

Musings of a Metallurgist

(by Harry Walker)

Page 1

June 2008

You, no doubt, never thought about it, but most people would probably assume that metallurgical research and medical research would have very little similarity. However, having done metallurgical research for most of my working life, I have come to see what I consider to be some interesting parallels between the two.

First, my background: I have worked on iron ore, precious metal ores (gold and silver) and base metal ores (copper, lead, zinc, and nickel). Of course, I have never done any medical research.

My experience indicates, that no matter which of the above listed ores one is dealing with, each lump of ore that comes from the mine is different. Some lumps are very similar, but others are very different. Therefore, ideally, each lump of ore should have a custom-made treatment in order to get the best separation of minerals in it.

This, of course, is impractical and impossible to do economically, so we compromise by mixing a lot of ore together to get a, more or less, average ore.

(I have worked in some ore-dressing mills where the ore - after fine-crushing - goes to a shuttle above the fine-ore bin. This shuttle, continually, runs back and forth from one end of the bin to the other so as to distribute it evenly throughout the bin and thus get a more uniform mix.)

Now I ask: In the medical field, is not each medical patient unique? If so, then ideally, wouldn't each patient require a custom-made treatment (for some maladies at least)?

But again, in our present state of knowledge, this is, no doubt, impossible. Again, a compromise is probably, often necessary, so treating the patient as though, he or she, is an average human being may be the only solution, even though an average human being does not exist.

Absolute science is above and beyond me and you and everyone.

Another parallel in these two branches of research:

The theory involved in treating iron ores is better formulated and easier to understand than the theory involved in treating other ores.

In this case, the iron containing minerals (usually hematite or magnetite) are separated from the waste minerals by either gravity or magnetic separation; and, although gravity and magnetism themselves are unexplainable, or almost so, nonetheless the laws that they follow are easily visualized, and are very useful in understanding these methods of separation.

This is in sharp contrast to the prevalent theories promulgated to explain the floatation process - the process most commonly used to separate the various minerals found in base metal ores. With this process, the theory has little practical value, and research on these ores is commonly relegated to trial and error, hit or miss, experiments.

The theory involved in treating precious metal ores, commonly that of dissolving the gold and silver in a very weak cyanide solution, falls in between the two extreme cases outlined above - much clearer than is the case with the floatation process, but not as clear as the theory involved in gravity or magnetic separation processes.

Now, I am asking do these various theories, more or less, correspond to the theories involved in medical practice. Are the theories involved in some cases (for instance broken bones) very clear-cut, while in some other cases are they so vague or speculative as to be of little practical help. In this case are the medical researchers, like the metallurgical researchers, left with only trial-and-error experiments to guide them.

When I listen to the news on T V, and hear reports that a certain pill or procedure is helpful in a certain percentage of cases, I conclude that the medical researcher's understanding is as limited as the metallurgists.