about 18 inches. On these data it was assumed - for prospectus purposes it ought to be said - that the vein There were three contained 1,000,000 tons of ore. other veins in the property which - also for prospectus purposes-were assumed to contain over 4,000,000 tons of ore, although there was not sufficient work done on them to thoroughly prove the existence of 4,000 tons. In this case we have not simply the assumption of the third dimension, the whole three are assumed. Can we wonder that severe things are sometimes said of those who make such an unscientific use of the imagination. Whether it be from incompetence or dishonesty is immaterial, the final outcome is alike disastrous commercially. That any competent person ever made such an estimate is incredible, and that anyone should issue such an estimate to the public, after its utter unreliability had been pointed out fully, is, to say the least, most discreditable.

Another instance may be given to show the risks that are sometimes run in estimating quantities on a minimum of information. The vertical projection below was submitted to the writer by the owner of the property to which it related, with a view to sale.



An ore chute was represented as existing in the form indicated above and a quantity given, corresponding thereto, as ore in sight. When the writer examined the mine he found that no chute existed. The country rock was limestone, in beds 2 to 4 feet thick, standing nearly on end. The overlying rock was igneous. The ore, a highly argentiferous galena, occurred interruptedly along the bed planes of the limestone as shown below, in plan, on an enlarged scale.

The different lots of ore seen in the uppermost tunnel were not on the same bedplanes as those in the level below, which again differed from those seen in the bottom tunnel. Moreover, ore occurred outside the supposed ore chute altogether. As a matter of fact, there was not a scrap of evidence to show that such an ore chute, as was assumed, existed. Not one of the lenses of ore extended from one level to the other. Had the ground been further blocked out by a number of raises, the invalidity of the inferences drawn with regard to the supposed ore chute would have been demonstrated.

Losses resulting from overestimate.— Excessive estimates of ore in sight not only enable promoters to obtain exorbitant prices for their properties, but most probably induce the purchasers to erect expensive treatment plants, which soon become useless where they stand, and often altogether valueless on account of the cost of removing them. Both these results cause unnecessary expenditure, which means avoidable loss, and therefore they are highly detrimental to honest mining. To put it on no higher plane, that ought to be quite sufficient to induce engineers to keep their estimates within the bounds of fact.

Suggestions.—As a rule, statements as to the quantity of ore in sight, like many other statements in reports, are made so that there is no possible way of checking them without going on to the ground. You have the simple statement that there are so many tons of ore in sight, and you are expected to accept it. That is not as it should be. Every statement of such quantity should be accompanied by an accurate plan and vertical section, on a working scale, which shall indicate the extent of ore to be estimated, and show clearly the ore which is known to exist, as distinguished from that which is only inferred. The width of the pay chute should be marked on the section at equal distances apart. Samples should also be taken at equal distances. The frequency of both will depend upon the character of the deposit. If variable in form, but fairly uniform in quality, the widths will need to be taken much more frequently than the samples. If the quality is variable the samples must be taken frequently. The width or length, area and weight which each sample represents should in every instance be stated. It is important, too, that the lines along which the samples are taken be shown on the plan. Ore deposits are frequently more or less banded, and, often, the values vary in the differ-It is necessary therefore that, in such deent bands. posits, the samples be taken across the banding, and not lengthwise of it. If taken in the latter direction the latter may be wholly from a rich band, or wholly from a poor one, and therefore, do not represent the average quality at that part of the deposit.

If these suggestions be followed we shall hear much less than in the past of errors in estimating ore in sight, for anyone can then check the calculations, and see at a glance what has been observed and what assumed. Only by wilful misrepresentation could the facts then be concealed.

Some people, unfortunately, are incapable of recording facts accurately, either from lack of the necessary training, or because their observations are more or less vitiated by all sorts of ideas that are not paralleled by phenomena, so that what IS becomes twisted into what, from their point of view, OUGHT TO BE. Such men would be much more useful in the realms of fiction than in a mine.

Others, again, are more or less capable of making the observations suggested, but from lack of experience



in structural geology, are not, in some cases, capable of forming a reliable opinion as to the quantity of ore in sight. The work of such men could be checked if their reports were prepared as recommended. The careless and reckless who might arily write down

The careless and reckless who might arily write down a few figures in the usual omnibus sentence as to the quantity of ore in sight — looking upon them probably as a mere matter of opinion—would doubtless feel themselves compelled to go into the matter thoroughly when the facts on which their opinion was based had to be set forth clearly in the manner suggested.

It is also necessury that a statement should be made as to who is responsible for the different data employed, as for example : Who made the geological observations, who took the samples, who made the assays, who supplied the plans. The value to be attached to each part and to the whole can then be fixed with some degree of uses data supplied by one less able or less careful, the