THE PROSPECTOR'S HANDBOOK: A GUIDE FOR THE PROPSECTOR AND TRAVELLER IN SEARCH OF METAL-BEARING OR OTHER VALUABLE MINERALS

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PREFACE.

To the lover of natural history, no matter in whatever part of the world he may travel, each tract of country offers object after object, subject after subject, of interest. He reads sermons in stones and rocks wherever fate happens to direct his footsteps; and, if he wanders over the bypaths of untrodden ground, derives a pleasure and satisfaction from the wonderful works of nature, such as no one who has not been privileged to experience it can realise.

Geological formations, strange to the eye accustomed, perhaps, to some particular locality, continually attract his attention; while each river-bed, each mountain-side, and each precipice merits an inspection, if not a close examination.

Accompanied by very many hardships and dangers though the life of a prospector must necessarily be, it doubtless possesses an intrinsic fascination; certainly there must be some extraordinary charm about his free-and-easy manner of living; he constantly, during his arduous and hazardous explorations, is buoyed up with the pleasing hope of, some day in the future, he knows not how soon or how late, being fortunate enough to reap a reward for his plodding labour, or, using his own phraseology, to "strike something rich."

After traversing the mineral fields of New Zealand, New Caledonia, New Mexico, and Colorado, I feel fully convinced that some simple guide or handbook for the use of

prospectors as well as travellers is a desideratum. The ordinary miner or prospector discards a lengthy descriptive work on Mineralogy, containing an account of all the known minerals, the majority of which are perfectly useless to him in his struggle for existence; and again, elaborate means of dealing with his specimens appear only like a puzzle. It is for this reason that I have endeavoured to treat the subject in as brief, though as comprehensive, a manner as possible; and I hope that these pages will satisfy the requirements of at least some of those toilers who explore the trodden or untrodden tracks on the face of the globe.

I cannot conclude these prefatory remarks without acknowledging with gratitude my indebtedness to many valuable works to which, by the kind permission of the author or the publisher, I have had access. Among these I would especially mention Mr. Robert Hunt's great work, "British Mining;" Mr. D. C. Davies's two comprehensive treatises, entitled respectively "Metalliferous Minerals and Mining" and "Earthy Minerals;" and Lieut.-Col. Ross's recently published work, "The Blowpipe in Chemistry, Mineralogy and Geology." I have also had the privilege of borrowing certain illustrations from these and other works, which I feel sure have greatly added to the value and usefulness of my pages.

October, 1895.

PREFACE TO SEVENTH EDITION.

SINCE the first edition was published, in the autumn of 1885, several important discoveries and openings up of metal-producing districts in various parts of the world have occurred, and references to these have now been added. Of such, the gold fields of South Africa and Western Australia are the most important; and the circumstances under which the precious metal has been found in the conglomerates of the former have astonished many experts. They certainly suggest an important lesson to the prospector, viz.—That it behoves him to explore a country with a mind open to new impressions. If he does not do so, for instance, in a large tract of land like West Australia, where mineral wealth seems to have been bountifully distributed in so many districts, he will be apt to overlook much that might be valuable.

Opportunity has been taken to refer to Aluminium ores. The metal has undoubtedly a great future before it; the discovery of a bed rich in aluminium ore is not by any means to be despised.

With regard to the Tables for the determination of a mineral by noting the colour and lustre, and then the streak, it should be borne in mind that, purposely, only a limited number of minerals have been tabulated, and also that the matter relating to the extraction of metal from ores and the concentration of minerals is necessarily in a very condensed form.

Since the sixth edition was published (1895), I have returned from a hurried visit to South and East Africa, and I think it worth while to mention here one point that not only applies to South Africa, but also to many other countries. It is that in localities where there is much flat or slightly undulating land, as in the extensive Karoo, the greater part of the country is really most imperfectly prospected, simply because soil, drift, &c., conceal the bed-rock. In Barberton district, which is hilly or mountainous, geological formations are exposed, but this is not the case in most parts of South Africa. That there may perchance be many more auriferous "banket" reefs or quartzites connected with, or distinct from, those already known to exist, no one can dispute, and it is not unreasonable to believe that in the future more diamond-producing mines in Orange Free State or elsewhere may be discovered. It is true that a slight elevation above a diamondiferous "pipe" formation may, in some instances, have been noticeable; at the same time I have heard that in other instances the converse has been the case, or the elevation was not apparent.

In British Guiana, too, much flat land or forest land covered with soil, containing the accumulation of vegetable matter, has retarded discoveries. Of course an outcrop, here and there, of hard rock such as quartz or quartzite may be met with; however, not by any means always. Therefore, especial attention should be taken to explore the banks and beds of rivers and dry creeks, as not unfrequently detached pieces of quartz, &c., and sometimes the lode or deposit formation itself, may be noticed in the river or creek bed.

There is another point which—although it is mentioned elsewhere in this book—cannot be borne in mind too carefully, and that is, that the searcher after minerals should not expect to find free gold or indications of a mineral staring him in the face; he should rather assume that these

may exist, and, in consequence, have samples of rock properly assayed. It is unreasonable to expect an ounce reef to show much free gold even on the outcrop, or by panning out, especially if the gold is in a very finely-divided state. Many years ago, I visited a very extensive gold mine in New Zealand, and never saw a trace of gold in the immense heaps of ore ready for crushing. In this mine the gold was found in the free state and not much mixed with sulphides. So, too, in one of the large mines of Johannesburg—a fifteen-pennyweights-to-the-ton mine—the output from which is more than 10,000 tons per month, the same thing occurred, the gold being concealed, in a very fine state, in the iron pyrites crystals.

In connection with precious stones, mention has been made of a small instrument which, so long as a certain amount of experimenting has been previously made with specimens, might be of much utility to prospectors who usually know but very little about gem stones, and yet who are very likely to meet with them in alluvial washings.

Finally, I take the opportunity of reminding the prospector who has to deal with surface rocks of a point of great importance. Rocks and minerals have to be written about, more or less, as if they were cabinet specimens, although (as every one will understand) many of them have been weathered for thousands of years. Even a description of the appearance of an unweathered rock does not fix itself in a student's mind so well as does the handling or the examination of a specimen. For this reason, I should advise any one who intends setting out on an exploration to make himself as familiar as he can beforehand with the appearance of the most important rocks—such as granite, diorite, schists, silurian rocks, &c.,—and to examine as many gossans as he can, as well as all kinds of oxides, not forgetting tinstone, in various colours; carbonates, chlorides, &c., of the various metals. After which he should learn

all about the sulphides of metals, tellurides, &c., which may be met with deeper in lodes or deposits. But he must especially remember, that while he is to be busy with surface matter, the mere study of rare and beautiful cabinet specimens, with their perfect crystals, will be of comparatively little use to him.

February, 1927.