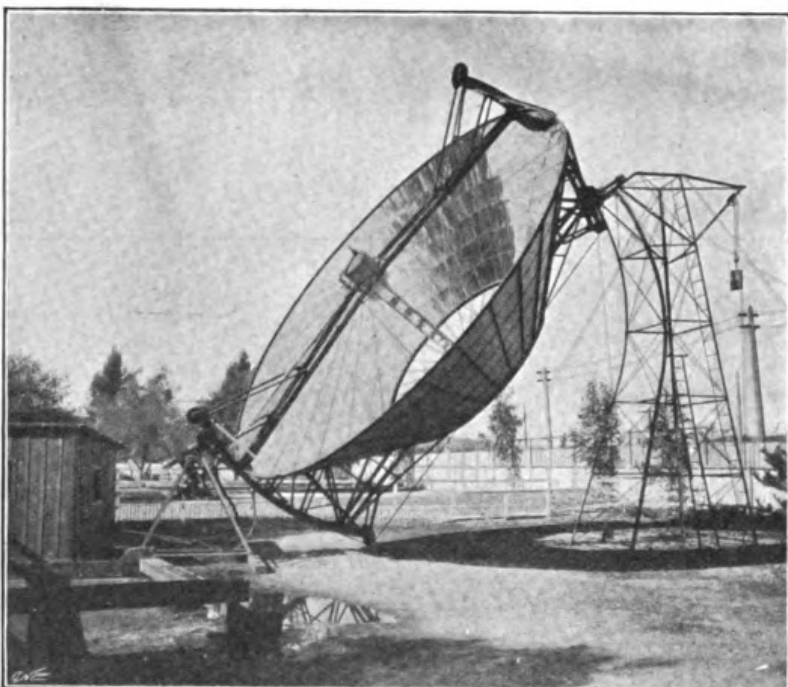


Some Wonders from the West.

XVII.—SOLAR MOTOR AT SOUTH PASADENA, CALIFORNIA.

By H. LUKENS JONES, PASADENA, CALIFORNIA.



From a] THE SOLAR MOTOR, SHOWING THE CENTRAL BOILER. [Photograph.



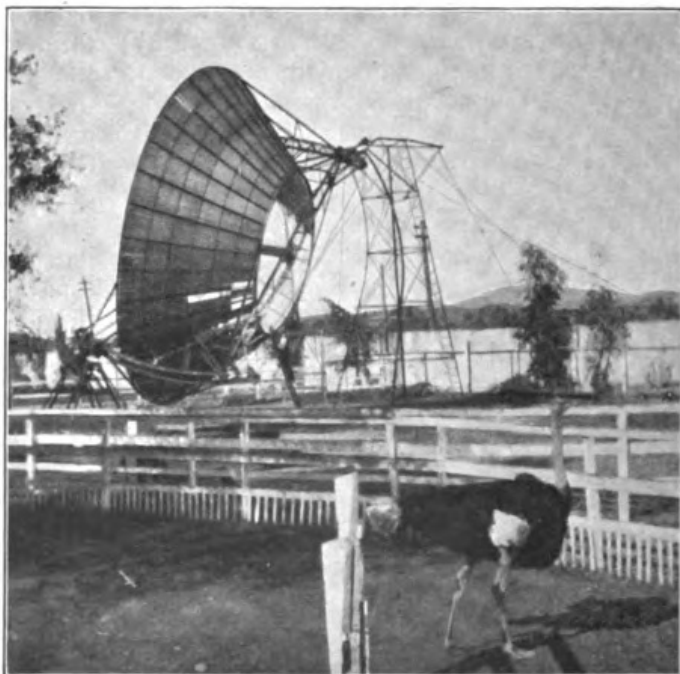
VAST amount of scientific thought and study have been lavished on the subject of solar physics, and at last a device has been perfected through the agency of which the sun's heat can be utilized in creating steam power. The new device is a solar motor.

At an extensive ostrich farm in South Pasadena, California, surrounded by a vast audience of dignified birds, that delightedly admire their wealth of plumage in the glittering expanse of mirrors, the machine is in daily operation. It may be likened to a huge umbrella, open and inverted at such an angle as to catch the sunshine on the hundreds of mirrors which compose its inside surface and reflect the heat on the long, slim boiler which takes the place of the umbrella handle. The machine is set in meridian, on two fixed supports, so as to balance the entire frame, and rests on an equatorial mounting, like a telescope, the axis being due north and south, and the machine turning east and west in following the sun. The reflector is 33ft. 6in. in diameter on top and 15ft. on the bottom. It contains 1,788 mirrors about $3\frac{1}{2}$ in.

by 24in. in size. The weight of the device is about 8,300lb.

The boiler is of tubular form, 13ft. 6in. in length, with a capacity for 100 gallons of water, and eight cubic feet additional steam space. The boiler is made of fire-box steel covered with an absorptive material, of which lampblack is one of the principal ingredients. Steam is conducted from the boiler to the engine by a flexible pipe made of phosphor bronze, and is entirely metallic. The machine is designed to withstand a wind pressure of 100 miles an hour.

The operation of the motor has been reduced to the simplest possible point, and requires very little human labour. When power is desired the reflector must be swung into focus, which is done by turning a crank. This is not beyond the power of a good-sized boy. An indicator shows when a proper focus has been obtained, and when this is done the reflector follows the sun all day, being regulated by an ordinary clock.



THE SOLAR MOTOR—BACK VIEW. THE OSTRICH IN THE FOREGROUND IS "CECIL RHODES." [Photograph.

The motor is pumping from an underground tank 12ft. deep, and lifts 1,400 gallons per minute, equivalent to 155 miners' inches. The present model is guaranteed to produce ten horse-power, but under the most

favourable conditions it will yield fifteen or twenty horse-power.

The solar motor is a complete solution of the question of making use of the surplus sunshine and underground waters of the deserts.

XVIII.—AN INGENIOUS ENGRAVER.



MR. SAMUEL E. DIBB ENGRAVING ON THE HEAD OF A PIN.
From a Photograph.

A FEW years ago a man engraved the Lord's Prayer on a United States 3-cent piece (exactly the same size as an English threepenny-piece), and the achievement was talked of all over the world. An engraver in New York undertook to beat that record, and he engraved the alphabet in capital letters upon the head of a pin. This feat was greatly talked about, the New York papers giving portraits of the engraver and drawing representing the pin in its actual size and magnified forty-five diameters. The pin was exhibited in public and optical institutions. But this performance has been quite eclipsed, and with it all previous records, by a young man in Toronto, Canada.

Mr. Samuel E. Dibb is an engraver employed by the "Grip Publishing Company," of Toronto. Mr. Dibb, although not claiming to be an expert engraver, and without any previous trials, set himself to beat the New York engraver. Just how far he succeeded the accompanying illustrations will show. Selecting an ordinary-sized pin, $1\frac{1}{8}$ in. long, and with a smooth head, he first drove the pin into the end of a soft wood block for convenience of handling, and then with the aid of an ordinary magnifying-glass, and with what is known among engravers as a "No. 1 tint" tool, proceeded with the engraving in the manner shown in the illustration. It is not so much to skill that Mr. Dibb attributes his success as to being the possessor of a very steady hand. On the first pin tried he engraved the alphabet, all the letters being cut in relief. Not content with this performance he next cut on the same-sized pin all the letters of the alphabet,

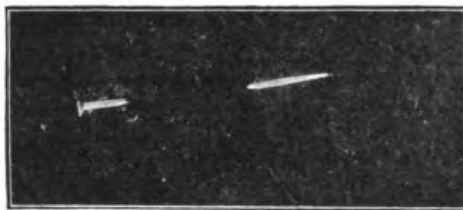


ENLARGEMENT OF A FIVE-CENT PIECE—THE SIZE OF A THREEPENNY-PIECE—
From a ENGRAVED BY MR. DIBB. *[Photograph.]*

the figures from 1 to 10, and the year 1899.

Mr. Dibb next turned his attention to engraving on a Canadian five-cent piece, which is the same size as an English three-penny-piece. After polishing the surface of the coin on one side he cemented it to the surface of a small block of wood to enable him to handle it more readily, and then with the same glass and tool which he had used to engrave the head of the pin he engraved on the coin the following: the Lord's Prayer, the Ten Commandments, his name and address, the date, Oct., 1898, and the words, "There are 1,593 letters engraved on this coin." To the naked eye the surface of this coin merely seems to be roughened with indentations, but when examined with a powerful magnifying-glass everything claimed to be upon it was found to be there in capital letters, and evidently with plenty of room and no evidence of crowding. We reproduce on the preceding page an enlarged photograph of the coin.

After finishing this coin Mr. Dibb believed he could do still better, and started on another coin the same size as the first one used. He had engraved the Lord's Prayer, the Ten Commandments, and part of the xix. Psalm, and with all this, which was more than was on the entire surface of the first coin, he had only used half



THE ENGRAVED PIN, ACTUAL SIZE.
From a Photograph.



THE BLACK DOT REPRESENTS THE HEAD OF THE PIN ENGRAVED.
From a Photograph.



ENLARGEMENT OF THE PIN'S HEAD, SHOWING THE ENGRAVING.
From a Photograph.

of the space on the face, when much to his dismay the coin was stolen and no trace of it could ever be found. But Mr. Dibb, with a true British spirit, would not be beaten, and again turning his attention to pins he engraved on the

pin which has been sent to THE STRAND MAGAZINE in order to prove that all that is said is correct, the following: "A B C D E F G H I J K L M N O P Q R S T U V W X Y Z, and 1 2 3 4 5 6 7 8 9 0. THE STRAND MAGAZINE welcomes the New Century 1901."

In all there are seventy-eight characters in capital letters. The accompanying photo., showing the pin's head enlarged, does not show up the work as well as can be seen by looking through a strong magnifying-glass. The work of engraving this pin-head took Mr. Dibb four hours, and we think this beats all previous records in this line. We found it very difficult to secure a good photo. of the pin, as the camera distorted it somewhat, but the difficulty was partly overcome by placing the pin-head pointing out of a board and then placing the same glass that was used in the engraving of the pin directly over it, and the camera at a distance of about 3ft. The exposure gave a negative about one-quarter of an inch in diameter. The photo. here produced was enlarged from a print of this negative.

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XIX.—THE MOST DESTRUCTIVE PROJECTILE EVER INVENTED.

IN spite of Peace Conferences and humanitarian efforts toward the suppression of warfare, the man who can invent the weapon calculated to wreak, in the shortest possible time, the greatest possible destruction of life and property is still a popular hero and certain winner of wealth and glory.

Year by year the power of these death-dealing agencies has increased until the possibilities would seem to be exhausted, but now to inaugurate the new century comes a gun

apparently more deadly than any of its predecessors.

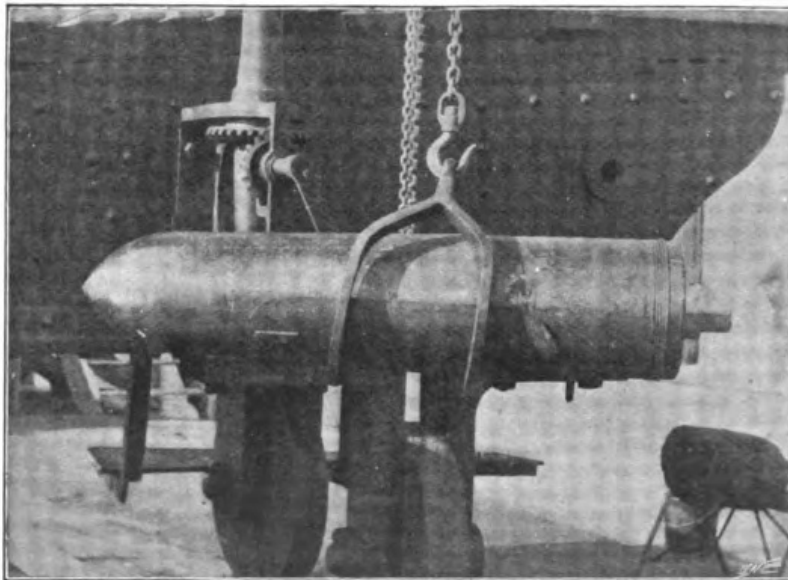
It is the invention of Louis Gathmann, of Chicago, and after a series of exhaustive tests has just been officially adopted by the United States Government. It will be of 18in. bore, and will throw 600lb. to 800lb. of gun-cotton a distance of five miles.

This new Gathmann arm, in a word, is a high explosive projectile, with a gun for firing it. It makes possible the use of

enormous charges of gun-cotton in shells discharged from high-power rifled cannon of the most modern construction and the longest effective range. It practically converts the modern cannon into a torpedo-tube and the modern explosive projectile into an aerial torpedo.

It has long been the dream of artillerymen to use high explosives in projectiles. All attempts to do so have proved abortive or inefficient. Dynamite guns have been comparative failures on account of the low muzzle velocities required by the use of compressed air. The low velocity entails two weaknesses which render the gun useless to a great extent. First, it gives an extremely short range to the gun, and makes accuracy of aim impossible.

In the Gathmann gun both of these faults



THE GATHMANN SHELL AS IT APPEARS WHEN BEING LOADED INTO THE GUN.
From a Photograph.

have been corrected, and a weapon has been produced whose projectiles carry a charge of gun-cotton sufficient to destroy, by one tremendous explosion, a modern warship and every human life thereon.

The shells discharged from Mr. Gathmann's cannon contain from 600lb. to 800lb. of gun-cotton, the most terrible explosive known. The detonation of this amount of gun-cotton in contact with the armoured sides of a modern battleship would crush in its massive steel shell, no matter what their strength or thickness. The mere shock or concussion of so much high explosive would, by impact of the air, kill, maim, or render insensible every soul.

At the recent test experiments at Sandy Hook department experts were completely

astounded at the tremendous destructive power of the new instrument of warfare. A powerful structure was erected consisting of 10 in. nickel-steel armour, backed by 180,000lb. of strong earthworks, timbers, etc. This target resisted the assault of several ordinary shells and remained practically uninjured, but at one shot from a Gathmann shell was completely demolished, and not one timber or piece of armour remained intact. Some of the pieces were blown two miles away, and the consensus of opinion among those present was that the most powerful warship afloat would be utterly destroyed as a result of such a shot.

What made this test even the more remarkable is the fact that only one-fourth of the proper supply of explosive was used—135lb. instead of 600lb. What would have happened to the target had the full complement been utilized can only be left to conjecture.

Mr. Gathmann has made a life-study of explosives, and has long been before the public as the inventor of many valuable contributions to war science. He considers his new gun his masterpiece, and when seen just after the Sandy Hook tests was highly elated over its success. Commenting on its possibilities he said:—

“Now, I claim for the Gathmann shell that whatever it hits is doomed. What chance could any warship, however powerful,

which had to fire a hundred shots to secure a victory, stand against a vessel whose every hit was mortal? The gun is a giant in dimensions, weighs over 100,000lb., and is 44½ft. long. Although it has an 18in. bore, it can be safely mounted on a 12in. gun-carriage.

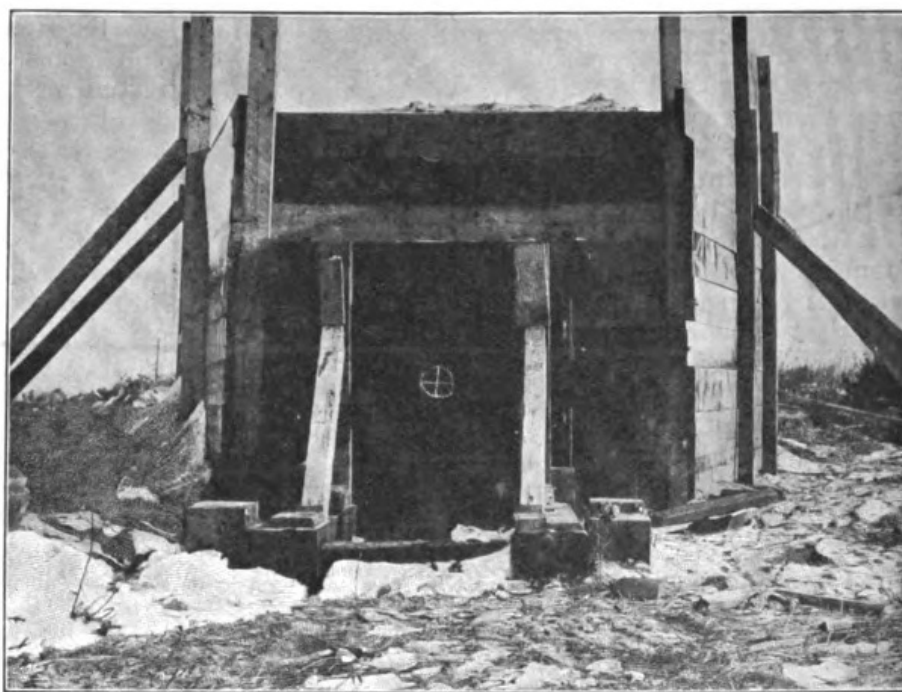
“The total weight of the torpedo-shell which this immense gun was constructed to hurl is 700lb. It is cigar-shaped. The muzzle velocity is about 2,200ft. per second, and the shell is fired from the gun with smokeless powder made according to a special formula and intended only for this particular work.

“The target or structure was erected under the supervision of trained army experts, and was staunch and powerful enough to resist

almost any attack with ordinary explosives. Five hundred men could have covered themselves within it and, safe from modern guns, could have done deadly execution on any exposed force within range. Several ordinary shells were fired at the structure and exploded without doing any appreciable damage. Then came the test of my shell.

"It was carefully placed in position, and I myself fired the shot. The effect was startling. The shell, rolling slightly, sped straight to the centre of the target, and hit it with an explosion that could have been heard for miles and shook the very ground under our feet.

"When we recovered from the shock we looked for the target in order to study the effect, but it was gone! Armour, timbers, and earthworks had not availed against that frightful cataclysm, and the structure was blown to atoms. Here and there we found



THE POWERFUL STEEL-PLATE TARGET, BACKED BY NINETY TONS OF EARTH, BEFORE THE SHOT.
From a Photograph.

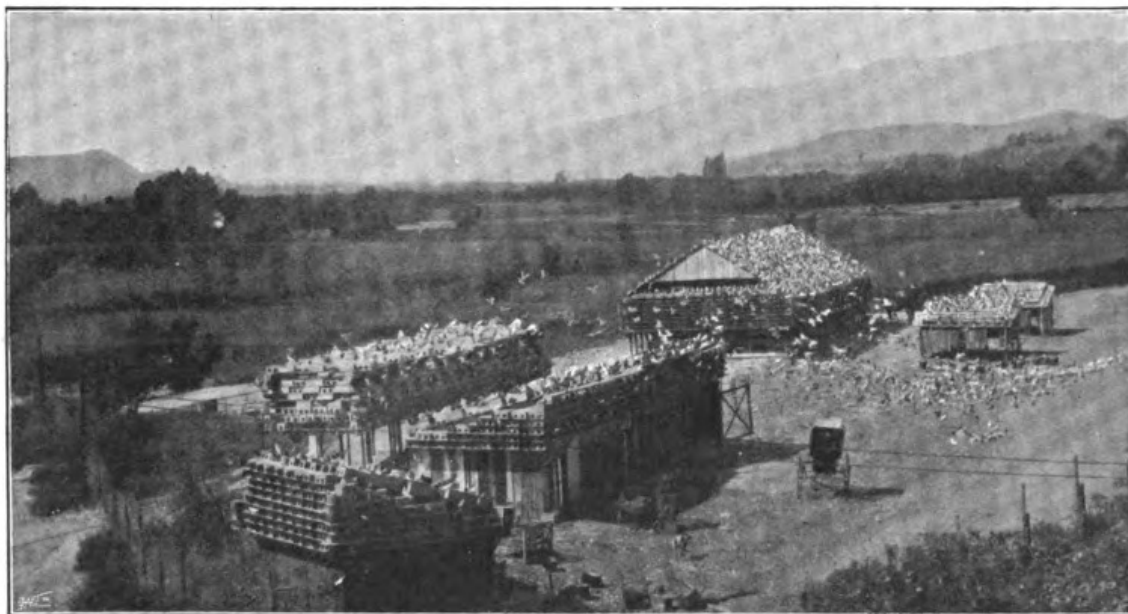
vestiges of the target, but mostly small pieces, and some of the *débris* was afterwards picked up several miles away, and all this with but one-fourth the regular load! Had 500 embattled men crunched in the structure not one would have survived."

XX. — THE ONLY PIGEON RANCH IN THE WORLD.

TWELVE THOUSAND flying pigeons are the main part of a pigeon ranch situated on the outskirts of Los Angeles, California. The pigeons live in three large tiers of coops or houses and in numerous smaller ones. The largest of the houses, which is shown in the illustration on the next page, contains 3,000 coops inside and 749 outside. The other two buildings are made up of 2,000 and 1,000 coops respectively. A remarkable fact



THE COMPLETE DEMOLITION OF THE TARGET AFTER BEING STRUCK BY THE GATHMANN SHELL.
From a Photograph.



From a]

A GENERAL VIEW OF THE PIGEON RANCH.

[Photograph.

in connection with this place is that the pigeons never leave the ranch, and it is seldom that one ever gets beyond the large wire fence that surrounds the place. They are fed on assorted grain and screenings, at a cost of about eight dollars per day. There are estimated to be about 12,000 flying pigeons on the ranch. There are also a large number of young birds, or squabs, which are

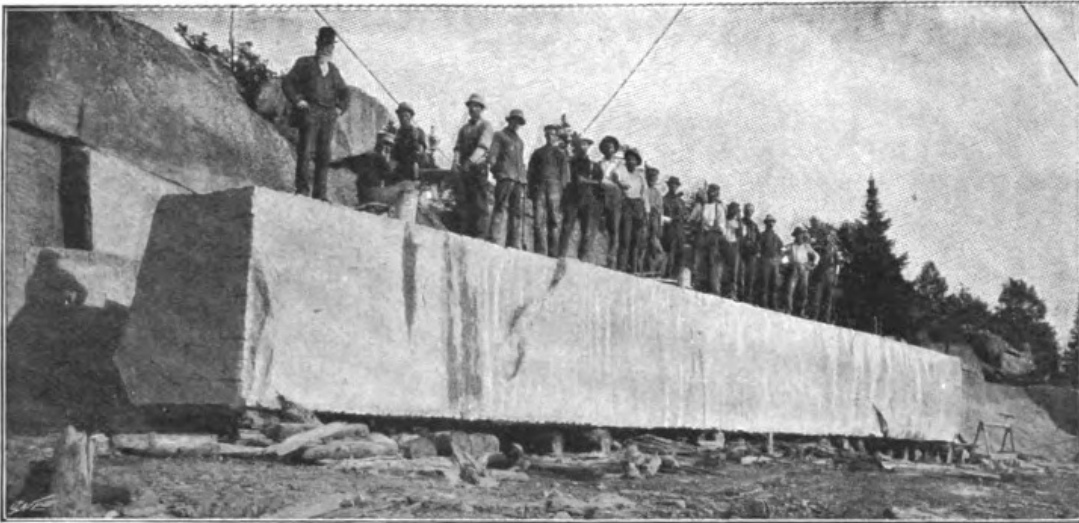
still in the nests. These squabs are killed for market before they are old enough to fly. As soon as they are able to fly they get thin. Each day the keeper goes through the nests and secures enough squabs to fill the market orders for the next day. These birds are killed by disjuncting their necks, and after being dressed are delivered. This is a profitable industry that requires very little care.



From a]

SOME OF THE PIGEONS FEEDING.

[Photograph.



From a Photo. by]

A PILLAR BEFORE TURNING—WEIGHT 310 TONS.

[W. H. Merrithew.

XXI.—GIANT LATHE FOR TURNING CATHEDRAL COLUMNS.

Look at the large block of granite seen in our photograph, and then think of the immense amount of work required to convert it into a perfectly round, highly-polished column! True, the work would be colossal were it not possible to accomplish it by machinery. And the machine which works this transformation may be described as the latest triumph in the industrial world. It is by far the largest lathe of its kind in existence.

But what makes this Wonder of the West so interesting is the fact that this piece of machinery was specially designed to turn and polish thirty-two large granite columns for a cathedral which is being erected in New York.

The accepted plans of the cathedral called for thirty-two huge columns, 54ft. high and 6ft. in diameter. Now, it was not considered an extraordinary feat to quarry columns of this length, though it was an order which quarry-owners were not in the habit of receiving every day. But after they were quarried how were they to be turned and polished? To have accomplished the work by hand would have been a very long and tedious operation, and also a very

costly one. It was suggested, therefore, that a lathe should be built for the purpose. When the engineers gave serious attention to the matter they soon discovered that a lathe to turn such an enormous mass of granite would require to be of very vast proportions. At last one was designed and patented by Messrs. E. R. Cheney and H. A. Spiller, of Boston, and built by the Philadelphia Roll and Machine Company, of Philadelphia, Pa. This lathe, by far the largest in the world, is 86ft. in length, and, when in working order, weighs 135 tons. It has swings 6ft. 6in. by 60ft. long, and eight cutters. Each tool, or cutter, takes out a cut 3in. deep, the entire eight cutters reducing the column 24in. in diameter at one pass over the stone. The block of granite seen in our first illustration weighs 310 tons; it is 67ft. long, 8½ft. high, and 7ft. wide. It was quarried by the Bodwell Granite Company, of Vinalhaven. After the blanks are quarried they are rough-hewn at the corners by hand in order that they may be placed in the lathe. Once in the lathe it requires about six weeks to turn out the finished column, dressed and polished.



From a Photo. by]

THE SAME PILLAR IN THE LATHE

[W. H. Merrithew.