can be assumed to prove that priority. If this is the case, he is not justified in assuming that his quotation from the edition of 1779 is identical in wording with the original statement in the preface of 1778. This quotation is: 'L'usage ordinaire a consacré le premier des ces mots (cosmologie) dans le sens où je l'emploie.'

Geikie's statement with regard to the 1778 edition is: "The proper word he admits should have been geology, but he could not venture to adopt it because it was not a word in use."

Eastman, assuming that the statement in the second edition was word for word the same as that in the first edition, says that Geikie's rendering is not justified.

I reply that his assumption is unfounded, for so prolific a writer would be more likely than not to vary the wording of his phrases on a second writing. But even if the assumption were correct, Eastman's own rendering, 'the word cosmology is more generally used in an equivalent sense' is as free in one direction as Geikie's in another.

Entirely aside from this question, which is somewhat on the hair-splitting order, it is to be observed that my statement was, that De Saussure was the first geologist (in the modern sense, as Dr. Eastman kindly added for me) to use the word geology in speaking of his science. There is no question that De Saussure was such a geologist. Let us see, then, what authorities like Von Zittel and Geikie think of Deluc in this regard.

Von Zittel qualifies him as a remarkably busy but flighty observer, and a fantastic scribbler whose publications have, for the most part, fallen into deserved oblivion. His use of the term geology he says is first suggested in the preface to a volume containing fourteen letters addressed to Queen Charlotte of England, whom he served for many years as reader and traveling companion. This preface, he says, makes the pompous announcement that the book will contain the groundwork of a cosmology or earth history, but when examined the letters are found to be mostly filled with long-winded descriptions of the lands and peoples visited and very little of what the preface promises.

Geikie classes him with Richardson, the believer in fossiliferous basalt, Kirwan and others of that ilk, and says:

> But though these men wielded great influence in their day their writings have fallen into deserved oblivion. They are never read save by the curious student who has leisure and inclination to dig among the cemeteries of geological literature.

S. F. EMMONS.

SPECIAL ARTICLES.

NOTE ON THE VARIATION OF THE SIZES OF NUCLEI WITH THE INTENSITY OF THE IONIZATION.

1. I shall use the word fog-limit, to denote the difference (δp) of pressure between the outside (constant pressure) and the inside of the fog-chamber, to which sudden exhaustion must be carried in order that condensation may just occur in dust-free air saturated with moisture. It is obvious that if the fog-limit is to be used as a criterion, the result depends in all cases (cæt. par.) on the particular type of fog-chamber used and all statements are to refer to a given type.

2. Nuclei of any size may be produced in dust-free moist air by varying the time and the intensity of the exposure to X-ray or other similar radiation. A particular fog-limit and hence a particular size of nucleus is reached for each case until the fog-limit vanishes. Thus in my experiments for

Dust-free air (radium at infinity)					$\delta p = 24.5$
Radium (10,000 ×, in thin sealed glass tube)					
	at 200 cm. from fog-chamber,				21.5
	at 100 cm. "	"			20 8
	at 45 cm. "	"			20.2
Radium, do., within the fog-chamber					19
X-ray bulb					
at 35 cm.	from fog-chamber,	exposure	2	min.	$\delta p = 19$
at 10 cm.	" "	"	2	"	18
at 10 cm.	" "	"	4	"	17
at 2 cm.	" "	"	2	"	15.5
at 2 cm.	" "	"	4	"	10
at 2 cm.	" "	"	10	"	vanishing
at 2 cm.	(stronger radiation)	"	5	"	5
at 2 cm.	(still stronger radiation)	"	5	"	below 4

To these may be added the fog-limits corresponding to the more gradual decay of excited radio-activity (radium 10,000 ×, in thin hermetically sealed aluminum tube placed for 15 or 30 minutes within the fog-chamber).

Radium present in fog-chamber						$\delta p = 18.5$
Radium removed.		3.5 hours after removal,				21
"	"	21	"	"	"	22
"	"	29	"	"	"	23

On leaving the fog-chamber for hours without interference, the fog-limit for the excited activity was found to be lower, the coronas (cæt. par.) larger than if but a few minutes elapse between the condensations. Thus it takes time for the induced activity to saturate the air within the fog-chamber with nuclei, and more time as its activity is weaker. Persistence in case of the larger (X-ray) nuclei must be reckoned in hours.

A little induced activity was obtained through the hermetically sealed glass tube (walls say .5 millimeter thick) vanishing completely in about fifteen minutes, to the fog-limit of dust-free air. The same radium in the hermetically sealed aluminum tube (walls say .1 millimeter thick) left an excited activity behind in the fog-chamber, vanishing in about forty hours gradually to the fog-limit of dust-free air. It seems, therefore, as if something besides beta and gamma rays passed through these relatively thick tubes. Leaving this for further examination* I need merely instance here the adaptability and sensitiveness of the condensation method for the present purposes, where, moreover, the coronas will indicate the numbers of nuclei produced under any given conditions.

2. The general facts of the preceding paragraph are inferred objectively if an X-ray bulb is placed near one end of a long condensation chamber of waxed wood and the effect of sudden exhaustion viewed broadside through plate glass windows.† The coronas obtained after short exposure are all roundish, but taper in diameter from a large size near the bulb to a vanishing diameter (apex) near the middle of the chamber, with all intermediate gradations of aperture in corresponding intermediate positions. All lie within two oblique lines symmetrically inclined to the horizontal axis and meeting near the middle. The pressure difference used is thus more and more in excess of the fog-limit as the line of sight is nearer the bulb. Beyond the apex, the pressure difference used is below the fog-limit. The number of nuclei within the given range of condensation, *i. e.*, above a certain lower limit of diameter, increases with the intensity of the ionization. Smaller nuclei occur throughout the chamber and particularly within the reentrant region left blank after condensation.

3. If the number of nuclei (n per cu. cm.) is mapped out in relation to the corresponding pressure difference, δp, the initial slopes of the curves obtained are steeper as the fog-limit is lower. Thus per increment of δp of one cm. of mercury above the fog-limit of the ionized medium, and decidedly below the fog-limit of dust-free air, I observed with

Radium in sealed aluminum tube within fog-chamber,	$\delta n = 12{,}000$
Radium in sealed glass tube within fog-chamber.	6,000
Radium in sealed glass tube, 45 cm. from fog-chamber, outside	4,000
Do., 200 cm. from fog-chamber	1,000
Dust-free air (δp above 24.5 cm., radium at infinity)	4,000

Hence, effectively, the gradation of nuclei is more even, finer, *i. e.*, with fewer gaps, as the fog-limit is low and the maximum size of nucleus larger, while for sparse distributions the steps from one nucleus to the next in the order of average size are relatively large. For a different medium, dust-free air, for instance, the gradation is characteristically different.

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* An important question is here confronted: Can an induced activity having any period of decay (within limits) be produced by successive filtering of the contents of the sealed tube containing radium, through walls of different thickness of density. In such a case the induced activity (supposing that no emanation escapes) would be a kind of phosphorescence.

† *Am. Journal*, Vol. 19, February, p. 175, 1905.

CURRENT NOTES ON METEOROLOGY.

LONDON FOG INQUIRY, 1901–3.

The 'Report of the Meteorological Council upon an Inquiry into the Occurrence and Distribution of Fogs in the London Area, during the Winters of 1901–2 and 1902–3' has been issued, and is summarized in *Nature* for January 12, 1905. The investigation was carried on with the aid of the Metropolitan