



### MAKING NITRO-GLYCERINE.

"Come up to the factory some day, and I'll show you how we make nitro-glycerine," was the invitation I received one afternoon in the oil country from an extensive manufacturer of the terrible explosive.

The invitation was a very cordial one, but there were considerations which made me somewhat slow in accepting it. "We have about seven tons of dynamite in one magazine, and two tons of glycerine in another," said my would-be host. These were among the considerations which deterred me.

"But," he added, "there's no particular danger in looking at the dynamite unless the building catches fire. You can play baseball with the cartridges, and they will never strike back, or you can pour the dynamite out on the ground and set fire to it without being injured. Unconfined the explosive will burn harmlessly; but I should not advise you to touch a match to a loaded cartridge. When the gases expand, they do so in extreme haste, and if anything tries to restrain them, it breaks, and some one gets hurt."

The nitro-glycerine man laughed rather grimly. Then, apparently thinking that he had not made his invitation quite alluring enough, he continued: "But it's different with nitro-glycerine. Baseball and fireworks are strictly prohibited. Glycerine is easily offended: and when it resents an affront, the world hears about it, but the object of its displeasure never does."

"Glycerine is as fickle and changeable, too, as the wind. One day a slight shock will explode it, and the next you may hit a can with a hammer and live to tell the story. Several years ago I had a very reckless 'shooter' in my employ. One morning I stood near the magazine, watching him as he loaded several cans into his waggon, preparatory to going out to 'shoot' an oil well. We were talking about the dangers of the business, and he laughed at my caution.

"The stuff won't explode," he said, scornfully, lifting a can above his head. I sprang toward him with a cry of warning and protest; but before I could reach him the reckless fellow shouted:

"It won't go off! See!" To prove his assertion, he hurled the can against the side of the factory with all his might.

"For a second my heart seemed to cease beating. I felt sure we were both dead men; but to my intense astonishment, the can, dented and bent out of shape, fell to the grass, and rolled harmlessly to my feet. The fellow laughed at me for one minute, but was out of a job the next. Such recklessness was too great to tolerate.

"A year later this same man, while loading a waggon in another establishment carelessly hit a can against a wheel, it is supposed, and was blown to pieces.

"The first time the glycerine was good-natured; the second time it was otherwise. Of course there must be an explanation of the inconsistent conduct of the compound; but investigation is attended with so much

danger that it is still a mystery.

"The glycerine's readiness or reluctance to explode doubtless depends upon its quality. One run of stock may be well washed and clean, and another may be full of impurities. If a can is filled to the very corks, too, so that the substance within has no opportunity to wash against the sides, I do not think it will explode so easily as one which is three quarters or seven-eighths full."

My friend asked me if I knew how prominent a part nitro-glycerine played in the nightly filling of my lamp. I told him that I did not; and he explained to me the process employed in the oil region of exploding a large quantity of nitro-glycerine at the bottom of an oil well to increase the flow of petroleum.

I found the dynamite and nitro-glycerine factories at opposite ends of a picturesque little valley, several miles from the town. Both structures were of very crude architecture, and resembled ordinary sheds or barns. But from the moment we rode down into the narrow gulch, the air seemed filled with whispers of death.

When we entered the dynamite factory, and the glycerine man pointed out the big boxes full of loaded cartridges, explaining that the dynamite made here was merely wood-pulp saturated with nitro-glycerine, I hardly heard what he said, but watched him with hawk-like vigilance.

He picked up a slender brown paper tube that looked like a Roman candle, and which he said was a dynamite cartridge. I held my breath until the tube was safely deposited upon the table again. He poured some of the dynamite, which closely resembled sawdust, into a shell, and rammed it down with a round stick as one would load a musket.

Nothing of an alarming character happened, and I began to breathe with more regularity. I was more at ease as we left the seven tons of dynamite behind, but the same horrible feeling of suffocation and coldness came over me again, as we approached the more dangerous nitro-glycerine manufactory.

The building contained several huge wooden vats, a few pails and barrels, an engine and a great iron, kettle-like receptacle. The glycerine man and his assistants removed their coats, and were soon at work.

The iron receptacle was called an "agitator," and simply described, consisted of a small kettle within a large one. The space between the two was constantly filled with a stream of cold water from a tank on the hill-side. The inner kettle was fitted with several paddles, which were turned by a crank.

About fifteen hundred pounds of acids, sulphuric and nitric mixed, were poured into the smaller kettle. A thin but continuous stream of glycerine slowly followed; the engine began to pant, the crank revolved, the paddles churned the glycerine and acids, and the manufacture of nitro-glycerine was going on before my eyes.

My host controlled the flow of glycerine by means of a stopcock, and watched the agitator and the thermometer which registered the heat of the perilous mixture with unremitting vigilance.

"Nitro-glycerine," my friend said, "is formed by the action of nitric and sulphuric acids upon glycerine. When those red fumes come up, the greatest caution must be observed. They indicate that the oil is on fire, and if the mixture gets warm enough an explosion will follow.

"Do you see that thermometer? The mercury registered sixty-five degrees centigrade a minute ago, but it is seventy degrees now, and still climbing higher. We must stop this at once. Halloo! More steam here!"

He shut off the oil as he spoke, and a second later the paddles in the agitator were churning the mixture much more rapidly. I began to edge toward the door, but the glycerine man called me back.

"I've got it under control now," he said. "The paddles have whipped the oil under the acids and extinguished the fire. The mercury is falling, and I can turn on the oil again now with safety. But if I had not shut it off at once, and if the paddles had not developed more speed, you and I would have enjoyed a foot-race together down the valley. When the mercury gets up to about ninety degrees centigrade, it is much safer to be somewhere else than in its vicinity. This stream of cold water constantly circulating about the base of the agitator keeps the mixture cool. When the weather becomes warmer we are obliged to use ice."

After two hundred and twenty-five or thirty pounds of glycerine had been put in the agitator and stirred a long time the entire mixture was emptied into the "drowning tank." Then it was transferred to other tanks and carefully washed, and at the end of about four hours the milky, amber-tinted nitro-glycerine was poured into rectangular tin cans. These cans were deposited in a huge iron safe, and the explosive was ready for the oil-well "shooters."

The "shooting" of oil wells is the discharge of nitro-glycerine at the bottom of the wells, in order to increase their flow. Nitro-glycerine, rather than the safer dynamite, is used because it can be exploded under water.

The manufacture of nitro-glycerine does not involve a heavy expenditure, and the price of it—one dollar and fifteen cents per quart as exploded in an oil-well—gives a large margin of profit, but without this large profit no one would engage in the dangerous business of manufacturing it.—*From the Youth's Companion.*

### THE MISSIONARY AND THE LION.

The Rev. Isaac Shimmin, our missionary to Mashonaland, learned that a lion had attacked a small Mashona village and carried off an ox. Together with another Englishman named Stevens, he tracked the lion to his lair. Mr. Shimmin tells the tale as follows:—

We then proceeded cautiously, and were suddenly thrilled by a low, deep, prolonged growling that seemed to rise from the ground where we were standing. This was quite sufficient to make the two natives fly for their lives. Before we could move another step the lion sprang into view, about thirty yards in front, and came crashing through the bushes towards us. The mingled growl and roar, and the apparently enormous size of the brute, caused by the great bristling mane, the horrible mouth wide open, the flashing eyes, and the noiseless swiftness of his movements, all contributed to form a picture which once seen can never be forgotten.

Two of our party yielded to the impulse of the moment and bolted to the rear. This left Stevens and myself alone to face the angry brute. For a moment I longed for a safer place; but knowing the danger of flight, I prayed earnestly for help and looked to my rifle. By this time Stevens was about ten yards to my left, near some trees; but unfortunately I was in an open space, and, humanly speaking, nothing could save me but a cool and successful shot.

Every movement now took place with lightning rapidity. I raised my gun, but before I could fire the lion suddenly swerved and leaped at Stevens, who instantly fired and then sprang behind a small tree, the trunk only about nine inches in diameter. This undoubtedly saved his life. The lion dashed against the tree with terrific force. The shock was so great that Stevens was thrown violently to the ground, and the lion, growling fiercely like a dog after a rat, again rushed at him. He instinctively put up his right foot to defend himself. The lion seized it in his mouth, and then partly fell, within five yards from where I was standing. I had kept the rifle at my shoulder, waiting for a chance to shoot without endangering the man. The moment the lion stumbled, I fired, the shot breaking his shoulder and going right through his body. The lion released his foot, but made another snap at the toes, when a good shot from one of the men who had been standing some distance behind, and a couple more bullets to make the matter certain, completed our victory. Al-

though I have taken so long to tell the story, the whole occurrence occupied but a few seconds. The roar, the charge, the seizure of Stevens, and the killing of the lion, happened almost together, and almost before we could breathe the danger was past.

We at once looked to the wounded man and found the foot very much lacerated, but no bones were broken. The lion's tooth had actually gone right through the thick sole of the ammunition boot, and up between two of the toes. Another gash had just missed the great tendon of the heel. We carried him back to the waggon and dressed his wounds; and as he is a strong, active man, I expect he will be all right again in a few weeks. We measured the lion, and Mr. Stevens declared it was the largest he had seen in his forty years' African experience.—*Missionary Notices.*

### A SLAVE-DRIVER.

The newspaper reporter in a large city sees probably more strange phases of life and human nature than most other men, and if it were his business to preach sermons, could find texts far reaching and impressive. A reporter on a New York daily told the following incident the other day:

A man last week committed suicide in a public library. I was assigned to "cover" the case. The body still lay in a corner of the reading-room. No friends had claimed it. The librarian said:

"I do not know his private history. He has been coming here for years. A quiet scholarly man, who earned his living by translating. He was, no doubt, very poor but a thorough gentleman.

"He was quite a young man when he first came here, and seemed to be a brilliant fellow, full of hope and courage. He worked hard. I understood somehow that he was going to marry. But he never did marry.

"As years went on I watched him grow thin and old before his time. Then he became silent and hopeless; apparently shunned his old companions and would barely answer in a gentle voice if I spoke to him.

"Whatever his trouble was, it was too much for him to bear. But I never thought it would end in—that," glancing at the dumb, motionless figure on the bench beside him. "Whatever it was, it robbed the world of a good man—who might, perhaps, have been a great one."

While the librarian was talking volubly, the coroner's physician was examining the body. I glanced at the dead man's face. It had a look of great age and weariness, inexplicably sad in so young a man. There had been in it noble meanings and a sweet fine tenderness.

The doctor held the man's hand, and pushed the sleeve up upon his arm. He beckoned to me.

"There was his trouble!" he remarked, pointing to countless minute scars on the dead arm. "There are the brands of a slave-owner that drives more men and women into old age and death than any ordinary disease."

"What has made them?"

"Hypodermic injections of morphine. This poor fellow had some pain,—neuralgia or poverty, or headache,—and one day discovered that a prick of a needle would bring relief. There is the end! Oh, I have heard the same story so many times!"

He arose and covered the dead face. What more could we do? The tale of that life was told.—*Youth's Companion.*

### WON'T AND WILL.

Sha'n't and Won't were two little brothers,  
Angry, and sullen, and gruff;  
Try and Will are dear little sisters,  
One can scarcely love them enough.

Sha'n't and Won't looked down at their noses  
Their faces were dismal to see;  
Try and Will are brighter than roses  
In June, and as blithe as a bee.

Sha'n't and Won't are backward and stupid,  
Little, indeed, did they know;  
Try and Will learn something new daily,  
And seldom are heedless or slow.

Sha'n't and Won't came to terrible trouble;  
Their story is awful to tell;  
Try and Will are in the schoolroom,  
Learning to read and to spell.

—*The Gleaner.*