LETTERS TO THE EDITOR.

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Wilde's Theory of the Secular Variation of Terrestrial Magnetism.

SOME prominence is given in NATURE of August 9 to a letter of L. A. Bauer, a magnetic computer of the United States Coast and Geodetic Survey, on the above subject. Absence from home and other circumstances have prevented me from replying to this letter before now. It is not my intention to engage in controversy with a critic who roundly condemns my theory and experiments without reason, and at the same time naively announces that, by means of formulæ established by himself, he has succeeded in representing the observations many times better than the magnetarium results.

My principal object in writing is to correct an error I have made in stating that no observations had been made on the dip at St. Helena previous to the year 1825. The error is all the more inexcusable as I have in my possession Hansteen's "Mag-

Date.	Observer.	Observed inclination.	Wilde inclination.	Observation Theory.
1700	Hansteen chart	11° 5' S.	3° 9' N.	- 15° 4'
1754·3	La Caille	9° 00'	0° 5' S.	- 8° 5'
1771·4	Ekeberg	13° 00'	3° 5'	- 9° 5'
1775·4	Cook	11° 42'	4° 0'	- 7° 4'
1780	Hansteen chart	10° 5'	5° 1'	- 5° 4'
1825·0	Duperry	14° 93'	14° 7'	- 0° 2'
1840·1	Ross	18° 27'	18° 5'	+ 0° 2'
1842·3	Belcher	17° 00'	19° 0'	+ 2° 0'
1846·8	Smyth	19° 39'	20° 5'	+ 1° 1'
1890·1	U.S.C. & G.S.	29° 65'	33° 8'	+ 4° 1'
"	"	31° 18'	33° 8'	+ 2° 6'

It will be observed that for the epoch 1825-1890, the dip increased no less than 16°·25, or fifteen minutes annually. Hansteen's great work was published in 1819, and his curve of the inclination for the epoch 1780, showing 10°·5 S., at St. Helena, was laid down from the observations of Ekeberg, La Perouse, and Cook, which indicate a diminishing dip for the epoch 1771-1775. Hansteen's chart of the inclination for 1700 is exquisitely drawn, but on a scale so small that St. Helena is not shown thereon. The position of the island is, however, easily found from the latitude 15° 55' S., and long. 5° 43' W., or 12° E. of the meridian of Ferro.

As Hansteen's historical work on the magnetic variation is very rare, I have had his chart of the inclination for the epoch 1700 reproduced by a photographic process, with the position of St. Helena dotted thereon, for the benefit of your readers.

It will be seen from the chart that the magnetic equator, or line of no dip, is about 1° north of St. Helena, so that the amount of south dip would not be more than 2° for the epoch 1700. Hansteen would appear to have laid down his curve of the dip for 1700 from the previous observations of Ekeberg and La Caille, which indicate a decrease, reckoning backwards, from 1771 to 1754; but he nowhere states in the text of his work, that his curve was drawn from an observation made at St. Helena in 1700.

The amount of dip, 11°·5, shown by L. A. Bauer for 1770, is the same as that observed by Cook in 1775, and is an obvious blunder in his reading off the position of St. Helena 1° below the isoclinical of 10° south, instead of from the magnetic equator.

I shall leave others to judge how far any statements of L. A. Bauer on the subject of terrestrial magnetism in general, and on the magnetarium in particular, are entitled to credit when he places his erroneous computation under the heading of observed inclinations standing against the distinguished names set forth in his table.

It may be of interest to magnesiicians to know that the secular changes shown in my tables of the declination and inclination at London, Cape of Good Hope, St. Helena, and Ascension Island are obtained conjointly on the magnetarium without change of resistance in the secondary circuit; together with the great eastern and western lines of no declination, the Asiatic oval of small westerly declination, the oval of small easterly declination in the Pacific, the magnetic equator, and many other agreements with the observations, all for the epoch 1880.

I regret that I have not been able to accomplish more; but in reply to the remark of L. A. Bauer that although I possess the records of secular variation stations in the United States, I have made no published attempt to reproduce them, I may say that two years ago I presented a magnetarium to the United States Coast and Geodetic Survey, at considerable cost and trouble to myself, with full instructions for working it, and have no doubt that the department will make good use of the instrument.

Alderley Edge, September 28.

HENRY WILDE.

netismus der Erde," with its valuable atlas-folio of charts of the magnetic variation, from which L. A. Bauer has derived his information of the dip at St. Helena for the epoch 1700-1780. Had I said that no reliable observations had been made before 1825, the statement would hardly have called for any notice. It is well recognised by magneticians that observations of the dip, up to the early part of the present century, were much more difficult to make than those of the declination, on account of instrumental imperfections and the unrecognised influence of vertical masses of ship's iron and local geological formations. Sabine, in his "St. Helena Observations," vol. 2, p. lxx., shows a difference of between 2° and 3° at Longwood and Sister's Walk, from the latter cause, and this illustrious magnetician did not venture to give observations of the dip further back than the epoch 1825.

I regret to observe that L. A. Bauer, in his intolerance of the magnetarium results, has inserted in his table guesses of his own for observations, which are very wide of the truth.

In order that my remarks on the dip at St. Helena may be better understood, I will, by your permission, reproduce the table of L. A. Bauer, although that of Sabine and the Admiralty chart are more in agreement with my results.