

CHEMICAL TESTS FOR MINERALS

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Chemical Tests for Minerals by Arthur J. Burdick

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ARTHUR J. BURDICK

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BY ARTHUR J. BURDICK

Author of "The Mystic Mid-Region—Deserts of
the Southwest," "The Prospector's Man-
ual," "Valuable Minerals, How to
Find and Know Them," etc., etc.



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INTRODUCTION

The prospector who goes into the field unprepared to make identifying tests of the rocks and ores which he may encounter is sadly handicapped and his chances for success are few.

There are a number of methods for identifying ore which are simple and inexpensive. In a little book entitled "Valuable Minerals, How to Find and Know Them," the author of this work has told how to classify ores by means of weight, hardness, color, streak, luster, etc. By these means one may identify many of the valuable ores.

It often happens, however, that two or more minerals are combined in one ore. Also, there is such a similarity in the ores of different mineral that it is difficult, sometimes, to distinguish between them and the prospector feels the need of further assistance.

To depend upon the assayer to identify the rocks and ores of his finding is not only expensive, but it occasions delay which is still more awkward and costly.

It is to assist the seeker for mineral wealth to a ready determination of his discoveries that this book is written.

A small field laboratory and an inexpensive blowpipe outfit are both time and money savers to the prospector. With an outfit of chemicals he can call to his aid Nature—the master assayer—one who makes no mistakes, and one who will not fail him if he but does his part.

The tests given in this work are qualitative. For quantitative determination the prospector should always consult the assayer. The main point with the prospector in the field is to learn whether or not he has actually located mineral of value. The assayer will tell him whether or not the ores are of sufficient richness to pay to operate.

That the careful study of this treatise and a painstaking following of the formulas herein given will lead the persistent and faithful prospector to satisfactory results is the belief of the writer.

CHAPTER I.

PRELIMINARY STEPS.

Before proceeding to the formulas given in this book, the prospector should familiarize himself with some of the principles which govern the use of chemicals, with the symbols by which elements and reagents are distinguished, with atomic weights, the specific gravity, hardness, etc., of the various minerals.

There are no chance propositions in nature. She always works on definite lines and follows established laws.

The same compound is always made up of the same constituents, combined with the same definite proportions.

Each element has its combining weight, always the same, although the same two elements may form more than a single combination, as for example, oxygen and nitrogen form no less than five compounds.

It will be seen by referring to the table of mineral elements, that each element has an

atomic weight given it, which is its combining weight. Hydrogen is the standard for comparison, and its atomic weight is placed at 1. This is the lightest known element. The atomic weight of oxygen is placed at 16. The constituents of water are two atoms of hydrogen to one atom of oxygen. The symbol expressing this combination is H_2O , signifying that two parts of hydrogen are combined with one part oxygen in the substance called water.

If one element unites with another in more than one proportion, these proportions will all be multiples of its combining weight.

For example: The atomic or combining weight of silver is 108; that of chlorine 35.5. These having a chemical affinity combine in equal atoms producing $AgCl$, or silver chloride. By weight the combination represents 108 of silver to 35.5 of chlorine. No other weight proportions could be represented. If three atoms of silver and five atoms of chlorine were mixed in a solution three atoms of silver and three atoms of chlorine would combine and the remaining two atoms of chlorine would remain in the solution not taken up.

The combining weight of a compound like-