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HOW TO WRITE GEOLOGESE.

Sir: Surely you will agree, provided no witnesses are present, that many of the concepts of geology are relatively simple. But may I inquire what would happen to our prestige if our colleagues in other professions and, most shocking of all, laymen, should begin to suspect this fact? May I therefore invoke the use of your columns to advocate the writing of geological papers in such a manner that students and non-geologists will either (a) despair of trying to read them or (b) be unable to understand them even if they do try? Clearly this is no more than the sound protective strategy long employed so successfully by lawyers and physicians.

Toward achieving this purpose, one simple but rather obvious technique is to build up a highly specialized terminology. Petrographers made notable strides in this direction during the last century, but the younger generation, alas, seems to be losing its grip. Geomorphologists, after a rather slow start, are catching up rapidly. Metamorphic geologists, under the leadership of that naively lucid master of prose, Alfred Harker, were in serious danger of becoming intelligible, but thanks to the Sander school things these days are looking up. For example:

"However, lattice orientation unaccompanied by cognate dimensional orientation can never be attributable to growth from an isotropic blastetrix" 1

and

"The temperature declines because of cessation of the exothermic chemical and mechanical equilibriopetal processes" ²

1 All numbered quotations are from published books and articles but printers' charges have been saved by not setting up the footnote references. Unnumbered quotes are quotes all right but from papers that have not been published (I wonder why).

But stratigraphy deserves the Primrose Medal. A paper telling how to distinguish—pardon me, differentiate—between an orthogeosyncline, an (not a, please) eugeosyncline, an exogeosyncline, an autogeosyncline, a zeugogeosyncline, an epieugeosyncline, a taphrogeosyncline, a paraliageosyncline, and a miogeosyncline is admirably calculated to trick those members of the public who move their lips while reading.

Not all of us, unfortunately, are gifted with the linguistic erudition—that insight into *Wortableitung*—which is essential to development of an intricate nomenclature, but any of us with the help of a few judicious hints can learn to construct sentences in such a way that their meaning is not apparent on first reading. The language that is progressing rapidly toward this end may be called, to coin a new term (or isn't it?), GEOLOGESE.

Geologese (alternative spelling: geolo-jeez) closely resembles Federal Prose ³ in general grammar and construction of sentences. It is also akin to Journalese. ⁴ All three languages bear a superficial but deceptive resemblance to English. Geologese shows, in addition, a marked Teutonic influence. In fact, a sure-fire method of achieving perfect Geologese is to write the paper in German and then translate it literally. But writers lacking a Teutonic sense of word-order may find it almost as easy to learn Geologese as to learn German, though the end-product can never be quite so fine.

Good geologese has the essential merit that it not only baffles non-geologists but offers strenuous mental exercise to geologists themselves; comprehending it and translating it successfully is an intellectual triumph. The reward that it offers is second only to the satisfaction of making an original scientific discovery; in fact some scholars greatly prefer it. After all, what golfer would enjoy playing a course that had no hills or hazards? The successful writer of geologese must provide adequate bunkers, dog-legs, and sand-traps.

One specially ingenious type of dog-leg is the "concealed change of subject" or "how-the-hell-did-we-get-here" sentence. Try this one for example: 5

"Geological sections on the footwall and hanging wall show correlation of various rocks and vertical movement of 1400 feet. . . ." That seems straightforward enough, but wait! You haven't come to the end of the sentence. It goes on: "is apparent."

See? You have to come back and start over, not missing the dog-leg at the second "and."

Here is another cleverly contrived dog-leg: 6

"As the acidity decreases the field of formation of muscovite" You read on to see what happens when acidity decreases the field of muscovite, but all you find is "probably extends to a lower temperature." So you go back and start over again.

"All gradations may be observed from massive sulphides without gangue to schist with scattered grains of pyrrhotite or chalcopyrite and vestiges or ghosts, of the schistose structure of the wallrocks" You might have expected a period here, but the sentence goes on: "are common even in the most massive sulphides." ⁷

[§] Example of Federal Prose: The Joint Army-Navy Post-Exchange-Ships Stores Working Committee.

⁴ Example: "Steel Contract Boasts Climax Murray Blasts at Red Unions."

Under the heading of sand-traps come contrivances designed not to deflect the course but merely to impede it. Among these are parenthetical references which can interrupt the continuity of a sentence more effectively than hiccups. Thus:

"Granite pebbles are reported from the north (Twenhofel, 1947, p. 75) and south (Jewell, 1939, p. 7) coasts. Some rocks that have been called Silurian (Springdale, Bostwood) (Twenhofel and Schrock, 1937; Espenshade, 1937; MacLean, 1947) are probably Devonian or younger (Twenhofel, 1947)." 8

After several pages of this, one is guaranteed to forget whether he is reading about the South Jewell Coast or the Younger Twenhofel (who, by the way, is a very nice fellow).

But it is not always necessary to ignore the reader's sensitivities completely. For example, writing "close proximity" makes the meaning perfectly clear to the reader who does not know that the phrase means "close closeness." Similarly, writing an hypothesis spares the feelings of any Cockney reader who happens to drop his aitches.

Judicious use of double negatives can achieve the intricacy of a mathematical problem. Take this one for instance:

"This is not to say, however, that argillized sediments are less common along channels of mineralization than elsewhere, for the reverse is true."

Exercise for the reader: Determine what is meant by "the reverse."

Philologists have not yet compiled a complete grammar of the Geologese Language but a few of the main rules are evident:

- Rule 1. Never use "of" if you can help it.
- Rule 2. Always use nouns in place of adjectives and string together as many of them as possible.

Since Rules 1 and 2 go hand in hand, a single set of examples will illustrate them.

Don't say, "the mineralogy of the copper-iron-sulphur series."

Say, "copper-iron-sulphur series mineralogy." ¹⁰ This will start people wondering what "series mineralogy" is anyway.

The phrase "upward-migrating intensity front hypothesis" is a nifty. It is so superb that practically no one could translate it into English even if he were able to distinguish a front hypothesis from a back hypothesis.

Rule 3. Never repeat the same word on any one page. Instead always use "the latter." That will encourage the reader to reread the paragraph in order to find out which was the latter. Application of Rule 3 is especially effective where there are at least three different words to which "the latter" might refer. Example:

"It describes and discusses the relationship of this granite to the country rocks into which it is intruded and to the other rocks of the origin described for the most part by Berkey, Luquer and Ries, Fettke and Agar. The latter occur about the Poundridge granite at distances of from 20 to 30 miles."

This paragraph leaves the reader in intriguing doubt as to whether it is Fettke alone or both Fettke and Agar who occur about the Poundridge granite.

An exceptionally ingenious trick if you can arrange it is to use two *latters* in the same sentence, each *latter* having a different antecedent, as: 11

"These mixed ores thus appear to be complements of the chalcopyrite ores, the latter being localized along steep boundaries of the ore locus whereas the former are so directly dependent on selective replacement of certain limestones that they characteristically possess the flat dip of the latter."

Considering both the mixed ores and the reader we wind up with the latter as mixed as the former.

Rule 4. A verb agrees with the last preceding noun. Examples:

"The plug of pyroclastics lie to the west." 12

"This differentiation series of igneous rocks from each of the different mining centers bear striking resemblances in composition" 13

"The course of differentiation as observed in changing mineral composition of the sequence of intrusive rocks are shown in Figure 6." 14

The reason for this rule is founded in simple good taste. Obviously only an illiterate would write: "pyroclastics lies," "center bears," or "rocks is."

Here are some additional models:

"In addition to the effect of the copper ion in the conversion of iron from the ferrous to the ferric state, oxidation of copper-pyrite ores were less likely to yield free sulphuric acid in their oxidation." ¹⁵

"The temperature observed in volcanoes average somewhere between 1000 and 1100." 16

Rule 5. Never use a simple word where a long one will do. How gauche it would be to speak of a left-handed strike-slip fault! Follow instead the elegance of this model:

"Thus they might be expected to have produced sinistral transcurrent faults in about a 170-350 direction and dextral transcurrent faults in about a 120-300 direction." 17

Note also the accuracy of the author's geometry. Does he talk about a 170–230 direction? No, for such a direction would be impossible. Does he talk merely about a 170 direction? No, for the reader might gather the impression that the fault had only a southeasterly strike, whereas this particular fault has a northwesterly strike as well.

But most of this admonition really boils down to Merrill's ¹⁸ three general rules: (1) Ignore the reader, (2) Be verbose, vague and pompous, (3) Do not revise.

Yours for a writer coordinated reader comprehension frustration campaign.

NICHOLAS VANSERG.

Vanserg Laboratories, Cambridge, Massachusetts.

18 Merrill, Paul W., The principles of poor writing, Scientific Monthly, vol. 64, pp. 72–74, 1947. See also Masterson, James R., and Phillips, Wendell Brooks, Federal Prose or How to Write in and/or for Washington, University of North Carolina Press, 1948.