Timber Culture in Tennessee.

Tennessee is one of the few States that have not been stripped of their timber without concern for future needs and climatic conditions. About fifty per cent of the land in Tennessee is still wooded. There are 26,880,000 acres in the State altogether, of which nearly 13,000,000 are timbered. Only three States in the South have a greater timber acreage—North Carolina and South Carolina and Georgia. As the altitude of the forests of Tennessee varies from 200 to 6,000 feet above the sea's level, woods of every kind known to the United States are to be found there. In value, the oak has the first place, but the ash, of which there are two varieties, the white and the blue, is hardly less important. Even in Tennessee the forests of ash are now found only in districts remote from the railroads, but so rapid is the growth of this tree that it is being planted as an investment. A farmer who set out a grove of ash trees covering ten acres twelve years ago now has 12,000 trees 8 inches in diameter on an average and 35 feet high. There were no expenses of cultivating, and the ten acres of 12,000 trees are worth at the present time between $7,000 and $8,000. Besides oak and ash, Tennessee possesses three varieties of elm, two of gum, two of fir, three of hickory, two of locust, three of maple, two of pine, three of poplar, and two of walnut. Among other trees found in abundance are the beech, birch, buckeye, red cedar, wild cherry, cottonwood, cypress, dogwood, basswood, mulberry, tupelo, sycamore, and the sassafras. Of oaks, there are no less than twelve varieties. Cedar, unfortunately, is going very fast. Bucket factories in the State use 5,000,000 feet of this timber every year. Telegraph companies use it almost exclusively for poles. Nearly 1,000,000 feet goes each year to St. Louis, where it is made into fence rails. The rapidity with which the cedar is being consumed has opened the eyes of some of the friends of the forests in Tennessee, and a warning has been sounded.—*N. Y. Evening Post.*

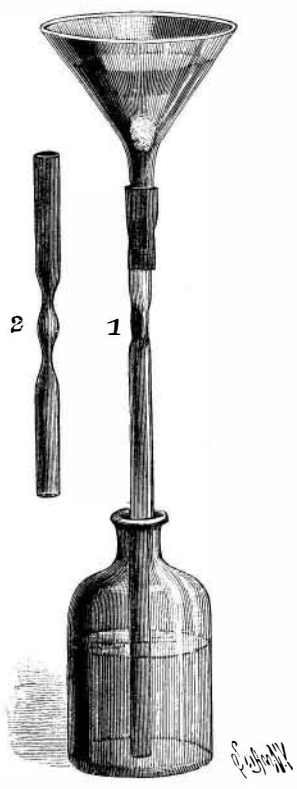
INCREASING USE OF TRACTION ENGINES.

The successful employment of the traction engine in heavy work is most effectively illustrated in the logging business of the Siskiyou Lumber Company, at Sisson, Cal., as shown in our engraving, made direct from a photograph. It is said the grades traveled over are also much steeper than it has been usual, heretofore, to attack with traction engines, but that the work is in every way successfully performed. The engine shown was made by the Best Manufacturing Company, of San Leandro, Cal., and many of these engines are now being used in California for agricultural purposes, freight hauling, etc. As the engine is three-wheeled, it can be turned in as short a space as a two-horse wagon. The starting, steering and reversing of engine, and pumping of water, are all done by one man without leaving his seat. The drive wheel tires are of steel, and the height of the wheels of the 50 horse power engine is 8 feet; the width of the tire, 26 inches. The engine is supplied with a windlass for hauling logs out of canons and other inaccessible places, this also being operated by the engineer from his place on the engine.

One of these engines is reported to be employed in hauling freight between Farmington and Stockton, Cal., on a road parallel with the railway and at the same rates, its owner thus doing a large and profitable business. The saving effected by their use in all kinds of agricultural work is something remarkable, the figures given for plowing, harrowing, and seeding, with the aid of these engines, being as low as 60 cents per acre, while, with the aid of a steam harvester, it is said that grain may be cut, thrashed, recleaned, and sacked ready for the mill at a cost of but 30 cents per acre.

RAPID FILTERING APPARATUS.

Mr. George A. James, chemist, of Selby, Cal., has sent us sketches of a very simple and effective filtering apparatus which we thought our readers would be interested in seeing. A glass tube of any convenient length, having a contraction near its upper end, is connected with the small end of the funnel by a short piece of rubber tube. The lower end of the glass tube is inserted in the bottle or other vessel which receives the filtered liquid, and the funnel is supported by a filter stand (not shown).



RAPID FILTERING APPARATUS.

The contraction in this case is made by flattening the tube so that its sides approach each other to within a very short distance, say $\frac{1}{100}$ of an inch. This contraction prevents air from entering the part of the tube below the contraction, and thus maintains a solid column of liquid below the contraction. The liquid by its weight produces a partial vacuum in the tube, and thus allows the air pressure on the liquid in the funnel to force the liquid through the filtering medium. The rapidity with which the filtering is accomplished depends upon the length of the tube, other things being equal.

In Fig. 2 is shown a modification of the apparatus, in which the tube is contracted evenly all around in two places, leaving a small circular opening instead of a flat one.

Experience shows the flattened tube to be preferable.

A Poser for Papa.

"Papa," said little Katie, "do you know how high those clouds are?"

"No, child," answered her father, with an indulgent smile.

"Well," said Katie, regarding them with critical eye, "I do. They're cirrus clouds, and they're about three miles and a half high. You didn't have very good schools when you was little, did you, papa?"—*Chicago Tribune.*

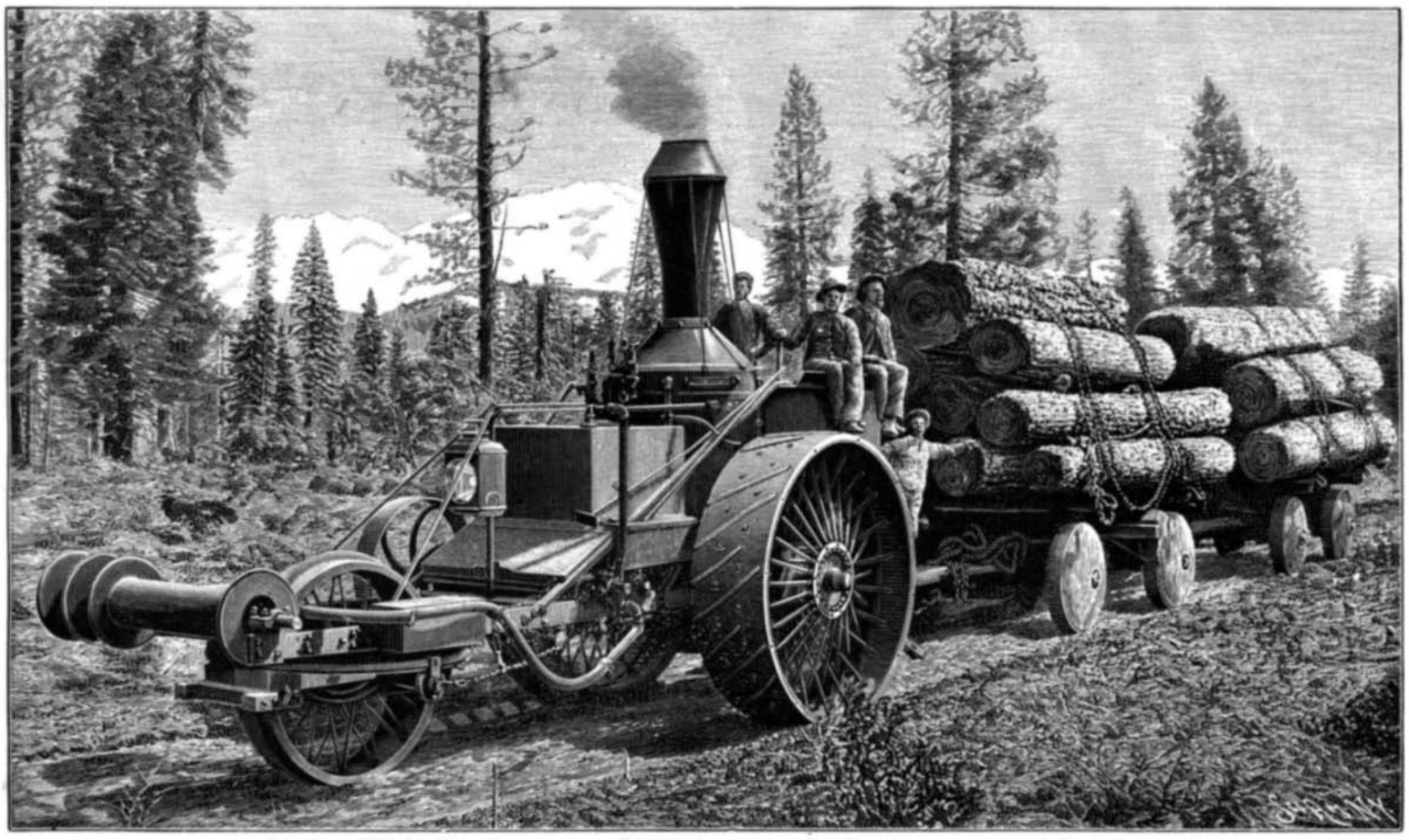
Remarkable Armor Plate Trial.

The St. Petersburg correspondent of the London *Times* says a remarkable trial of English armor plates took place on Thursday, June 28, in the artillery polygon at Okhta, near St. Petersburg, with results that were certainly startling. There were three plates—one from Messrs. Cammell, measuring 8 feet square and 6 inches in thickness, and two from Messrs. John Brown & Company, one being of the same dimensions as those of the Cammell plate, and the other 8 feet square, 10 inches thick, and bent. All three plates had been face-hardened by the Harvey process. The gun used throughout was a 6 inch Oboukhoff of 45 calibers. The projectiles were of two sorts—namely, the latest improved Holtzer shell, made at the Russian Putilof works, and a similar shell with a Russian improvement, the secret of which is jealously guarded. The velocity of six rounds fired at the 6 inch plates was about 1,850 foot seconds. At the 10 inch plates the velocity was nearly 2,400 foot seconds. One round was fired with each projectile, which, on account of the curvature of the plate, struck with an obliquity of from eight to ten degrees. All the shells treated by the secret Russian process penetrated the targets entirely, and sped some thousand yards to the rear, while the other shells under similar conditions, though obtaining greater penetration than has ever yet been reached by any projectiles known in England, were stopped and broken up. The secretly improved shells passed right through a wooden screen erected a short distance from the backing of the plates, so that there could be no doubt that they went through the plates undamaged, although no one was allowed to see them afterward.

It would seem that two lessons are to be learned from this important trial. In the first place the Holtzer shell made in Russia is better than any known in England; and secondly, the secret Russian improvement which it has always been expected would fail when tested by oblique firing has undoubtedly proved itself to be a remarkable success, and has placed in the hands of the Russian government a projectile superior to any hitherto invented. The oblique tests in themselves will be immensely useful, as I understand that very little experience has up to the present been gathered by oblique firing against armor. This in real warfare would naturally be the rule, and not the exception. Further trials at still greater angles of obliquity will take place.

Utilization of the Earth's Heat.

In his address to the *Chambre Syndicale des Produits Chimiques*, Mr. Berthelon, the illustrious chemist, suggested as a subject for the attention of the next generation of engineers the substitution of the heat of the sun, or the central heat, as a source of energy, for that derived from coal. The sinking of a shaft three or four kilometers deep is not beyond the power of modern and especially of future engineering. At such a depth, water would be found with a temperature of 160 degrees to 200 degrees Cen., which would develop enough power for any number of machines. This power would be available in any part of the globe, and many thousands of years would pass away before this store of energy would suffer an appreciable diminution.


TRACTION ENGINE USED FOR LOGGING PURPOSES IN CALIFORNIA.