much to do with the unequal impoverishment of the outcroppings.

The foregoing statements and conclusions point to the following as the sequence of changes culminating in the existing series of deposits:

First, silicification of the granular-rhyolite by a solution containing free sulphuric acid and the deposition of the metallic sulphides with gold and silver.

Second, folding of the strata.

Third, oxidation and impoverishment of the surface ore and concentration of the precious metals in the bonanzas. The last is evidently the most important, since otherwise the ore would be comparatively worthless.

The question naturally arises, to what depth do the folds extend that contain the ore-bodies? This might be susceptible of an answer if the folds were uniform, which they are not. Nor is it likely that a knowledge of their depth would prove of economic importance, since in all probability the bonanzas will not extend below the line of oxidation. For fear the last remark should create a false impression as to the value of the deposits, it may be as well to add that the magnitude of the reserves does not justify any immediate apprehensions on the part of the companies operating there.

In the preceding remarks on the genesis of these deposits it may appear that some of the conclusions are based upon insufficient evidence, but the anomalous features presented certainly demand something more than a mere statement of observed facts. For this reason I have ventured to put forward my own views in this particular case, and although they may be only approximately correct, they are such as seem to me the most plausible under the circumstances.

Mr. Cross gave the result of a microscopical examination of the gold sand from Snake River, Idaho Territory, presented by Mr. Pearce at the previous meeting.

The minerals determined in a portion of this sand mounted in balsam were:

1. *Garnet.* Very abundant, usually pinkish in color, sometimes reddish brown, and rarely almost colorless. Grains seldom show crystal form, are quite free from inter-

positions, and are isotropic in action on polarized light. A few seemed to be crystals of form *mOm*. One nearly colorless grain held a particle of magnetite(?) partially imbedded.

2. *Quartz*. In rounded and also in irregular grains. Clear, colorless, and carrying some fluid inclusions. Much less abundant than the garnet.

3. *Augite*. Like that occurring in basalt; partly irregular, and partly worn.

4. *Olivine*. Showing characteristics of same mineral in basalt. Some grains contained octahedra of picotite, and others were more or less changed into a yellow substance doubtless allied to serpentine.

5. *Hypersthene*. In prisms, showing pleochroism and other characteristics of mineral extracted from hypersthene-andesite Somewhat less abundant than augite.

6. *Hornblende*. Dark green fragments; rare.

7. *Plagioclase feldspar*. Containing glass inclusions.

Besides these, other not definitely recognized minerals were observed. One in particular was colorless, sharply crystallized, apparently in tetragonal prisms with pyramid, full of glass inclusions, and polarized strongly. Another was an opaque ore-mineral.

Mr. Cross remarked that the presence of these minerals was indicative of the surrounding rocks. The garnet, quartz and gold must have been derived from an Archaean area, while the other minerals plainly pointed to the presence of basalt and hypersthene-andesite not far away.

[DISCUSSION.]

Mr. Pearce stated that a large quantity of magnetite had already been extracted from the sand. He had tested for tin, but had found none.

Mr. Eilers said that the locality was undoubtedly above the Shoshone Falls, with cliffs of basalt adjoining, and that exposures of Archaean formation were probable at the head waters of the river.

MEETING OF APRIL 2ND, 1883.

W. F. Hillebrand read a paper entitled "On a variety of Löllingite containing cobalt and nickel.*"

*A paper by the same author containing the results of more extended observations having been read at a subsequent meeting (Dec.), further notice is here omitted.