REVIEW OF "REPORT OF THE COMMITTEE ON NAVAL AFFAIRS, TO WHOM WAS REFERRED THE MEMORIAL OF HENRY HALL SHERWOOD . . ."[1]

Biblical Repertory and Princeton Review, *July 1838*, 10:*506–509*[2]

July 1838

We notice this report in order to express our disapprobation of the high encomiums pronounced by the committee of Naval Affairs on the labours of Dr. Sherwood, and to protest in behalf of the scientific character of our country, against the plan of discussing such subjects in Congress before proper means have been taken to determine their true character. The committee state that they have availed themselves of the opinions of scientific

[1] The remainder of the title reads: ". . . Claiming to Have Made New and Important Discoveries in Magnetism Generally, and More Particularly in the Magnetism of the Earth: and Representing that He is the Inventor of an Instrument Called the Geometer, Whereby, Etc. Washington, pp. 23."

As later documents will show, Sherwood's petition to Congress and the official response caused a furor in the scientific community. The report of the Senate Committee on Naval Affairs (*Senate Documents*, 25th Congress, 2d Session, July 3, 1838, No. 499 [in Henry's pamphlet collection]) sheds some light on Sherwood's life. He was reared in New York State and earned a medical degree. Although supporting himself by a medical practice, he was preoccupied with problems in the field of magnetism, which he considered fraught with ignorance and error. His proposal to Congress was apparently his first attempt to revise magnetic theory and to derive useful applications from his new understanding. One of Sherwood's later publications was entitled *The Astro-Magnetic Almanac, for 1843. In Which All the Motions of the Earth are Demonstrated in Accordance With the Theory of the Ancient Eastern Nations.* Other pamphlets dealt with esoteric medical applications of electricity and magnetism. Animal magnetism was a prominent topic in his medical journal, the *New York Dissector,* which he edited between 1844 and 1847.

Sherwood petitioned Congress for financial support to publish a new theory of terrestrial magnetism and to perfect his "geometer," a navigational device based on these principles. The crux of his theory was that the earth had a single magnetic north pole rotating around the terrestrial pole and that the magnetic axis made an angle of 23° 28′ with the terrestrial axis. Proofs and other details are discussed in Henry's review.

The Senate Naval Committee was impressed with the novelty of Sherwood's discoveries and especially with the promised benefits to navigation. In his letter of August 9, 1838, to Bache, Henry detailed the congressional actions. Henry's review of the Naval Committee report focussed on alleged fallacies in Sherwood's scientific theories (even though some of the scientific principles involved were still in a state of flux). But also at issue were matters of ideology and form. Henry attacked the qualifications of those who refereed Sherwood's memorial, not for their lack of eminence but the want of specialized expertise—a critical aspect of Henry's professional ethos. The public, Henry implied, should defer to scientists on matters within their intellectual domain. Henry also took offense at tell-tale signs of quackery in Sherwood's approach to scientific problems. His review, for example, took a sarcastic swipe at one of Sherwood's odd locutions: the reference to angles "instinctively" assumed by magnetic axes. The reviewer preferred the less animate sounding "spontaneously." Furthermore, Sherwood's easy leaps from data to broad theoretical concepts violated Henry's sense of the dignity and rigor of scientific discovery.

[2] Henry's review for the journal published by friends at the Princeton Theological Seminary was, as was customary with that journal, anonymous. Henry also preferred it that way, for reasons which are given in his letter to James Henry of September 11–13, 1838 (below).

gentlemen, and that these opinions are annexed, and form a part of the report. Now, the name of but *one* person known to science is attached to this article,[3] and he acknowledges that he has not examined the subject with proper attention. Yet "from these opinions, as well as from their own examination, the committee are fully persuaded that the discoveries and invention of Dr. Sherwood are entitled to the most serious consideration of the public, and to the encouragement and patronage of congress. The committee regard them as highly interesting and important to the navigation and commerce of the United States, and as bidding fair to open a new era in the history of the science of magnetism.

"They deem the subject of so much importance that they do not hesitate to express the opinion that an enlightened policy on the part of the Government should induce congress to grant the requisite aid. The committee will, as soon as they are able, present, for the consideration of the senate, such a bill as shall be best calculated, in their judgment, to carry out the recommendations of this report."

Now, notwithstanding this very favourable opinion of the committee, derived in part from their '*own examination*,' we do not believe that there is a person of any scientific reputation in our country, who has paid attention to this subject, who will not immediately say that the whole affair is perfectly puerile and entirely unworthy, for a moment, of the serious attention of congress.

An account of the labours of Dr. Sherwood is given by Dr. Dwight:[4] they relate, 1. To "important discoveries" in the magnetization of plates of iron. 2. To the deductions from these of the laws of terrestrial magnetism, and 3. To the invention of an instrument, called a Geometer, for determining, by magnetism, the latitude and longitude of places with practical accuracy. We are first informed that "Dr. Sherwood has succeeded in magnetising a continuous ring and circular plate of iron, which has heretofore been considered impracticable." To prove this, an extract from Dr. Roget's treatise in the Library of Useful Knowledge[5] is quoted, and misapplied. The true meaning of the extract is simply this; not that a ring cannot be magnetized, but that it may be so magnetized that it will exhibit no polarity until broken into pieces, the several poles in contact mutually neutralizing each other.

[3] Thomas P. Jones, Patent Office Examiner and editor of the Franklin Institute's *Journal*, is also the "Dr. J." criticized in the last paragraph.

[4] Sereno Edwards Dwight (1786–1850), son of Yale President Timothy Dwight. An 1803 Yale graduate, he assisted Benjamin Silliman and tutored in mathematics, rhetoric, and classics. He went on to a career in law and the church and, from 1833 to 1835, served as President of Hamilton College. *DAB*. Dwight strongly endorsed Sherwood's proposals to the Senate Naval Committee.

[5] P. M. Roget, *Treatises on Electricity, Galvanism, Magnetism, and Electro-Magnetism* (London, 1832).

But who ever doubted that a circular plate could be magnetized? Perhaps the committee, certainly not Dr. Roget, since at page 7, Art. Magnetism, of the same work, he has given a wood cut to illustrate the magnetism of the very article in question.

A detailed account in a very unscientific form is next given of experiments made with circular and oblong plates. These were magnetized, if we understand the account aright, regularly and irregularly. In regard to the irregular magnetism, it is perhaps not known to the committee that from the experiments of Haldat,[6] plates of any form may with a strong magnet be magnetized with any number of poles from one to a thousand or more; nay, that Dr. Sherwood's name may be traced on a plate in magnetic but not imperishable characters, and that these will become visible only when iron filings are strewed over the surface. There is no end to the variety of polarity which can be thus given to a plate, but there is nothing important in all this, since the whole may be referred to a few well known principles.

In reference to the regular magnetism, Dr. Sherwood's discoveries, as far as they are susceptible of generalization, may be thus stated,

1. When an oblong plate of sufficient width is magnetized in the usual manner, he finds that the poles are not at the end of the plate, but a little within or towards the middle.

2. That the axis of magnetism does not coincide with the axis of the plate; that is, with a line drawn through the middle of its length.

3. "That when the magnetic fluid is allowed by the portions of the plate to act freely, the angle instinctively taken by the two axis, seems to be in all cases 23 deg. 28 min. The same phenomena are exhibited in the magnetism of circular plates.

4. "The discoveries of these laws led necessarily to their application to terrestrial magnetism," and he "at once concluded that the laws of magnetic influence in the magnet and in the earth are one and the same."

With regard to the first mentioned discovery, that the pole is not at the end of the plate, this is certainly true, but unfortunately for Dr. Sherwood's claims to scientific honours, it is by no means new, and is mentioned in almost all the elementary works on the subject, even in the one quoted by Dr. Dwight himself—Art. Electro Mag. p. 86, ¶ 282.

The second important discovery, that the two axes do not coincide, is also

[6] Charles de Haldat du Lys (1770–1852), French physicist. Allen G. Debus, ed., *World Who's Who in Science* (Chicago, 1968).

equally true and equally original, as may be seen by again referring to the same elementary work, Art. Mag. p. 58. ¶ 253.

The third discovery, that of the instinctive angle of 23 deg. 28 min., we must confess is entirely new, for we can find no statement so perfectly absurd in all the records of science. The angle which the two axes spontaneously assume is purely accidental, and is scarcely ever the same in two similar plates, for the truth of this we refer to the experience of all those who have ever measured the angle in question. The quantity 23 deg. 28 min. is well known in Astronomy as the approximate value of the inclination of the plane of the earth's equator to the ecliptic, and we can easily see how, with some, vague ideas of the connection of phenomena, Dr. Sherwood has himself "instinctively taken" this mysterious angle, not from experiment, but from some crude hypothesis.

Next, as to the laws of terrestrial magnetism, deduced from the foregoing experiments; namely, that the earth has one magnetic pole in the north; that this pole is at the distance of 23 deg. 28 min. from the true pole; that the line of no variation is a true circle, &c.

By these deductions Dr. S. is fairly brought to the *reductio ad absurdum*, for they are entirely at variance with some of the best established facts in terrestrial magnetism. The earth, from the labours of Hansteen and others, is now proved to have four magnetic poles, two in the northern[7] and two in the southern hemisphere. The position of one of the former was determined from actual observation, in the northern part of our continent by Capt. Ross;[8] that of the other in Siberia by a scientific corps, under the direction of Hansteen, and at the expense of the Russian government. Again, the line of no variation, instead of being a circle, as is asserted by Dr. Sherwood, is a line in the eastern hemisphere extremely tortuous, which may be represented, with some degree of accuracy, by SS thus placed, $\mathcal{S}_{S}$

But how does Dr. S. explain these discrepencies? very easily; he "perceives, from the general laws of magnetic forces as established in the iron plate, that this account is wholly erroneous;" that is, all the actual observations made in the east of Europe, by men of science and respectability, to establish the position of the points, and consequently the line of no variation, are erroneous. This forms, certainly, a "new era," not in the history of magnetism, but in that of absurdity and presumption, and we shall scarcely be surprized to learn hereafter, through the medium of a congressional document, that all our maps, constructed from actual survey, have

[7] Although Henry was expressing the scientific consensus of 1838, in 1839 Gauss published a persuasive argument for a single north magnetic pole. See *Henry Papers*, 2:190n–191n, and Sydney Chapman and Julius Bartels, *Geomagnetism*, 2 vols. (Oxford, 1940), 2:925–927.

[8] James Clark Ross.

been proved erroneous by some new experiments on the laws of projectiles.

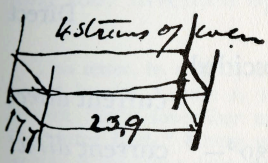
The space allowed for this notice will not permit us to make any comments on the invention called the Geometer. We may, however, say that an invention, founded on false principles, can never give uniformly true results.

We presume that Dr. Sherwood himself entertains a sincere belief of the importance of his discoveries, but interested as we are in the welfare of American science, we cannot, in silence, suffer its character to be injured abroad, and the public name to be abused at home, without endeavouring to expose the error. In conclusion, we must state our regret at seeing the name of a gentleman attached to this report, who has been long and favourably known to science, and who, we know, possesses much valuable and practical scientific knowledge. Magnetism, however, is not in his line, and since even Homer himself sometimes nods, Dr. J. may be allowed to be a little oblivious on this subject.

"RECORD OF EXPERIMENTS"

Henry Papers, Smithsonian Archives

Aug 1st 1838



Enlarged the fram[e] of the real so as to make the whole circuit about 120 feet. 1st put compound wire above where the circuit was broken in one place, the needle put in an other, became powerfully *directly* magnetic. This effect must have been produced by the elect cutting across for when the strands were seperated no effect was produced.

2nd Strand united and in one continued circuit—very litle magnetism but in *contrary* direction—

3 Seperated the wires again ie removed the spires about a foot from each other. The needle magnetic, but in *direct* manner

4 Again not quite so much seperated current *direct*

5 The wires were placed together so as to form again the rope, very litle or no magnetism. Ang 60°—very strong charge

6 Again the same as above but the charge weak magnetism decided, current adverse—

The ends of the rope were grasped, shock [?received]—spark very brilliant and of a peculiar appearance—