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Errors in Surveys [reply]

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Errors in Surveys.

Editor Mines and Minerals:

SIR:—I have read with much interest two articles on errors in transit work in highly inclined sights, in inclined shaft work. These articles were in January and May, 1899, issues of MINES AND MINERALS.

I have done some of this work and would like to know if my deductions are correct in the following shaft work, and where there is a possible chance of error, and how it could creep in. The instrument used is a Buff & Berger, with side telescope, and the method in reading horizontal angles is by reading foresight direct and then with telescope reversed, and taking mean of double angles both horizontal and vertical. By this means, according to "Johnson Surveying," reading with telescope direct and reversed, errors of collimation and eccentricity are eliminated. Am I correct in this?

The following is an account of the work done and results I got: Lines were run down one shaft at angle 65° from horizontal, from surface to seventh level then to eighth level. Horizontal component of first equaled 223.51 feet, vertical component 490.05 feet. Those of eighth level were horizontal component 268.65 feet; vertical component, 583.42 feet. Then transit was set up in shaft, and line produced in cross-cut of seventh level, after which line was from seventh to eighth level. Then transit was set up at eighth level, and bearing of line in cross-cut was first carried in by backsight to surface, and then to seventh level, the difference in bearing being only $1'$.

By same means as above, lines were run down another shaft at an angle of 75° from horizontal. First to one level then to lower level and levels connected, and in this case the bearings checked to within 30 seconds.

Am I not right in accepting this work as correct, and if not, what could be done to correct it, or what error could creep in that would make both results check?

In another shaft, work was checked by running lines down within two weeks of each other, and these checked within 1 minute. In first two cases sights were taken to depth of over 500 feet, in last, only between two levels, a distance of 100 feet.

I should state that it is impossible to connect surveys by means of raises, or connecting shafts, as given in different methods.

Yours truly,

Soudan, Minn.

F. R. ABBE.

[NOTE.—The following reply to Mr. Abbe's question has been kindly furnished by Mr. Barrell, author of the articles in *MINES AND MINERALS* referred to, who has also prepared an article dealing with the points brought up by Mr. Abbe, which will appear in *MINES AND MINERALS* for April.—EDITOR.]

Editor Mines and Minerals:

SIR:—Mr. Abbe, inquiring concerning his work in the three shafts, mentions that it was done with a side telescope and wishes to know to what extent his method checked his results. To reply intelligently to these questions it is necessary to make a preliminary discussion, and at your request, I forward such for publication as an article at your convenience. In it errors of three classes are mentioned and instruments of three types. As Mr. Abbe has used a side telescope all errors except those possibly due to lack of sensitiveness of the plate bubbles have been eliminated. However, for horizontal distances as great as these sights give, and for the angles of these shafts, any style of instrument carefully used should give good results directly.

That the level bubbles were satisfactory is shown by the checking of the surveys in that shaft where the work was repeated after an interval of two weeks. His method of making a closed survey in the shaft is a very suggestive one, although it turns out to be inapplicable to this case, and I have enlarged upon it elsewhere. Of course it had the same value as a close of three sights anywhere within the mine in guarding against mistakes. From the statements in his letter there is no reason to doubt the correctness of all the surveys in question.

Yours truly,

JOSEPH BARRELL.
