

The Mining Engineer

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A mining engineer is simply an engineer engaged in mining; and the engineering part of mining comprises the opening of mines, the support of their walls and roofs, the extraction of ore, coal or rock, the hauling and hoisting of men and materials, the drainage, lighting and ventilation of the mine-workings. These operations involve civil, mechanical, electric or hydraulic engineering; and consequently the mining engineer must be acquainted with all these branches. The peculiarity of his profession is that the work is largely done underground, and therefore involves some special difficulties and dangers.

The penalty for mistakes is sometimes very heavy. Bad ventilation in a coal mine may cause, not merely a lot of headaches, like bad ventilation in a building, but explosion and conflagration, destroying hundreds of lives. Bad civil engineering, in the support of the walls of a deep shaft, may lead to the collapse of the shaft, imprisoning the miners below. Bad mechanical engineering in the construction and care of machinery may result in the breaking of a steel rope, precipitating a cage-load of men hundreds of feet to certain death.

On the other hand, mining is not, on the whole, an extraordinary or unhealthy occupation. Those of us who spend much time underground come to feel ourselves safer there than anywhere else. Three or four perils are constantly present, and must not be carelessly disregarded; but scores of accidents which befall the laborer on the surface never happen below.

The definition of a mining engineer which I gave at the beginning omits many things generally supposed to belong to that profession. The truth is that, in this country especially, mining engineers often used to be, and sometimes still are, called upon to perform many duties outside of mining engineering proper.

Forty or fifty years ago there were no American schools for mining engineers, and the graduates of European schools were in great demand to take charge of new mining enterprises, especially in the wild, unsettled regions of the far West. They were employed, for instance, to say whether a particular property, showing signs of valuable ore, would be profitable as a mine, and could be safely purchased at a given price for that purpose.

What Was Expected of Him.
This is something which cannot be positively declared by anybody. The man who can form the most valuable opinion of it is the economic geologist, who has studied that particular branch of geology, and has examined a great many different mines in all stages, so that he can, to some extent, judge of the importance of the surface signs. He ought either to be a mining engineer also, or else to have the advice of a competent mining engineer, because the manner and cost of working the proposed mine and of disposing of the product are part of his problem. But a first rate mining engineer, who has spent many years at one mine, may be not an economic geologist at all.

Then they used to expect the mining engineer to know all about everything connected with the enterprise, including often the building and running of a stamp mill or a smelting furnace, and of the management of the commercial part of the business. Sometimes he knew enough to direct all these departments. Generally, in those days, he knew more than his associates. But his knowledge in these particulars must have been, in most cases, incidental and superficial. Nowadays the geological, engineering, commercial and metallurgical departments are much more clearly separated; but it is still an advantage to a mining engineer to be acquainted with the principles and practice of the other departments.

The economic geologist aspires to become an "expert" authority, consulted by many different clients. The metallurgist, beginning in the assay office, hopes to be in time the superintendent of great smelting works; while the mining engineer, starting probably as a mine surveyor, has the chance of rising to the position of mine manager, and even of general manager, "if he has it in him"—that is, if, besides performing his own duties faithfully and well, he shows, at every step of promotion, a knowledge of the department next to his own.

There are now a score of good American schools in which mining engineering is taught, and the supply of mining engineers is said to be greater than the demand. I am not quite sure as to that; but this much is certainly true—that the prizes in this profession are few, because the number of large mines, calling for extremely able managers, is small, compared with the number of establishments requiring good civil, mechanical and electrical engineers. On the other hand, I believe that in this, as in every other profession, there is "room at the top," although nobody can hope to reach the top without a long, hard climb.

This rank they have earned by hard professional work, incorruptible integrity and loyalty, and immensely wide experience, besides the good fortune which gave them the opportunities they were brave to seize and competent to use.

The Fascination of His Work.
After this wise, and perhaps somewhat tiresome warning, I may add,

without fear of misleading any reader, that the profession of the mining engineer still presents, although perhaps not so abundantly as half a century ago, the prospect of interesting and even romantic adventure. Once the youth who yearned "strange countries for to see" joined a crusade or a company of "free lances." The romance of war has been pretty completely destroyed, now that one usually cannot see the enemy at all, still less charge them with a loud hurrah.

Next to the fury of battle came the fascination of the sailor's life. But that, too, is gone. The whales have been decimated, the sails have given place to the screw, and the ocean mariner chiefly swabs decks or stokes furnaces.

Then succeeded the era of the hunting of big game as an outlet for the energy and ambition of young men. But the big game is already scarce; all the buffaloes have been butchered; even President Roosevelt cannot find a bear, except after many days of tramping, with the aid of a host of men and dogs.

Meanwhile, as a substitute for all these many exercises, athletic sports have come into vogue. Yet even these show some symptoms of decadence, like those which presaged the fall of Rome. To sit on benches and shout (I believe the modern term is "root," but why?), while others "do or die," is not "athletic," and cannot satisfy, in that respect, the general need of bodily exercise. Our sports are training a chosen few only.

Really, as it seems to me, the one worthy contest left for the young men of the twentieth century is the contest with the conditions and forces of nature; the one worthy conquest is the conquest of new realms for civilization and industry.

More than half a century ago we began this great campaign on our Pacific slope; and "the winning of the West" which followed was so glorious a chapter of history that I have often boasted of it to my younger colleagues, telling them that whatever they might achieve in this century, they could not surpass the last, because there were no more such worlds to conquer. But I have lived to witness similar wonders wrought in Ontario, British Columbia and the Yukon Territory, as well as in our own Alaska, and to note in Mexico, in Central and South America, in Africa, Siberia and China the signs of a great new era of industrial progress.

In all such victories of modern civilization the mining engineer has been the leader. It was mining that inspired the Spanish conquerors of Mexico and Peru, and even furnished to the European colonists in North America their commercial hope and inspiration. It was mining that settled California, and afterward the whole imperial domain between the Rocky Mountains and the Pacific. Mining peopled and fostered the Australasian commonwealths, and transformed the political and industrial conditions of Africa.

Everywhere and always it has been the pioneer of all other industries and factors in human progress. Hence, even now, the mining engineer who chooses to make the sacrifice of home comforts may take part, at the very front, in the world battle of the twentieth century. And he need not fear that, whether at home or abroad, his life will be without thrilling incident.

Even in free America he may have to stand with heroic fidelity in defense of the property of his employers against violence, like Arthur Collins. Or in case of some awful catastrophe, he may have to lead the forlorn hope that descends into the shadow of death, upon the slender chance of rescue; for noblesse oblige.

COMMANDERS OF THEMSELVES

Some Points of Similarity Between General Lee and General Grant.

The proposition to erect a joint memorial to the memory of General Lee and General Grant the two, great opposing commanders of the Civil War, brings to mind some of the points of similarity of those famous soldiers. Not only did they command their respective armies, but each had remarkable command of himself. Walter H. Taylor, in "Four Years With General Lee," and Horace Porter, in "Campaigning With Grant," both bear testimony to this control which makes a man master of himself.

"Lee was a man of a naturally positive temperament, but he had remarkable self-control. His passions were strong, but they were in complete subjection to his will. He was not one of those amiable men whose temper is never ruffled, but the occasional cropping out showed how great was his habitual self-control.

"He had a great dislike to revising army communications. One day when it was positively necessary to look over some reports I had, he was in not a very pleasant mood. Something had irritated him, and it showed in a nervous little jerk of the head. After disposing of a case of vexatious character, he seemed greatly worried, and I, forgetting what was due my superior, impatiently threw down the paper with signs of anger. Lee controlled himself at once, and said, in a calm voice:

and the code of honor among us is that, upon such an errand, the engineer goes at the head.

Or he may have to encounter savage or foreign foes, as did Pumphrey and King and Janin in the days of the Apaches in Arizona, or some of our American engineers in the Transvaal, notably that illustrious hero, George Labram, who performed unparalleled feats of technical skill in the defense of Kimberley, and who was killed by a chance shot in the very hour of victory.

The "Tightest Places."
Some years ago I was called to preside at one of the monthly dinners then held by the Engineers' Club of New York City. At many previous dinners we had had toasts in honor of the various branches of the profession, including the army and the navy, with more or less formal and tame replies; and everybody was tired of that routine. On this occasion, under a happy inspiration, I broke through the formal custom, saying to the company:

"Gentlemen! There will be no toasts to-night. The subject for the evening is, 'What was the tightest place you ever were in?' Mr.—, what was the tightest place you ever were in?"

Of course I had taken pains during the preceding hour to get the promise of aid from one or two of the mining engineers present. So my first and my second man were ready with their personal reminiscences. That was quite enough to start the fire. One story brought out another, and when we parted, in the small hours of the morning, there was still a "waiting list" of speakers who had to be suppressed. In fact, the same subject occupied another whole night a month later.

And what a thrilling series of stories we heard! Under the contagious influence of the hour, men told of experiences which they had never confessed even to their wives or rehearsed even to themselves, for fear of reviving horrible dreams about them. The majority of the speakers were mining engineers, although the experiences they described were not always connected with their profession—except so far as the frequent explorations of mining engineers bring them into all sorts of "tight places."

Two had narrowly escaped death in mining shafts; one had fallen into a stormy sea, and had been washed back to the ship's deck by a great wave; one had escaped from Libby Prison; one, while gathering specimens on a precipitous bluff bordering the Bay of Fundy, had been cut off and chased up the bluff by the sudden rise of the tide; one had bravely faced a solitary death in the Grand Canon of the Colorado, and saved himself with almost incredible skill, presence of mind and providential good fortune. And so on, and so on.

It was a memorable evening; yet that company had not been, in the least degree, selected with reference either to dramatic experiences or to the ability to give dramatic accounts of them. And I honestly believe that similarly exciting narratives could be elicited from any casual gathering of fifty mining engineers, if they were once "set a-going," in an informal and colloquial way.

Yes, indeed, there is opportunity of adventure for a mining engineer who chooses to put himself in the way of it, or does not flinch when it comes to him. And whether he travels into far countries, or accepts peaceful occupation nearer home, there is always one means by which he can prevent himself from being forgotten. If he will but closely observe and faithfully record what encounters in his own practice—no matter in how humble a sphere—he will certainly be able, sooner or later, to contribute to professional literature something which will be recognized as intelligent and useful. And as a result, somebody will invite him to "come up higher!"—The Youth's Companion.

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THE PULPIT.

AN ELOQUENT SUNDAY SERMON BY
DR. CURTIS LEE LAWS.

Theme: Backsliding.

Brooklyn, N. Y.—In the Greene Avenue Baptist Church, Sunday, the pastor, the Rev. Dr. Curtis Lee Laws, preached a strong sermon on "Backsliding." The text was from Proverbs 14:14: "The backslider in heart shall be filled with his own ways." Dr. Laws said:

Do you recall your early experiences in the service of the Lord? Do you remember the day and hour when the burden of sin rolled off your heart, and when you could look up for the first time into the face of your heavenly Father, rejoicing in His presence and in His love? Do you not recall how the whole world suddenly became more beautiful and how your heart yearned over your friends and enemies as never before? There was on old man converted to Christ down in Washington some time ago. He was a rugged old fellow with an esthetic nature had not been much cultivated, and he did not have an artist's eye. The morning after his conversion, when his wife came down to breakfast, he was standing at the dining room window looking out at the desolate winter scenery. He turned and said: "Wife, come here and look, come here and look; the very trees are clapping their hands in praise to God!" Ah, in the days gone by there has been many an echo of those words in many a heart.

To me after I found God, the whole world was more beautiful; the sky was bluer, the grass was greener, the breezes were softer, the sun was warmer and all mankind were dearer to me.

What is the meaning of all this? It means that I had found that which was the complement of my whole being. As Augustine said: "O Lord, Thou hast made us for Thyself, and we are restless till we rest in Thee." It means that I had found the satisfaction which this world had never afforded me, for as the ocean only can fill the ocean's bed, so God alone can satisfy the mind of man. Blessed is the man who has been reconciled to his heavenly Father, who has returned like the prodigal to his Father's love.

I turn now to the dark side of the picture. How few of us have kept this early joy, and have continued in this blessed peace? Of course you know the story of the lost chord. A woman, in the shadows of the twilight when her heart was sad, gently touched the keys of a glorious organ. She did not know or care what she was playing; her fingers lingered idly but caressingly upon the keys. Suddenly she struck a chord, and its wondrous melody as it filled the room raised an uplifting and transforming and heavenly.

It flooded the crimson twilight,
Like the close of an angel's psalm,
And it lay on her fevered spirit,
With the touch of infinite calm.

It quieted pain and sorrow,
Like love overcoming strife;
It seemed the harmonious echo
From our discordant life.

It linked all perplexed meanings
And trembled away in silence,
As if it were loth to cease.

Something disturbed this woman and called her from the organ. As soon as possible she hurried away. Her hand was gone, and though she kept on playing she could not bring it back again.

How similar to our experience as the children of God and yet how opposite! Many of us have lost our peace, our joy, our rapture, but bless God we can all have this heavenly music in our souls again, if we are willing, for God is willing to heal our backsliding. Backsliding is so common among Christians as to be almost universal. Of course, there are different degrees of backsliding. Some have gone only a little way, while others have gone so far that the return will be difficult, but thank God, not impossible.

First of all, let us consider how men become backsliders. The word itself is significant. To go forward requires effort, to go backward requires no effort at all. In the Christian life, if you cease to go forward you will inevitably go backward. This backsliding always begins in the heart. We may go on for a time in the ceaseless round of Christian activities, while in our hearts these things are growing more and more distasteful. The heart may therefore be in wrong relation to a given thing, while our actions may be perfectly excellent. But God knows that that man is a backslider, and he knows it matters very little. But after a time all men will know it, for the backslider in heart generally becomes the backslider in life. It is very hard for men to continue long in hypocrisy. Ordinarily a man's outward life is the expression of his inner life. A man's character may be better than his reputation, but ordinarily reputation and character agree. We call the unclean and unclean "diamonds in the rough."

We constantly say of the man who sins with his tongue, "Well, you know, he is very hasty and impetuous, and often says things which he does not mean." But God says these things have their origin in the heart, and from the heart flow outward. When our conduct becomes bad, it is because we have already been backsliders in our hearts. Then bad leads to worse. Like Peter, we begin "to follow the Lord afar off," and this inevitably leads to the denial of our Master. You remember that when the Master was taken captive He was immediately forsaken by His apostles. Then began the procession from Gethsemane to the judgment hall. The Master walked alone His weary way. He trod the wine-press alone. The shadow of the cross had already fallen athwart His pathway. But after a little while two of the apostles summer up courage and follow the company. One of these was John, and he walked as close to Jesus as he possibly could. But Peter did not have the courage to do that, so he

lagged behind, or, as the record says, "he followed afar off." When the company reached the judgment hall, John went in with Jesus, but Peter, straggling in late, dared not go there, but with shamefacedness sat out in the court and warmed himself by the fire. Step by step he had led to his own undoing. The servants jeered him and taunted him, until he grew profane and blasphemous, and declared that he never knew Jesus of Nazareth. Had he followed close to the Master, the presence of Jesus would have sustained and strengthened him, in the companionship of John he would have found courage, and he would have been saved from the influence of the evil company which proved his ruin. Is not this the proper diagnosis of many sin-sick souls among us? Is not this the exact history of your backsliding?

You began by sheer neglect. You did not confess outwardly positive sins, but you neglected the means of grace. You were startled when you recognized the growing indifference in your heart. Bible reading became irksome, and you no longer delighted in private prayer. In the meantime your devotion to business or pleasure caused you to give up the prayer meeting. Then you became irregular on Sunday evenings, and gradually you dropped out of all church attendance. In the meantime you were not sustained and cheered by the constant presence of your Lord nor strengthened by the companionship of your fellow Christians. Then you drifted out among unbelievers, and perhaps they have taunted you into denying your Master in ways which ten years ago you would not have dreamed of. Of course you did not start out to make shipwreck of your faith. You were hoodwinked by the devil. Even a fool would shun the first steps toward evil if he could see the end from the beginning. In our city there are tens of thousands of men and women who have drifted into sin and drifted out of the church. My heart yearns over these people, for they belong to God. They have been redeemed by the blood of God's Son. They ought to be eating at their Father's table, but instead of this they are spending their all in riotous living, or it may be that the devil has already put them to feeding swine.

Now let us consider the result of this backsliding. I do not mean to influence of backsliding upon others, though this is far-reaching and baneful, but the curse of backsliding to the backslider himself. My text says that the "backslider in heart shall be filled with his own ways." "Whatsoever a man soweth that shall he also reap." The law of the harvest is a universal and unalterable law, but a considerable time generally elapses before a man eats the bread of his own sowing. I do not envy the backslider. By experience I know something of the bitterness of the agony which he now suffers or which the future holds in store for him.

Now let us consider God's attitude to the backslider. He yearns over His wayward and wandering children, and longs for their return. The picture of the prodigal son is the parable of the prodigal son is the best description of God in the whole Bible. And is not the picture of the prodigal son the best description of the backslider that you know of? In the heart of God there is an abundant welcome for every returning backslider, and the church of God ought not to be less hospitable than the heart of God.

If again I may use the Apostle Peter as an illustration, we may surely learn from his restoration that unworthy Christians may become worthy Christians, that weak Christians may become strong Christians, and that our very failings may become stepping stones to success. After his experience, Peter was too humble a man to praise himself; but all of us know that the Master took him back to His heart and immediately intrusted him with the interests of His Kingdom. This weak and halting and backsliding man was destined to become the leader of the apostles in devotion and suffering and success. It thrills my heart to watch the humble and chastened and restored backslider. I am glad it was Peter who preached the wonderful sermon at Pentecost, for it proves to me that God can take the weakest of us and make us strong and powerful, if we will only give ourselves to Him. I close with these words of invitation from my Master. My first word is to the Christians within the church who have grown cold and neglectful: Our Master is anxious to forgive us and to have us start afresh. Let us be done with our indifference and serve the Lord with joy and enthusiasm. My second word is to the Christians who have fallen into sin and drifted out of the church: Your Lord stands with open arms and pleads with you to come back to Him, and the church wants you. If you will forsake your sins, no one will remember them against you. Come, and you shall have the gold ring and the best robe, and we will kill the fatted calf in our rejoicing, and in most of our churches there will not be a single Pharisee and elder brother to begrudge you the welcome you are receiving.

My last word is to the men and women who have never yielded their hearts to the love of God, nor surrendered their wills to the will of God: The Father has a royal welcome for you. It was for your sake that God sent His Son into the world. John 3:16 is the Master's message to you. If you do not remember the beautiful words, hunt them up in your long-neglected Bibles, and then come, come, come.

Joyful Service.
Blessed is the Christian who works, cheered by the sure hope of his Master's final victory. He cares little for the tears now, for he can look forward to the hour when he shall come to the harvest home, bringing his sheaves with him. He hears easily the noise and the wounding of the battle, for he hears prophetically the music of victory, and knows that he follows a Captain who has never known defeat, and that the joy of victory, like the joy of harvest, shall come to him to compensate for all his weary toil and all earth's strife and conflict.

Great Expectations.
We should widen our expectations to the magnificent sweep of His promise.—MacLaren.

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Simplicity in Living.
If one advances confidently in the direction of his dreams, and endeavors to live the life which he has imagined, he will meet with a success unexpected in common hours. He will put some things behind, will pass an invisible boundary; new, universal, and more liberal laws will begin to establish themselves around and within him; or the old laws he expanded and interpreted in his favor in a more liberal sense, and he will live with the license of a higher order of beings. In proportion as he simplifies his life, the laws of the universe will appear less complex, and solitude will not be solitude nor poverty poverty, nor weakness weakness.—Thoreau.

London's Death Rate.
The annual death rate in areas of congested population like the great cities of the world, may well be considered under ordinary conditions one of the most accurate measures of the benefits of modern civilization. To so conduct affairs—whether of the home life, business or government—as to best insure the prolongation of life is perhaps the finest achievement possible for organized society. It is remarkable that the largest city of the world should stand in front of all others in respect to its small aggregate of deaths to population. The death rate in London for 1903 was only 14 per 1,000.—Philadelphia Record.

No Fault of His.
"See here," exclaimed the angry man as he entered the walking-stick emporium. "I bought this cane here last week."

"Yes, I believe you did," rejoined the proprietor, calmly. "What's wrong with it?"

"You said the handle was genuine ivory and I find it is artificial," said the irate party.

"That may be true," replied the dealer, "but it is no fault of mine. I import all my ivory from Africa and the only explanation I can give is that the elephant may have had false tusks."—Chicago News.

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