Polytechnic Institute of Graz, has been promoted to an assistant professorship of Geometry and Dr. W. Felix, of the University of Zurich, to an assistant professorship of anatomy.

DISCUSSION AND CORRESPONDENCE.

CLOUDS OVER A FIRE.

On Tuesday, December 1st, I had an excellent opportunity to observe the formation of cumulus clouds over the smoke from a large fire. The morning was clear, with the exception of a few scattered strato-cumulus and cumulus clouds near the horizon. The wind was northwest and blowing at about 12–15 miles an hour. The fire was in the coal pockets of the Boston and Maine Railroad, in Charlestown, and burned fiercely for some hours, sending up immense volumes of smoke which were blown off to sea across the city of Boston. The cloud, as I observed it, looking from the southwest and thus obtaining a view at right angles to the smoke, was formed at some little distance to the southeast of the fire, and over a part of the smoke, which rose up higher than the rest, as is shown in Fig. 1. It was distinctly a cumulus, but its base and a good deal of its main portion were often obscured by the smoke. Fig. 2 is intended to give some idea of what was observed as the second stage in the phenomenon. The whole body of the cloud has been carried to the southeast, further away from the fire, and the effect of the stronger upper winds is seen in the blowing forward of the top of the cloud. At this stage the cloud could plainly be seen to be dissolving as it descended to lower levels.

In Fig. 3 we have represented, to the right, the third stage of the cloud, which is now rapidly diminishing in size and being carried away by the wind, while nearer the fire a new cumulus has been formed. It was noted that the formation of the cumulus in its first position, as shown in Fig. 1 and at the left of Fig. 3, was intermittent. There was not always a cloud at that point, but one grew whenever there was an especially active ascent of the smoke, and the position of this first cloud, at its beginning, was always the same with reference to the fire and the trail of smoke.

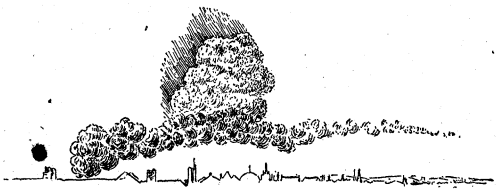

Fig. 1.

Fig. 2.

Fig 3.

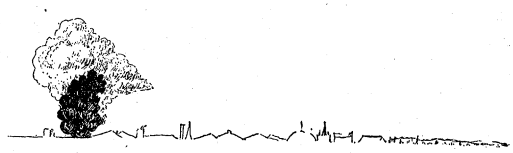

Fig. 4

There seems little need of comment on this simple but interesting phenomenon. The conditions for cloud formation were not reached vertically over the fire, for the smoke was blown to leeward at once, and the warmed air did not rise high enough to reach its dew-point until it had been blown a-quarter or a-half of a mile to the southeast. For this reason Figs. 1, 2 and 3 show the cloud to the right of the fire. Looked at down the wind, *i. e.*, from the northwest, the appearance of smoke and cloud were as shown in Fig. 4.

It may be interesting to note in this connection the case of cloud formation over a fire mentioned by Espy in his *Fourth Meteorological Report*. The observer quoted by Espy was on the top of Mt. Monadnock, N. H., and saw the growth of a cumulus cloud over a fire of brush on the lowland. The cloud increased in size, and finally gave a shower of rain over a limited area.

The accompanying figures were drawn by

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.

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.

BEMAN AND SMITH.

NOTE.—That a perigon could be divided into $2n$, $3\cdot2n$, $5\cdot2n$, $15\cdot2n$ 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 $17\cdot2^n$ 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^p; hence the general form for the prime numbers mentioned is $2^{2^p}+1$. 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