the action for libel, and the various criminal prosecutions of Hampden I had been compelled to undertake.

Notwithstanding this settlement, however, Hampden was by no means silenced. The very day after his recognizancss expired, in 1878, he began again with his abusive post-cards, circulars, and other forms of libel. In 1885 he wrote and

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printed a long letter to Huxley, as President of the Royal Society, chiefly on his biblical discussion with Mr. Gladstone, in a postscript to which he writes as follows:—

"I have thoroughly exposed that degraded blackleg, Alfred Russel Wallace, as I would every one who publicly identifies himself with such grossly false science, which he had the audacity to claim to be true! If this man's experiment on the Bedford canal was founded on fact, then the whole of the Scriptures are false, from the first verse to the last. But your whole system is based upon falsehood and fraud, and refusal of all discussion; and such characters as Wallace seem to be your only champions." And he has an appendix on "Modern Education conducted on Wrong Principles," in which we find such gems as this:—

"When Mr. Mundella and Mr. Gladstone were schoolboys, the educational professors were all newly indoctrinated with the pretentious learning of the 'Principia' of Newton. The Bible was not regarded as of any authority upon such subjects, and a flood of writers were all extolling the immortal genius of the 'incomparable mathematician.' Newton and his apple-tree were spoken of as the foundation of all true philosophy. The plausibly sounding phrases 'Attraction' and 'Gravitation' were in every pedagogue's mouth, and the poor children were birched into repeating them every hour of their lives." And so on for three closely printed pages.

About this time he printed one thousand copies of a two-page leaflet, and sent them to almost every one in my neighbourhood whose address he could obtain, including most of the masters of Charterhouse School, and the residents as well as the tradesmen of Godalming. It was full of—"scientific villainy and roguery,"—"cheat, swindler, and impostor."—"My specific charge against Mr. A. R. Wallace is that he obtained possession of a cheque for £1,000 by fraud and falsehood of a party who had no authority to dispose of it."—"As Mr. Wallace seems wholly devoid of any sense of honour of his own, I shall most readily submit the whole matter to any two or more disinterested parties,

and adhere most absolutely and finally to their decision."— "I will compel him to acknowledge that the curvature of water which he and his dupes pretend was proved on the Bedford Level, *does not exist!* And this Mr. Wallace saw with his own eyes." And so on in various forms of repetition and abuse. To save trouble, I drew up a short circular stating the main facts already given here for the information of those who had received Hampden's absurdly false libels, and thereafter took no further notice of him.

One day about this time we happened to have several friends with us, and as we were at luncheon, I was called to see a gentleman at the door. I went, and there was Hampden! I was so taken aback that my only idea was to get rid of him as soon as possible, but I afterwards much regretted that I did not ask him in, give him luncheon, and introduce him as the man who devoted his life to converting the world into the belief that the

earth was flat. We should at least have had some amusement; and to let him say what he had to say to a lot of intelligent people might have done him good. But such "happy thoughts" come too late. He had come really to see where I lived, and as our cottage and garden at Godalming, though quite small, were very pretty, he was able to say afterwards that I (the thief, etc.) was living in luxury, while he, the martyr to true science, was in poverty.

He continued to circulate his postcards and tracts, and to write to all manner of people, challenging them to prove that the earth was not flat, for several years after. The last of his efforts which I have preserved is an eight-page tract, which he distributed at the Royal Geographical Society's Exhibition of Geographical Appliances, in December, 1885, in which he attacks all geographical teaching in his usual style, and declares that "at the present moment they are cowering beneath the inquiring gaze of one single truth-seeker, John Hampden, the well-known champion of the Mosaic cosmogony, as against the infidel theories and superstitions of the pagan mystics, who is, at the end of fifteen years' conflict, still holding his ground against all the

professional authorities of England and America; and the single fact that during the whole of that time, no one but a degraded swindler has dared to make a fraudulent attempt to support the globular theory, is ample and overwhelming proofs of the worthless character of modern elementary geography." And again: "Surveyors and civil and military engineers are offered £100 for the discovery of any portion of the earth's curvature, on land or water, railway or canal, of not less than five or ten miles, within one hundred miles of the metropolis. Why does not Mr. A. R. Wallace do again what he says he has done before?" And in a list of advertisements of books, etc., supporting his views he has this one: "*Scientific Information wanted*. A gentleman of ample means and inquisitive disposition offers £100 for particulars setting forth conclusively the grounds on which Sir Isaac Newton's Globular Theory was presumably established or asserted to be the fact"

And this man was educated at Oxford University! Seldom has so much boldness of assertion and force of invective been combined with such gross ignorance. And to this day a society exists to uphold the views of Hampden, Carpenter, and their teacher, "Parallax!"

The two law suits, the four prosecutions for libel, the payments and costs of the settlement, amounted to considerably more than the £500 I received from Hampden, besides which I bore all the costs of the week's experiments, and between fifteen and twenty years of continued persecution—a tolerably severe punishment for what I did not at the time recognize as an ethical lapse.