A MINING ENGINEER OF THE FIFTEENTH CENTURY*

Being Some Comments on "De Re Metallica" of Georgius Agricola, 1555.

By F. W. Gray.

As a relief to the consideration of the everyday problems that confront the mining engineer in his dealings with men and materials, complicated as they are by the vexatious and kaleidoscopic social conditions that attend this present age, it may afford diversion, and possibly a little consolation, to dip into the pages of a mining engineer who did his earthly pennance some five centuries ago, and whose experiences seem to have been not unlike to those now being passed through by those among ourselves who have the temerity in this topsy-turvy time to follow the profession of the mining engineer.

George Bauer was born in Saxony in 1494, long before the beginning of European colonization in North America, and he was a young man of 26 when Cortes and his Spanish braves conquered Mexico, thereby laying the seeds for a great deal of trouble among the mining engineers of our time. Bauer's work, "De Re Metallica," was published towards the end of a well-filled life, and appeared in 1555, shortly after his death. For two centuries it retained its premier position as the authority on mining. The work was written in Latin, the name Agricola being the latinized form of "Bauer" or the German for farmer. From time to time down the centuries, translations have been made, of varying merit, but it has remained for an American, Mr. Herbert Clarke Hoover, and his wife, to give to the English-speaking public a worthy and accurate translation, for which Mr. Hoover and his wife have earned the gratitude of every mining engineer who loves his profession. The translation is elucidated by full and learned annotations by Mr. Hoover, and is illustrated by all the curious woodcuts of the original work, in which one may trace the crude progenitors of the elaborate machines used in modern mining.

As the translator remarks, the work has no practical value to-day, but is interesting by reason of its antiquity, and by the comparisons it suggests with present conditions.

Agricola is decidedly of the opinion that the miner should be skilled in many arts and sciences, and specifies among the accomplishments necessary to his education instruction in philosophy (that is, natural science or physics), medicine, astronomy, surveying, arithmetic or accounting, architecture, and the law. Agricola has nothing but contempt for the ignorant and incompetent miner, and even in his limited day, appreciates the immense range of subjects with which the fully qualified mining engineer must acquaint himself, should he wish to become a "master miner." How would Agricola regard the mountain of mining literature which now confronts us, and is ever being added to, when, as in these latter days, the whole gamut of human knowledge is laid under contribution in the service of the miner? He would be both brave and sanguine who to-day would attempt a description of the whole art of mining in one volume.

A great deal of space is taken up by our worthy predecessor in defending the art of mining and miners against those who object to it as being destructive to agriculture, as inciting the passions and cupidity of men, and as not being "honorable employment for respectable people." It seems that the uninitiated have been saying hard things about our profession for a long time.

The following observations do not seem entirely unfamiliar, and perhaps could Agricola have seen the latest specimens of flotation prospectuses he might have been enabled to further extend his catalogue of "some of the wicked and sinful methods by which they say men obtain riches from mining."

"When a prospect of obtaining metals shows itself in a mine, either the ruler or magistrate drives out the rightful owners of the mine from possession, or a shrewd and cunning neighbor perhaps brings a lawsuit against the old possessors in order to rob them of some part of their property, or the mine superintendent imposes on the mine owners such a heavy contribution on shares that if they cannot pay, or will not, they lose their rights of possession; while the superintendent, contrary to all that is right, seizes upon all that they have lost. Or finally the mine foreman may conceal the vein by plastering over with clay that part where the metal abounds, or by covering it with earth, stones, stakes or poles, in the hope that after several years the proprietors, thinking the mine exhausted, will abandon it, and the foreman can then excavate that remainder of the ore and keep it for himself. They even state that the scum of miners exist wholly by fraud, deceit and lying. For to speak of nothing else, but only of those deceits which are practised in buying and selling, it is said they advertise the veins with false and imaginary praises, so that they sell the shares in the mines for one-half more than they are worth, or on the contrary, they sometimes deduct from the estimate of them so that they can buy shares for a small price."

The promoter of Agricola's day must have been a modest gentleman if he inflated his stock by one-half merely. Recent modern examples of the gentle art of fleecing lambs show great improvement in this particular branch of deceit, and in Agricola's century the agile promoter must have been woefully handicapped, when compared with his modern brother, by the lack of the untruthful camera, and the wondrous lithographs that are so useful in extracting savings from the stocking-toe. The advice of Agricola to the would-be investor can hardly be excelled to-day. He suggests that the wise and prudent man before buying shares "goes at once to the mine that he may for himself examine the vein, and consider whether he will buy or sell." What would Agricola have thought to oil wells in California, or Alberta—to come nearer home—advertised by reams of glozing lies through the columns of a syndicated press with keen financial instincts?

There is no mention of coal in the work, except a casual reference to bitumen, and the only source of power at the disposal of the miner of Agricola's century was the work of men and animals, and the natural forces of wind and water. Manual labor, aided by crude, yet ingenious, applications of the lever, screw, geared wheels and treadmills, was the chief motive power. Use was made of horses and dogs, and there is one curious illustration showing a treadmill operated by goats.

Probably the most interesting feature of the work, and certainly the most entertaining feature, is the numerous and detailed woodcuts. In the matter of illustration, Agricola's treatise puts to shame many modern technical works on mining, for the drawings are clear,

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