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PLAIN GEOLOGY

by

George Otis Smith

The following article was published many years ago in Economic Geology. The thoughts so well expressed by Dr. George Otis Smith, then director of the U.S. Geological Survey, are just as timely today - they will always be timely.

Editor

Some years ago I spoke to an audience of mining men on the subject of plain writing. My talk was an appeal for the simple and direct statement of scientific thought in popular language; but that appeal was addressed to consumers of geological literature, and I should probably do better to make a similar appeal to some of the producers of geological literature.

Geology has of late been presented to the public in so many new aspects - commercial, military, political, and even legal - that he would be bold who would add to its modern varieties; therefore I ask here only a return to a primitive type, and my topic is "Plain Geology."

I am convinced that, at its best, science is simple - that the simplest arrangement of facts that sets forth the truth best deserves the term scientific. So the geology I plead for is that which states facts in plain words - in language understood by the many rather than only by the few. Plain geology needs little defining and I may state my case best by trying to set forth the reasons why we have strayed so far away from the simple type.

First of all, I suppose we may as well admit a certain liking for the sound of words, and the longer the word the more sound it has. Especially enjoyable is this mild form of hypnotism if both ideas and words are such as to make us feel that we are moving in the highest circles. At the meeting of the British Association this year one physicist frankly explained that the idea of relativity is popular because to most people it is "pleasantly incomprehensible." It was a hardened reader of manuscript who confessed that he liked to hear a psychologist talk. "Of course, I understand not a word he is saying, but it is a noble and an inspiring spectacle to see a mere human being crack a whip over an entire vocabulary and see the words jump up on their little red chairs like so many trained seals." But, as I wish to suggest, doing tricks with words may be more entertaining than really useful.

Again, I fear lest in our writing we lose sight of our audience, if, indeed, some of us ever see at all the audience to whom we address our written reports. The chief purpose of words is to convey thoughts, and unless the wave-lengths of the words are right the receiving apparatus will utterly fail to pick up the thoughts. How easily we can underestimate the difference in vocabulary between our audience and ourselves was brought to my notice recently when I heard a brother geologist speak at a dinner to a large group of oil operators, highly intelligent but not broadly educated men, to most of whom the oil business was simply a profitable side line. I thought the talk unusually free from the technical terms so commonly used in the inner circle of our fraternity and was therefore surprised when a table companion remarked that this talk didn't get across because it included many words not understood by the majority of those who heard it. I asked for particulars, and he at once specified "periphery," a word the speaker had repeatedly used in describing where to test out this or that oil pool. "Half of those people don't know what 'periphery' means," said this gentleman, who knew the audience better than I did, and I saw that he was right; and then I realized how much better that common every-day word "edge" would have served - so many things have edges and to so few do we need to attribute peripheries! And when we come to think of it, we realize that "edge" is a sufficiently exact term to apply to an oil pool, the position, shape, and extent of which we know only in very general terms.

This brings me to a third reason for our use of highly technical language: we too often try to overdress our thoughts. Just as there is a somewhat prevalent notion that clothes make the man, so we subconsciously believe that words make the idea. We follow the precept, "To be scientific, use scientific terms," and in so doing we deceive ourselves. I do not wish to be unduly autobiographic in this analysis, but to show my true sympathy for those whose practices I denounce, I confess that I, too, have had the unhappy experience of stripping the technical words from what looked like a good-sized geological deduction only to find that the naked idea was rather small and not my own. It is also a common experience to make the sad discovery that a piece of involved and obscure writing is simply the product of roundabout reasoning or twisted thinking. Our own words fool us, and unconsciously we cover up with long words or tangled rhetoric our lack of plain thinking.

In picking my samples of the wordy sins of scientists, I naturally turn to the writings of my associates on the United States Geological Survey, not because they are the worst offenders but because they are sinners with whom I am best acquainted. Some of these writers, after setting down a technical phrase, realize the need of reaching their readers with words more easily understood and so translate their own scientific terminology on the spot; for example, one good geologist refers to "disseminated grains scattered through the rock," and another addresses the two parts of his audience with this sentence, "Disintegration is slow in these rocks, and they do not break up rapidly." "Disseminated" and "disintegration" are words that please every ear, trained or untrained, while the garden variety of mind is helped along by the plain words "scattered" and "break up."

It seems that in our hunt for general principles we feel the need of tagging each observed fact with some word that may connect it with the language in which the great fundamental laws of the universe are proclaimed at the seats of learning. For this reason - I prefer to suggest no other - a Survey author refers to cracks and crevices in rocks as "spaces of discontinuity." I remember a long sentence in the manuscript of a report on a western coal field in which the fairly common fact that shale is softer than sandstone was stated with full acknowledgments to "differential erosion" and due respect for the "physiographic cycle," terms very comforting to the graduate student at our greater universities, but not at all useful to the practical man trying to open up a coal mine in Montana.

It takes years for some geologists to break the fetters of this scholastic habit of using big words for small ideas. Probably every one of us has been guilty of sentences like the following, which appeared in a Survey manuscript: "The argillaceous character of the formation is very prominent in some localities, although it is usually subsidiary to the arenaceous phase." On being translated this means: At some places the formation includes considerable clay, but generally it is made up chiefly of sand.

In our writing I believe, however, we are tending to write more plainly - to say "sand" instead of "arenaceous deposit," "clay" instead of "argillaceous stratum," "close folding" instead of "intense plication," "river banks" instead of "riparian borders," "mouth" instead of "debouchure," "shore" instead of "littoral margin," and "the overlying bed is limestone" instead of "the superincumbent material consists of a stratum of calcareous composition."

I even hope the day may come when more of us will say "beds" instead of "strata," for the context usually shows that we are talking about rocks, not about furniture. I, too, love the sound of "strata," but all the pleasure I get from it is wholly lost when those who strive to copy our learning speak of "stratas." As a measure of our progress, I may quote from a Survey author of an earlier day, who referred to "autogenous hydrography on a vertically heterogeneous terrane" - truly a nut of a thought, which I'll not try to crack, lest I find it all shell. It was a Survey graduate, I believe, who defined "form value" as "an intangible quality expressing the broad applicability of the energy form in contrast to its theoretical thermal value as commonly expressed in B.T.U." Words fail me, either to translate that definition or to describe it, though I may apply to such language a few words used in another connection by a Survey writer: "This holds the promise of large potential possibilities."

But I do not wish to claim for the Federal Survey any monopoly in learned writing. It was one outside of our fold who urged me to use plain language at a meeting where we were both on the program. I tried to follow his excellent advice, but in his own address before a mixed audience I listened with rapt attention to sentences like this: "So now every legitimate evidence of fact and deduction points to the origin of microbic unicellular life in the moist, subaerated soil away from the direct sun; and the soils of today are alive - a mighty host - with such microbic creations existing under paranerobic conditions." Before such words I realized that I, too, was a layman, for what I heard was, in the words of the speaker, "difficultly intelligible," if, indeed, I might not appropriately adapt to my use other sounding words in the same address and frankly confess that such language "outstripped the early promise of my cephalic ganglia and left me hopelessly decephalized."

Technical terms have their places, and I am on record as admitting that exact scientific statement needs special terms, words that best keep their razor edge when used only for hair-splitting distinctions. This limited use of a highly specialized terminology is wholly defensible, for it would be folly to throw away tools so well fitted for special purposes, just as it is unwise to put them to everyday uses with everyday people. "Transsubstantiation," "transpiration," and "transgression" are technical words that are useful enough to the professional theologian, biologist, and geologist, but they are code words that must be decoded before others can understand them. We know that a telegraphic code saves words for those who use it, but it also most effectively conceals information from the uninitiated.

I have a very definite purpose in this appeal for plain geology that a larger part of our people can understand. Today our science has more contacts with life than ever before: industry has taken geology into partnership, and engineers and capitalists and statesmen all look to geologists for advice. This greater demand has called to the ranks many with varying degrees of professional incompetence, a polite phrase by which I mean in plain English that some who call themselves geologists are knaves, others are fools, and yet others are hybrids. Now, the universal camouflage of the fake geologist - whether of the untaught or uncaught variety - is his protective coloring of technical words. To his clients or his dupes who are weak in geological knowledge these long and unusual words are impressive and serve his purpose, but to those who have had the advantage of special training and experience his use of geologic terms at once exposes his true character. Indeed, this is the basis of the practical test that some of us apply to the report in an oil prospectus if, as so commonly happens, we have never heard of the so-called "well-known authority on the geology of the greatest oil fields of the world." Such an expert uses all the latest terms, but he mixes their meanings, his report is senseless, and we know him to be a faker. But I have yet to note the fake geologist imitating plain statements of geologic

facts - that kind of masterpiece he doesn't attempt to copy. So I suggest this method of protecting our useful science from successful imitation: the economic geologist should tell his story in plain English, then because of the transparency of his statements his clients or the public can see things as they are and will learn to refuse the highly colored substitute offered by his quack imitators.

There is really somewhat of an obligation upon us, both as scientists and as partners in the world's business, to show the world that geology is not mystery or magic, but only common sense. I have told practical men of business that they should give little credence to the geologist who can not tell his story in common language. The world has a right to discount our usefulness and even to distrust our honesty if we persist in concealing our thoughts, or lack of thoughts, behind a mask of professional jargon. The lawyers and the physicians whom I trust most can and do explain their technicalities to me in words that I can understand. Isn't plain geology the safest and most useful kind?

Director, U. S. Geological Survey
Washington, D.C.

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OREGON MINING NEWS

Edward Woodford, civil engineer of Roseburg, Oregon, has leased the old Continental Mine on the South Fork of Myrtle Creek, Douglas County.

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The bucketline dredges owned by the Sunshine Mining Company, Burnt River Division, and the Western Dredging Company have resumed operations on Burnt River near Whitney and at Mt. Vernon on the John Day River, respectively.

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The Associated Dredging Company is installing a dragline dredge on lower Burnt River, Baker County. The work is under the joint direction of Mr. W. A. Hilliard and Mr. Ira Proud.

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The Salem alumina plant, which will test and develop the Chemical Construction Company's ammonium sulphate process for production of alumina from Northwest clays, is now producing ammonium sulphate. Difficulty in obtaining ammonium sulphate has necessitated combining sulphuric acid and ammonia in the plant, according to the Chemical Construction Company's process for regenerating ammonium sulphate. Because of the need for supplying farmers with this fertilizer, the Salem plant is now selling ammonium sulphate for agricultural purposes. A further supply will be made up for starting the testing work on clays.

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The Southport mine of the Coast Fuel Corporation, Coos Bay, is now producing at the rate of about 200 tons a day. All of this coal is coming from the double entry being driven from the new slope under the old workings. A new trolley locomotive has recently been installed underground.

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The Pyx mine, Greenhorn area, Grant County, is being opened up by Dr. Young and Jess Edwards of Baker. Frank Klein, with a small crew, is sinking a new shaft. It is planned to continue this work throughout the winter.

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The Argonaut mine, in the Bourne area west of Baker, has been taken over by Washington D.C. interests, and will be operated as the AMOL (Argonaut Mine, Oregon, Ltd.) Organization plans include construction of a 50-ton mill. The company was formed through the efforts of Col. Frank M. Arthur and Mr. John Arthur.

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The Enterprise Mining Co., Oakland, California, is planning to test placer ground in Eagle Valley, Baker County.

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Chadwell brothers are cleaning out the old McGee mine on East Eagle Creek, Baker County, for the purpose of sampling.

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MONTANA MINING INDUSTRY

The first official News Letter of the Mining Association of Montana was published early in November 1945. The issue contains much information of value not only to Montana but also to the mining industry in general. The comprehensive program of the State Bureau of Mines and Geology is described in detail.

Comments on gold and silver as given in the News Letter are reproduced below:

Gold:

At the hearing of the Mining Subcommittee of the Senate Small Business Committee held at Helena on August 6 and 7, 1945, the solution of the problems of the gold mining industry was crystallized in a short statement made by John T. Potts, President of Victoria Mines, Inc, of Silver Star, Montana. Mr. Potts made his statement after consultation with Senator James E. Murray, Chairman of the Committee, who presided, Congressman Clair Engle of California, a guest member of the Committee, and W. C. Broadgate, the Committee's Technical Consultant. Mr. Potts stated:

> "Most of the shutdown gold mines, after they are opened, need money to rehabilitate their property to resume operations and a higher price for gold to continue operations."

Mr. Potts and other witnesses also advocated that gold mines shut down by government edict, L-208, should look to the government for loans to rehabilitate and resume operations and for relief payments to cover losses sustained during the shutdown.

Bills to cover the recommendations have been introduced in Congress in both the House and Senate. Senator Murray and Congressman Engle have introduced companion bills, S. 1497 and H. R. 4393, to cover relief for gold mines and bill S. 1200 has been introduced by Senator Murray to liberalize RFC loans for the development of mineral resources, including gold mines closed by order L-208. A bill earlier introduced by Senator McCarran of Nevada, known as S. 27, passed by the Senate and now in the House Committee on Mines and Mining, also provides for relief of shutdown gold mines including relief from property and other payments during the shutdown. A somewhat similar, but broader bill was introduced in the House by Congressman Engle at the time that Senator McCarran's S. 27 was introduced in the Senate. All of these bills or a combination of them, are being urged for passage of the two Houses by the mining industry.

In several countries where they have more faith in metallic money than in "managed currency", gold is selling at from $48 to $90 per ounce. We understand that the Italian lira recently was devaluated 50% and a number of economists and financiers are of the opinion that the economic situation in France will not be stabilized until the franc is devaluated. These conditions may bring about an increased price for gold all over the world.

It is reported in Washington that bills will be introduced in Congress to give the President the power to further devaluate the dollar and also asking for an increased price for domestically produced new gold.

Silver:

One of the foremost silver experts in the United States recently advised us,

> "The present shortage of silver, in my opinion, will soon force the price to a higher level. The industrial demand during the next twelve months will amount to more than twice as much as the domestic production. The coinage demand for the next five years throughout the world will be the greatest in its history."

According to late figures the United States will this year use 100,000,000 ounces of silver in industry against domestic production of less than 40,000,000 ounces. The world will use 125,000,000 ounces in industry against a world production this year of 100,000,000 ounces. Recently the OPA advanced foreign silver from 45¢ to 71.11¢ per ounce the same as the price for domestically produced silver. Senator Green of Rhode Island has introduced a bill, S. 1508, to extend the privilege of U.S. silver manufacturers to buy surplus Treasury silver at not less than 71.11¢ per ounce for a period of two years after January 1, 1946. Senator McCarran of Nevada has introduced two bills to raise the present domestic price of silver to $1.29 per ounce. Our domestic silver manufacturers are distinctly short of silver and it seems the only way to get it is to stimulate domestic production by raising the price. Manufacturers using silver heretofore have opposed price raising but some are said at this time to urge higher prices.

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O AND C LANDS

Senator Guy Cordon states that his bill S. 313 to reopen O and C lands to exploration, location and entry under general mining laws is still pending before the Senate Committee on Public Lands. The Secretary of the Interior made an adverse report on this bill and Senator Cordon then incorporated its provisions in another bill, S. 723, which contains provisions in which the Interior Department is much interested, and Senator Cordon believes that this new bill will be supported by the Interior Department. However, the Department of Agriculture is opposed to the provisions of the bill relating to administration of controverted O and C lands and this disagreement between the two departments is delaying action. If, because of this disagreement, it develops that the chance of getting S. 723 out of committee and through the Senate appears to be poor, Senator Cordon will press for action on S. 313 notwithstanding the Interior Department's adverse recommendations. The matter is being actively considered in both the Senate and House Public Lands Committees and in the departments.

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GOLD*

As High as $89 per Ounce

The following is a partial schedule (obtained from the United States Treasury) of gold prices prevailing in foreign countries:

Country or City	Per Ounce
Chile	$ 48.00
Argentina	48.00
Bombay	62.40
Greece	80.00
Cairo	88.50
Bagdad	89.00

When foreign countries will accept gold at these prices in payment for their products, shipped to other countries, the United States is going to find itself out on a limb in demanding over twice as much gold for its exports. Trade is going to go to the nations which will accept the least quantity of gold in payment.

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*Pay Dirt, October 1945, published by the Arizona Small Mine Operator's Association

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