Mr. G. C. Curtis, Assistant in the Physical Geography Laboratory of Harvard University, from his own observations and after sketches made by the writer.

R. DEC. WARD.

HARVARD UNIVERSITY,
December 19, 1896.

### COMPLIMENT OR PLAGIARISM?

OUR attention has been called to a communication from Professor George Bruce Halsted in a recent number of SCIENCE in which he says that we '*took*' a whole block of problems and a long note from Halsted's Elements of Geometry.

If Professor Halsted had only printed in parallel columns extracts from Halsted's Elements of Geometry and the corresponding paragraphs in Beman and Smith's Plane and Solid Geometry, his charge of plagiarism would have fallen to the ground. For those, however, who have not the two books at hand, it may be worth while to make a few comments upon his accusation.

The *order* of the problems: To bisect a perigon; to trisect a perigon; to divide a perigon into five equal angles; to divide a perigon into fifteen equal angles, etc., is so natural that for this Professor Halsted will surely claim no originality. The same order may be found in Newcomb's Elements of Geometry, an earlier book than Halsted's.

Does Professor Halsted claim that we '*took*' our *solutions* from his book? A comparison will show only such resemblances as are inevitable when two authors are dealing with the same material.

It must then be the *terminology*, and especially the word '*perigon*,' which we have been guilty of appropriating. A modern treatment of the subject of angles requires the use of single terms for the angle formed by a half revolution of the moving arm and the angle formed by a complete revolution. To designate the former the term straight angle is now fully established; for the latter we had a choice among such terms as round angle, circum-angle, perigon, full angle, closed angle. After due consideration we chose 'perigon,' a word given in both the Century and Standard Dictionaries, and found in several geometries, among them Faifofer's (*perigono*).

Finally Professor Halsted lays especial emphasis upon the long note which we '*took*' from his Elements. We quote the two notes in full.

| HALSTED. | BEMAN AND SMITH. |
|---|---|
| REMARK.—From the time of Euclid, about 300 B. C., no advance was made in the inscription of regular polygons until Gauss, in 1796, found that a regular polygon of 17 sides was inscriptible, and in his abstruse Arithmetic, published in 1801, gave the following: In order that the geometric division of the circle into *n* parts may be possible *n* must be 2, or a higher power of 2, or else a prime number of the form $2^m+1$, or a product of two or more different prime numbers of that form, or else the product of a power of 2 by one or more different prime numbers of that form. In other words, it is necessary that *n* should contain no odd divisor not of the form $2^m+1$, nor contain the same divisor of that form more than once. Below 300 the following 38 are the only possible values of *n*: 2, 3, 4, 5, 6, 8, 10, 12, 15, 16, 17, 20, 24, 30, 32, 34, 40, 48, 51, 60, 64, 68, 80, 85, 96, 102, 120, 128, 136, 160, 170, 192, 204, 240, 255, 256, 257, 272. | NOTE.—That a perigon could be divided into $2^n$, $3 \cdot 2^n$, $5 \cdot 2^n$, $15 \cdot 2^n$ equal angles was known as early as Euclid's time. By the use of the compasses and straight edge, no other partitions were deemed possible. In 1796 Gauss found, and published in 1801, that a perigon could be divided into 17 and hence into $17 \cdot 2^n$ equal angles; furthermore, that it could be divided into $2^m+1$ equal angles if $2^m+1$ was a prime number; and, in general, that it could be divided into a number of equal angles represented by the product of different prime numbers of the form $2^m+1$. Hence it follows that a perigon can be divided into a number of equal angles represented by the product of $2^n$ and one or more different prime numbers of the form $2^m+1$. It is shown in the Theory of Numbers that if $2^m+1$ is prime *m* must equal $2^{2p}$; hence the general form for the prime numbers mentioned is $2^{2p}+1$. Gauss's proof is only semi-geometric, and is not adapted to elementary geometry. |

Of course Professor Halsted is aware that from the days of Young, possibly earlier, in his Elements of Geometry, 1827, up to the present the substance of Halsted's 'long note' has been given in the better geometries, as witness Baltzer, Henrici and Treutlein, Chauvenet, Newcomb.

Professor Halsted's motive in making his charges we leave for others to determine.

BEMAN AND SMITH.

### VOLCANIC DUST IN SOUTHWESTERN NEBRASKA AND IN SOUTH DAKOTA.

APROPOS of Prof. Salisbury's note on the subject in SCIENCE of December 4th, I would call attention to the fact that the occurrence of volcanic ashes in southwestern Nebraska has long been known. At the same time, notices of present exposures are of value. The deposit was at first called 'geyserite' by Prof. S. Aughey before 1880. References to the subject will be found as follows: 'Sketches of Physical Geography and Geology of Nebraska,' 1880, by S. Aughey: American Geologist, Vol. I., p. 877, and Vol. II., pp. 64 and 437; Proceedings