SCOPE OF THE WORK OF THE ARIZONA STATE BUREAU OF MINES

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THE SCOPE OF THE WORK OF THE ARIZONA STATE BUREAU OF MINES

The general function of the Arizona State Bureau of Mines is to conduct in behalf of public welfare the fundamental inquiries and investigations as will lead to increased safety, efficiency and economy in the mining industry of Arizona. The work follows two broad lines that are of the greatest concern—the safeguarding of the lives of the miners and employees of the metallurgical and mineral industries and the development of more efficient and less wasteful preparation of our mineral resources. Such inquiries and investigations are general in scope.

The Bureau of Mines is a non-partisan organization. It does not stand for the miner against the operator or for the operator against the miner, but does stand for the welfare of all the men who labor in the different branches of the mining industry and for the development of that industry. The reason that mining has received little state aid in the past is principally due to the fact that the mining industry is generally regarded as an industry comprised of a few highly profitable properties, and their owners have never requested state aid, but there is a large number of small mines in the state, approximately 2,000. Few seem to appreciate the importance of helping these men who hold the small properties to find methods by which they may be worked at a profit, instead of being helplessly transferred to a few large corporations who alone have the funds for developing processes which make profitable operation possible. An urgent appeal for state aid comes from the prospectors engaged in the industry in Arizona, who desire state aid in the development of safer and more healthful working conditions, who desire assistance in bringing the consumer of mineral products in touch with the producer. Mineral products are becoming more and more indispensable in the domestic life of the people and to our manu-
facturers, as well as being the basis of transportation facili-
ties and the products to be transported.

Agricultural products, if ordinary care is taken of our
soils, will be supplied continually by annual crops, but the
case is different with the mineral resources. Our mines can-
not produce more than one available supply, which must meet
the future as well as the present needs. The experience has been
that the use of our resources is increasing much more rapidly
than our population.

More important than all of the above are the hazards of
the industry, the accidents which yearly result in large losses
of life, and the unfavorable conditions in many mines and
metallurgical plants which affect diversely the vitality of em-
ployees. None of these conditions are encountered in agricul-
ture, but are in a peculiar way characteristic of the mining
industry.

It may be argued that the mine inspector's office governs
a great deal of this work, and it is true as far as mechanical
devices for improving safety are concerned, but no industry
has the lives of others so dependent upon the personal factor
of the employees themselves as the mining industry. It has
been figured that not over 40 per cent of the accidents could
have been corrected through mechanical devices, and it is only
by the education of the miner to his personal responsibility
that the balance may be improved. This is the work of the
State Bureau of Mines.

Besides improving the conditions for the miner, the work
of the State Bureau of Mines is aimed towards increasing the
production, which means an increase in the number of men
employed and under better conditions, will mean a more com-
plete utilization of our present resources, and the making of
a large number of small mines into producers. In the act
of creating the Arizona State Bureau of Mines, the following
were given as its objects:
1. The collection, compilation and publishing of statistics of all kinds relative to Arizona mining, such as production, values, efficiency reports, methods, mill statistics and other things of interest and importance to every mine operator of this as well as other states.

2. The collection of a library and bibliography of all literature pertaining to Arizona mining and geology.

3. Experimentation, and publishing of results of Arizona problems of wet, dry and electrostatic concentration, dry placer, flotation methods, etc.

4. The qualitative determination of rock and mineral samples.

5. The collection of typical geological and mineralogical specimens to constitute the museum of the State Mining Bureau.

6. To serve as a bureau of exchange and information on Arizona mining.

7. The collection of models, drawings and descriptions of appliances used in mining and metallurgical work.

8. The establishment and maintenance of a state mine rescue car for service and training in mine rescue work, first aid and general safety.

However, the Bureau of Mines is many times called upon to do things which are not within its scope, and often which are impossible. The Bureau is allowed to make gratis qualitative tests of rocks, where the sample sent may be given either a petrographical or a mineralogical name. It is also within the scope of the Bureau to answer definite questions regarding the rocks sent in, if these questions may be answered without an assay. The questions "Is copper present?" "Is Molybdenum present?" "Are nitrates present?" are permissible, as well as any of the minerals which do not require an assay. But to find out if gold or silver is present would necessitate
assaying, which would be in competition with the legitimate business of the state, and which is therefore prohibited by state law being done free.

Many inquiries ask the commercial value of rocks, but this also necessitates assaying, as the commercial value of rocks involves quantitative rather than qualitative work, and is therefore prohibited.

Many samples are sent in of altered country rock, altered to such an extent that it would be impossible for the Bureau of Mines or anyone else, for that matter, to determine the original structure.

In some cases samples are received with a request to determine if a large number of minerals are present. Recently one was sent in for a qualitative determination of some eighteen metals. This individual case would cost the state from thirty to forty dollars, and many hours of work, which, of course, is unreasonable.

It is remarkable how many people believe that questions of geology, further extensions of ore depths of shafts may be answered from the examination of a small sample. So many other factors enter into these matters; that such questions are impossible to answer.

It is with no idea of criticism that this pamphlet is written, but merely to show the people whom we desire to serve why many of their inquiries cannot be answered and that the information that they desire cannot be given unless satisfactory facts are at hand. We desire the people to understand the limitations of our work and to appreciate that while we are ready and willing to do everything possible to serve them, there are some things that are beyond our reach. We believe it is far better to give authentic information. The latter would have a tendency to deceive, and of course would injure the reliability of the Bureau of Mines. With the large number of inquiries that come in daily, it is often impossible, with the funds at our disposal, to answer each inquiry in as de-
tailed a form as we would like to do, and for this reason it is difficult to give the inquirer all of the reasons why we cannot give him a satisfactory reply. However, we wish him to know that we have told him everything which we know to be authentic, and that he may depend on this information.

The State Bureau of Mines is permitted to do assaying, but is required by law to charge precisely the same as the commercial assayers. In accordance with the act of the Legislature of the Territory, approved March, 1897, and amended in March, 1899, assays of ores and minerals are made for the prospectors and miners of Arizona and for others at fixed rates established by the law, and tabulated below. Extreme accuracy and excellence of work are considered of more importance than pecuniary profits. All assays are made in duplicate, and if not accordant, are repeated. The money received for assaying is deposited monthly to the credit of the assay fund, which is used to pay the assayer and the cost of material and apparatus.

**COMMON ASSAYS AND CHEMICAL DETERMINATIONS**

**ONE ELEMENT ONLY:**

<table>
<thead>
<tr>
<th>Element</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold, or silver, or copper, or lead, or iron, or insoluble</td>
<td>$1.00</td>
</tr>
<tr>
<td>Zinc, or calcium, or magnesium, or sulphur, or manganese</td>
<td>$1.50</td>
</tr>
<tr>
<td>Silicon, or chlorine</td>
<td>$2.00</td>
</tr>
</tbody>
</table>

**COMBINATIONS**

<table>
<thead>
<tr>
<th>Combination</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold and silver</td>
<td>$1.00</td>
</tr>
<tr>
<td>Copper and iron, or lead and iron</td>
<td>$1.50</td>
</tr>
<tr>
<td>Insoluble, copper, and lead</td>
<td>$2.00</td>
</tr>
<tr>
<td>Insoluble, copper, and iron</td>
<td>$2.00</td>
</tr>
<tr>
<td>Insoluble, lead, and iron</td>
<td>$2.00</td>
</tr>
<tr>
<td>Insoluble, zinc, and iron</td>
<td>$2.50</td>
</tr>
<tr>
<td>Insoluble, lead, copper, and iron</td>
<td>$2.50</td>
</tr>
<tr>
<td>Gold, silver, copper, and lead</td>
<td>$2.50</td>
</tr>
<tr>
<td>Gold, silver, copper, iron, and insoluble</td>
<td>$2.50</td>
</tr>
</tbody>
</table>
SPECIAL CHEMICAL DETERMINATIONS
ONE ELEMENT ONLY:

Aluminum, or tungsten, or barium, or chromium........... 3.00
Cadmium, or tin, or arsenic, or bismuth, or antimony,
or titanium, or sodium, or potassium, or uranium
or phosphorous.......................................................... 4.00
Nickel, or cobalt, or molybdenum, or vanadium........... 5.00

CHEMICAL ANALYSIS

Coal and coke analysis, giving moisture, volatile combustible matter, fixed carbon and ash................. 5.00
The same, including determination of sulphur and phosphorus ........................................................................ 7.50
Silicate analysis............................................................................. 15.00
Cement analysis (chemical).......................................................... 15.00
Cement tests (strength and soundness, by the Department of Civil Engineering).................................... 3.00
Boiler water analysis................................................................. 10.00

All assays, chemical determinations and chemical analysis, except gratuitous qualitative tests mentioned elsewhere, are required by law to be paid in advance. Remittances should be made by post office money order, Wells Fargo money order, bank draft, or check of a Tucson bank, payable to the State Bureau of Mines, Tucson, Arizona.