GEOLOGICAL COMMUNICATION IN THE INDUSTRIAL MINERALS

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ABSTRACT

United States production of the industrial minerals, ahead of that of the metals since 1946, has shown a steady and rapid growth. By 1963, their value was more than twice that of the metals. Yet papers on the metallic ores continue to dominate the meetings of the Society of Economic Geologists and constitute nearly nine-tenths of the lead papers in *Economic Geology*. Most of the geological communication that does take place concerning the industrial minerals deals with high-value special-purpose minerals, which are comparable to the metallic ores in geologic complexity.

The large-bulk rock products, which are growing fastest in production value, are characterized by relatively simple geology and by thousands of small producing firms, many of which do little or no geological work. The need for geological advice by this very large segment of the industry is bound to increase. In the meantime, a plea is made for more geological communication among those concerned with the industrial minerals of all varieties.

INTRODUCTION

The term *industrial minerals* in the title of this paper is used in a collective sense to refer to the whole realm of the nonmetallic minerals other than fuels. I take it for granted that *communication*—exchange of ideas and information, both oral and written—is, in general, desirable; readers who think it is not desirable need go no further into this paper or those that follow. The term *geological* refers to matters of occurrence and origin of the raw material. All are acquainted with the standard rock-products flowsheet, which starts at the upper left-hand corner with a truck unloading into the primary crusher beneath the words "From quarry". Communication which is geological has to do with what is to the left of the primary crusher, out there in the quarry.

Problems of geological occurrence are not divorced from practical matters, but are directly concerned with them—particularly in the industrial minerals, where occurrence and character of the raw material so commonly bear directly on extraction and use.

PRODUCTION VERSUS COMMUNICATION

Figure 1 shows the dollar value of domestic production of the industrial minerals and the metallic ores from 1940 to 1963. (If the mineral fuels were also shown on this chart, the line representing them, on this same scale, would be far above the chart.) The figure shows that the value of the industrial minerals has risen every year since 1949, most years quite steeply, and that by 1963 it was more than twice that of the metals. The value of the metals, on the other hand, has fluctuated widely; in 1963 it was almost exactly what it was in 1940. The conclusion is unavoidable that, over the past two decades, the domestic metals have been going nowhere, while the industrial minerals have shown a steady and rapid growth. The Bureau of Mines figures show, incidentally, that the industrial minerals that are growing the fastest are the large-bulk construction materials, among which of course are limestone and dolomite, the subjects of this Forum.

In view of these relations, it would seem reasonable to conclude that geological communication should be considerably greater in the industrial minerals than in the metallic ore deposits. How pronounced the error is in such an assumption is indicated in Figure 2.

Geologists concerned with industrial minerals and ore deposits have an association, the Society of Economic Geologists, and the Society has a journal, *Economic Geology*. The Society, at its meetings and especially in its journal, has long

reflected far more communication by geologists with metal-mining companies than by those associated with the industrial minerals. Gillson in 1960 showed that, over a 10-year period, 89 per cent of the lead articles in *Economic Geology* dealt with metallic ores; a check of recent volumes shows that the picture has not

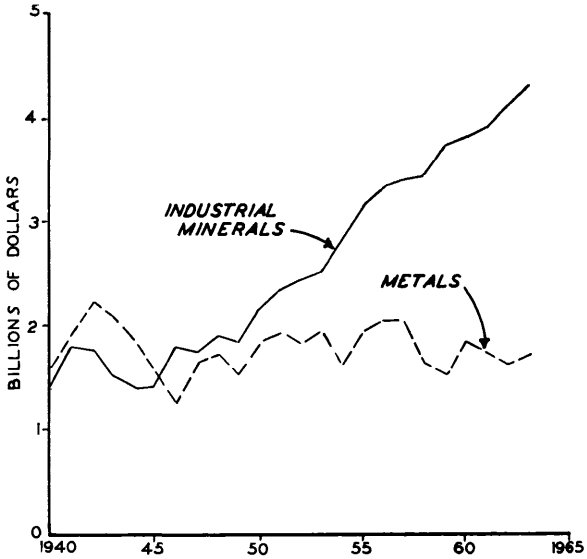

FIGURE 1. Value of United States production of industrial minerals and metals, 1940–1963, in 1957–59 constant dollars.

changed. Reading this periodical, students may be pardoned if they gain the impression that economic geology and ore deposits are synonymous.

Thus the ore-deposit geologists out-meet, out-talk, and out-write (I do not say out-think) those of us who are concerned with the crucially important industrial minerals.

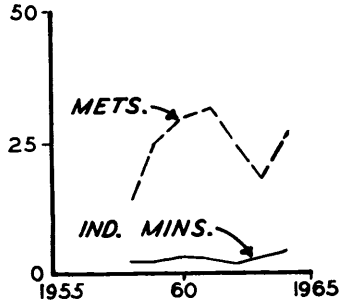

FIGURE 2. The subjects of lead papers in the journal, *Economic Geology*, 1958–1963. mets.—metals; ind. mins.—industrial minerals.

DISCUSSION

The gross imbalance between value to the economy and geological communication does not denote a sinister plot on the part of our colleagues in the metals, or a conspiracy by the editors of *Economic Geology*. It simply means that few industrial-minerals geologists are contributing manuscripts. The men in metals are articulate, not to say loquacious; those in industrial minerals seem to be nearly tongue-tied. What are the reasons for this situation?

Perhaps one reason is tradition. Ever since the Stone Age gave way to that of bronze, man has been fascinated with the usefulness and beauty of metallic substances. Curiosity about the peculiarities of ore deposits—exemplified by *De Re Metallica*, published more than 400 years ago—seems to persist undiminished. Most of the industrial minerals, on the other hand, have no such ancient traditions; indeed, the very name of the group suggests prosaic uses in the industry of modern times.

But a less fanciful answer to the question also exists. Since every metallic ore deposit is an extreme departure from the normal, with numerous complex peculiarities, it can be profitably exploited only with the aid of expert geological advice. There are many mining districts, and there are a large number of mining geologists who like to discuss their professional problems. Thus, there is a large volume of geological communication. On the other hand (runs the argument), most deposits of the industrial minerals are so simple that geological information is really not needed. ("The stuff is there. We just get it out," said one engineer.) What geology is needed may be provided by the quarry superintendent on Saturday mornings. Or a company may have its geological work done by a consultant, who is too busy making a living to attend meetings or publish papers. Some concerns find themselves in a competitive bind, real or imaginary, and, although they may have acquired some excellent geological information, flatly refuse to release any of it to anyone for any purpose. No wonder there is so little geological communication in the industrial minerals!

But if every deposit of metallic ore is a geological abnormality, so, really, is each deposit of feldspar, vermiculite, borax, and the many other nonmetals of special properties and high value. Indeed, commercial deposits of such materials as paper-grade kaolin—"aristocrats of rock refinement," in Keller's phrase—are so rare and valuable that their discovery and exploitation require geological advice. The numerous geologists employed by producers of these special-purpose materials are largely responsible for the geological communication in the industrial minerals that does take place.

The contention that the industrial minerals' mode of occurrence is so simple that little geology is needed can apply only to the large-bulk rock materials. These are the products growing the fastest in production value; a large proportion of the total output is produced by small companies, many of which do little or no geological work; therefore, the number of geologists, and the communication among them, are disproportionately small.

That many producers of rock products—even some of the larger ones—are getting along without geological help means, of course, that they are living on borrowed time. As specifications become more rigorous, competition stiffens, and urban sprawl pre-empts areas counted on for expansion, more and more of these producers will doubtless see the geological light.

CONCLUSION

My conclusion is really a plea for more communication among industrial-minerals geologists. Existing media are quite adequate; they merely await our attention. It is pleasant to report that one of the two sessions of the Society of Economic Geologists' spring 1965 meeting was devoted to papers on phosphates, pegmatites, barite, and potash. I hope that this 50–50 division of time between ore deposits and industrial minerals may be maintained. And equal space in *Economic Geology* will be possible if enough papers of adequate interest are furnished.

Let us beef up the geological side of the Industrial Minerals Division of the Society of Mining Engineers, AIME; let us contribute further to *Mining Engineering;* let us attend such meetings as the Northern Ohio Geological Society's Symposium on Salt and this present Forum on limestone and dolomite. Let us, in brief, create more interest and make more noise.