A Remarkable Woman.

Mrs. Deborah Powers, head of the banking firm of D. Powers & Sons and of the great oilcloth manufacturing firm of the same name, died at her home in Lansingburg, N. Y., on May 28, at the age of 101 years. She had resided in Lansingburg for seventy-five years. She left an estate valued at two millions of dollars. She retained her mental faculties unimpaired almost to the very last.

Mrs. Powers was born in Hebron, N. H., on August 5, 1790. For eight years prior to her marriage earned her livelihood by tailoring and spinning. On February 22, 1816, she married William Powers, whom she had known from childhood, and who was a school teacher in Lansingburg.

Soon after their arrival in Lansingburg, Mr. Powers had his attention attracted by a piece of floor cloth in the bottom of a carriage, and, having some knowledge of the manufacture of table oilcloths, determined to attempt the manufacture of the article. His experiments were attended with so much success that he soon abandoned school teaching. Mrs. Powers was her husband's only assistant for some time, but the business increased so rapidly that more room and additional help were necessary. In 1829 the building of a large factory was begun.

In that year Mr. Powers was burned to death while making varnish, and Mrs. Powers was badly injured while trying to save him. Left with two small children and an unfinished factory on which a large sum was due, Mrs. Powers did not despair. She bent all her energies to the continuance of the business, with such success that in 1842 she had a fine business, a large factory free from debt, and a large sum of money. Mrs. Powers spent hours every day in the office and factory until about twenty years ago, when she surrendered the personal control of the business to her son. In 1877 Mrs. Powers organized the private bank of D. Powers & Sons, and its patronage was soon large and lucrative, everybody having confidence in Mrs. Powers' ability. It is now one of the most popular banks in that part of the State, and Henry L. Lamb, at one time superintendent of banks, is the cashier.

Grub Fungi.

We lately received from a correspondent in Bolivia a specimen of the above, also another specimen of the same character from a correspondent in Vermont. We submitted both specimens to Dr. C. V. Riley, of the Entomological Bureau at Washington, who writes us as follows concerning them:

"I have received from your office a letter from Myron E. Sprague, Plymouth Union, Vt., also a translation of a communication from Marco D. Paredes, La Paz, Bolivia, both accompanied by specimens of a fungus growing from the larva of a Lamellicorn beetle. Mr. Sprague's specimen was the common white grub fungus which I have figured and described in the *American Entomologist*, vol. iii. (June, 1880), pages 137 to 140. This fungus was formerly known by the name of *Torrubia militaris*, but is now placed in the genus *Cordyceps* and the specific name now given to it is *Ravenelii*. It infests a number of different insects. The Bolivian form is very similar; the larva is closely allied to the white grub, belonging to the same series of earth-inhabiting Scarabæids. The fungus cannot be specifically determined, as it is entirely sterile, but it is without doubt a species of *Cordyceps* and closely allied to our North American species."

Watch Glasses.

It is interesting to know something of the details and labor connected with the production of these handy adjuncts to the laboratory. The glass is blown into a sphere about a meter in diameter, sufficient metal being taken to give the required thickness, as the case may be. Disks are then cut out from this sphere with the aid of a pair of compasses having a diamond at the extremity of one leg. There is a knack in detaching the disk after it has been cut. A good workman will cut 6,000 glasses in a day.

THE TRAIN STAFF BLOCK SYSTEM.

Although single track railways are rapidly becoming a thing of the past, there are still many such roads in the country, some of which will be changed to double or quadruple track roads in obedience to the exigencies of traffic, while others will forever remain in their present condition. Some roads are furnished with a double track throughout, with the exception of a few sections or unimportant branches, which are of necessity continued on a single track system.

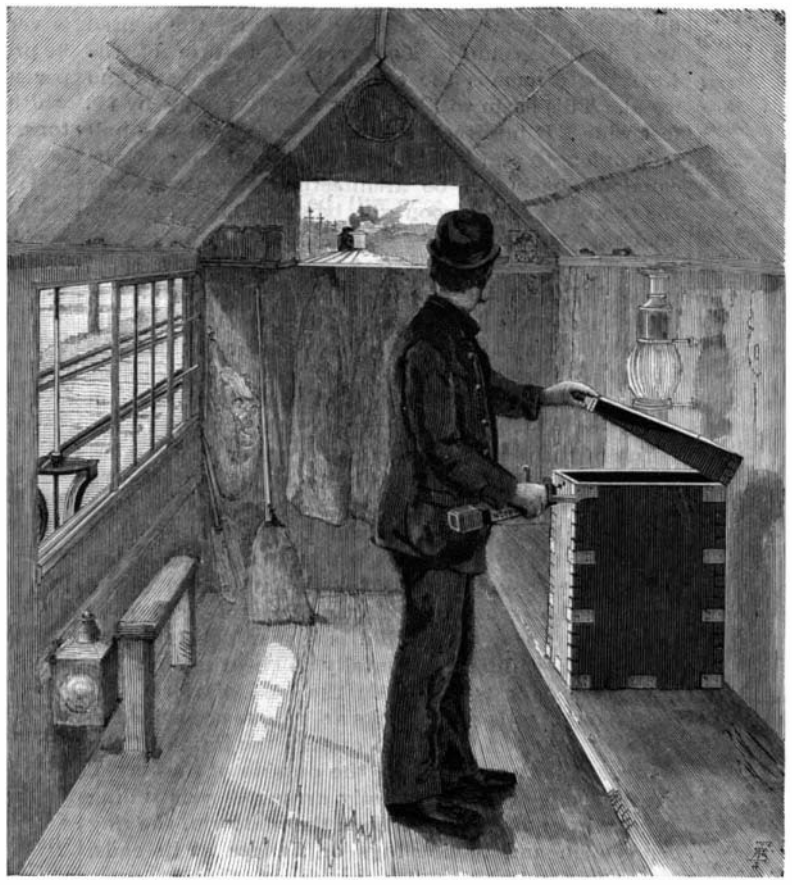


Fig. 2.—SWITCHMAN SECURING A TICKET FOR THE FIRST TRAIN OF A SERIES.

Fig. 3.—THE TRAIN STAFF.

In proportion to the traffic, more accidents occur upon single track roads and upon single track sections than upon a double track, and this is to be expected without some very perfect block system, which will prevent the entrance upon a given section of trains from opposite directions, and also limit and control the number and movements of trains passing in either direction. This has been accomplished in various ways by means of electrical devices, mechanically operated semaphores, etc., but a simpler and more effective system is in use upon the Shore Line Division of the New York, New Haven and Hartford Railroad, where the train runs over several miles of single track. The system is as simple as it is effective. It was brought from Europe some time ago by Mr. Charles P. Clark, president of the road, and it has been in successful operation ever since. For our information we are indebted to Mr. Wm. A. Waterbury, superintendent.

At each end of the single track section, in the house of the switchman, is placed a box containing tickets, which are red at one end of the section and white at the opposite end. The box is provided with a lock which can be opened only by a key carried in the end of a staff upon which is mounted a plate bearing the words "Niantic and New London." The key is movably mounted in the staff so that it may be slid out for use, or drawn in for protection. Only one staff is furnished for the section.

The mode of operation is as follows: The engineer of a train approaching the single track section—provided he is not followed by another train—upon entering the red ticket end of the section takes from the switchman the train staff, and retains it until he reaches the end of the section, when he delivers it up to the switchman at the opposite or white ticket end. So long as the staff is retained by the switchman no train can follow the out-going train, as the switchman who gave up the train staff has no means of opening the box, and cannot, therefore, authorize a train to follow the first train, either by giving a ticket to the engineer, or handing him the staff. If, however, other trains are to follow the first one entering the single track section from the same direction, the switchman gives to the engineer of the first train a red train staff ticket from the box in the switch house; at the same time he shows the engineer the train staff, thus indicating his authority to dispatch the train and to send the second train upon its arrival. If but two trains are to pass over the section in the same direction, the switchman gives to the engineer of the second train the train staff, and it is carried to the opposite end of the section and there delivered to the switchman, as in the first case. A red ticket will allow a train to pass in one direction only, a white ticket being required to allow a train to pass in the opposite direction.

It will thus be seen that until the train staff reaches the switchman at the white ticket end of the section he cannot admit a train to the section from that end without giving the engineer a white train staff ticket, or the staff itself, a thing which he cannot do until he receives the staff by the hand of the engineer from the red ticket end of the section.

Two trains moving in opposite directions cannot occupy the same section at the same time where this system is rigidly carried out. In this case the engineers and the switchmen are made directly responsible for the safe passage of the trains.

This system has been long in use in Europe on short lines, bridges, etc. It was used on the Tay bridge, and has been quite extensively adopted in Australia.

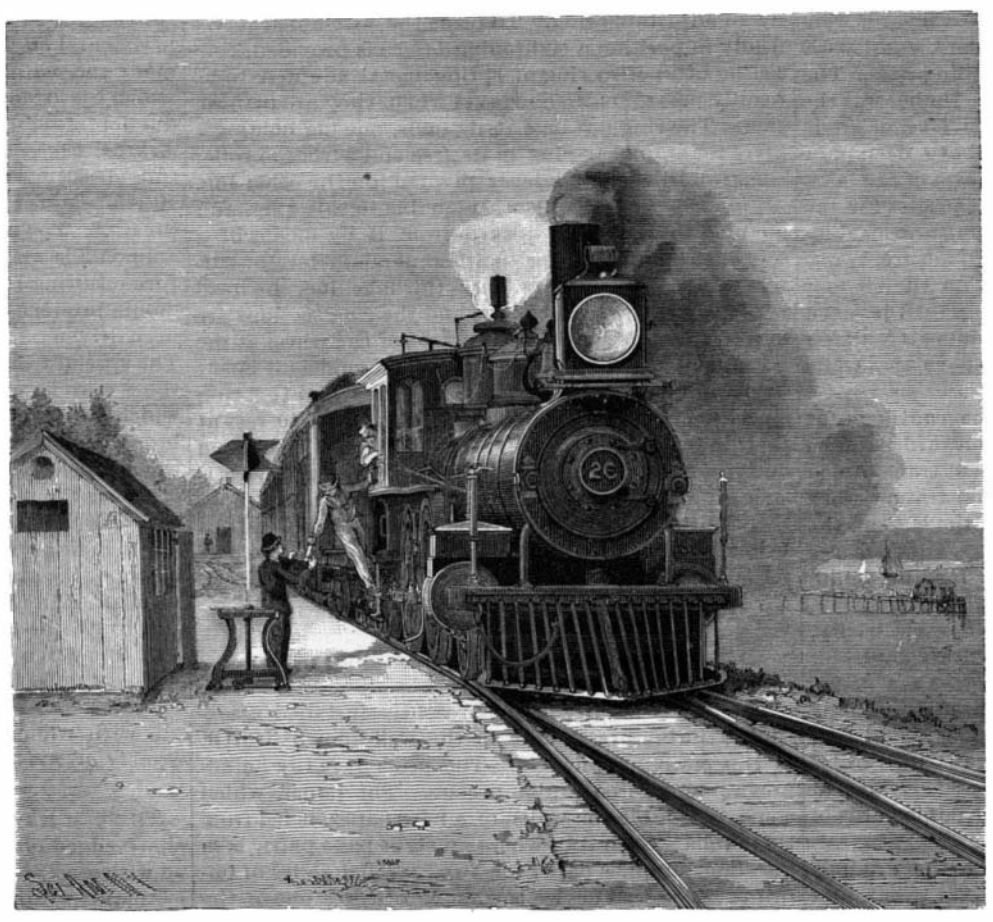


Fig. 1.—OPERATOR RECEIVING THE TRAIN STAFF.

Poisonous Dry Goods.

The British consul at Christiania, in Norway, about four months ago forwarded a letter calling the attention of the Foreign Office to the fact that, owing to the English printed fabrics containing arsenic, there had been a great decline in the quantity of such goods imported into Norway, and the British printed cloths were getting a bad reputation in consequence of their containing such a large excess of arsenic. This letter was forwarded to the Manchester Chamber of Commerce, which procured samples of the goods in question, and they were handed over to Mr. Ivan Levinstein, who had the samples examined, and they were found to contain arsenic in large quantities.

Financial Outlook for Our World's Fair.

The appropriations thus far made by sixteen States, for representation at the Columbian World's Fair, in Chicago, compare as follows with the amounts appropriated by the same States for the Centennial Exposition of 1876 :

	1876.	1893.
Arizona	$5,000	$30,000
Colorado	10,000	100,000
Connecticut	25,000	25,000
Indiana	5,000	75,000
Iowa	20,000	50,000
Maine	10,000	40,000
Massachusetts	50,000	75,000
Minnesota	500	50,000
Montana	5,000	50,000
New Hampshire	16,500	25,000
New Jersey	24,000	20,000
Ohio	45,500	100,000
West Virginia	20,000	40,000
Wisconsin	22,000	65,000
Pennsylvania	1,125,000	300,000
Illinois	10,000	1,000,000
Total	$1,393,500	$2,045,000

In Arkansas, Kansas, New York, Oregon and Rhode Island, appropriation bills have failed ; in Delaware, Kentucky, Maryland, Michigan, Mississippi and Nevada, the legislatures have either not assembled, or action is pending. These States made appropriations as follows for the Centennial :

Arkansas	$15,000	Mississippi	$5,000
Delaware	2,000	Nevada	20,000
Kansas	10,000	New York	33,000
Kentucky	5,000	Oregon	4,000
Maryland	15,000	Rhode Island	7,500
Michigan	7,500		

The following States, which did not appropriate a dollar for the Centennial, have made large donations to the world's Columbian Exposition :

California	$300,000	North Carolina	$25,000
Idaho	20,000	North Dakota	25,000
Missouri	150,000	Vermont	5,000
Nebraska	50,000	Washington	100,000
New Mexico	25,000	Wyoming	30,000

In 1876 the city of Philadelphia gave $1,500,000; Chicago has already voted $5,000,000. The United States spent $649,250 and loaned $1,500,000 to the Centennial Fair, which was afterward repaid. The government has voted to expend $1,500,000 on its exhibit at Chicago in 1893.

These figures show a total "in sight" thus far for Chicago of $9,275,000, against the entire amount of $5,166,750 contributed for the Centennial. Of the latter, the managers were responsible for the return of $1,500,000 to the general government, while it is safe to assume that some pretty liberal appropriations will yet be made for the Chicago Fair by the several States in which favorable action has not yet been taken.

Much Work Already Done at Chicago.

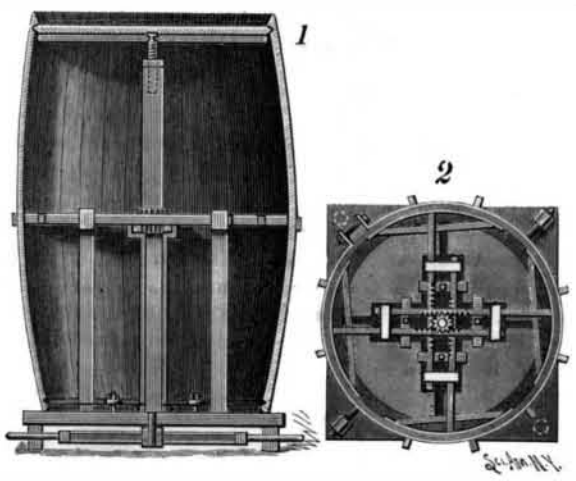
Work on the site selected for the Columbian Exposition at Chicago was begun about the middle of last February, and has proceeded in three stages—clearing the grounds of timber, collecting the black earth, and then filling in the areas from which the work was taken. About seventy acres covered with oak trees were cut away from ground five to twelve feet above the lake level. Then the black earth of the tract was collected and spread. Forty thousand cubic yards were put on the site of the natural island ; 45,000 yards were deposited immediately around the island, and 120,000 yards on the territory south of the building sites. The first work done after the clearing of the timber was the filling of the building sites. The ground level or grade of the grounds is four and a half feet above datum, or about five and a half feet above the level of the lake. On the four and a half foot grade are the sites for the liberal arts, fisheries, government, agriculture, machinery, and electricity buildings. The horticulture, transportation, and woman's buildings are on the six foot level, the machinery and mines buildings on the seven foot level, while the administration building is fourteen feet above datum, or about ten feet above the grade of the grounds.

The site is practically ready and the contracts for some of the main buildings are already awarded. The 600 acres of uneven park land has been transformed into a level plain. The most of the preparatory work has been done, except the dredging of the lagoon, the canal, and the basin. The landscape gardeners are already at work, and the contractors for the buildings can begin operations. The sites for the fisheries, government, woman's, horticulture, mines, electricity, agriculture, and machinery buildings are completed. On another page will be found illustrations of accepted designs for some of the principal buildings. The sites for the administration, transportation, liberal arts, and machinery buildings are progressing satisfactorily. When the preparatory work on the grounds is finished there will have been handled 1,000,000 cubic yards of earth.

The force which has been at work on the grounds since April 1 consists of about 600 men, 225 teams, and four dredging boats. Two more dredges will be put on soon, and this force is considered sufficient to finish the grounds within the specified time of the contract, which expires early in July. The dredges are now cutting the lagoon which is to surround the natural island. They are operated night and day, the force of men and horses being sufficient during the day hours to handle the earth thrown up. This earth is used to fill in the unfinished building sites and the dented area of the grounds. The greatest feature of the work yet to come is the excavation of the basin and canal. This basin will be about 1,500 feet long by 350 feet wide. It intersects the canal, which will be a half mile in length and 150 feet wide. The banks of the canal and basin will be architecturally treated, while the shores of the lagoon will be natural and receive landscape treatment.

AN IMPROVED BARREL MAKING MACHINE.

A simple and durable barrel making machine, designed to set up and hold the staves in proper position while the hoops are being driven on, is shown in the illustration, Fig. 2 being a sectional plan view taken on a line just above the middle through Fig. 1. In the center of the platform, set on lugs resting on the floor, is a vertically arranged shaft having on its lower end a wheel with projecting arms adapted to be moved by the foot or hand to turn the wheel. On the upper end of the shaft is a platform to support the head of the barrel, there being a screw in the upper end of the shaft to raise or lower the upper platform as desired. On the shaft near its middle is a gear wheel in mesh with racks sliding horizontally in bearings on the upper ends of posts erected on the base platform, and on the outer ends of the racks are ring sections held in place by braces adapted to engage the inside of the staves. About opposite, on the outside of the staves, is a ring supported on radially arranged rods sliding in posts extending upward from the platform, the ring being open and having lugs or flanges at its ends,



DRAKE'S BARREL MAKING MACHINE.

connected with each other by a bolt, whereby the ring may be loosened or tightened on the staves, according to the diameter of the barrel. On the base platform is a false bottom, made in sections, adapted to be moved inward or outward according to the size of the barrel, and clamped in place, the lower inner ends of the staves resting against the periphery of the false bottom, and being held in engagement therewith by an adjustable ring. To press the assembled staves firmly in position a tightening device is provided, consisting of an open ring of spring metal adapted to be readily passed over the staves when they are in position. The ring has lugs at its ends, one lug holding a pivot for a link carrying in its free end a friction roller engaged by a curved lever pivoted on the other lug. An inner segment is also attachable to this ring, and adapted to be moved inward from it by means of a screw, to adapt the ring to different diameters of barrels. In making a barrel with this machine, the head is placed on the top platform and the ring sections are moved to proper position by means of the wheel at the bottom, operating the vertical shaft, sufficient space being allowed between the outer ring and the ring sections for the staves to be passed through, to rest at their lower ends between the rim of the false bottom and the surrounding ring. The tightening device is then applied to draw the staves together and hold them until the hoops are driven on, the other head not being in the barrel until afterward, or until the barrel is filled. The machine has been patented by Mr. Henry T. Drake, of Wadesborough, N. C.

The New York "Herald" Sextuple Printing Press.

The New York *Herald* has recently installed a sextuple printing press, built by the well-known firm of R. Hoe & Co., of this city. The press is really an aggregation of three duplex presses. The paper, which comes of double the width of a newspaper, is fed from three rolls. Each roll, where an eight page paper is in question, supplies paper for two parallel series of imprints. The feed device is what constitutes one of the most important features of the machine. A small roller with endless belt is caused to press against the periphery of the roll of paper. As the roller and belt rotate at uniform speed in a direction to deliver paper from the great roll, a uniform speed of delivery or feed is secured, whatever the diameter of the roll of paper. The papers are printed, cut apart, pasted if required, folded, counted, and delivered by the press. The speed is very high ; as many as 90,000 four-page papers can be produced by it per hour. This is twenty-five copies per second. The press consumes 25⅞ miles of double width paper per hour. It weighs about fifty-eight tons.

Loftus Perkins.

By the death of Mr. Loftus Perkins, which took place on April 27 last, at Kilburn, the Society loses one who took a very active interest in its work, and was the representative of a family which has for long been closely associated with it. Mr. Perkins' grandfather, Jacob Perkins, an American by birth, who spent a large portion of his life in England, was a prolific and ingenious inventor. Jacob Perkins took out no less than 19 patents in the days previous to 1852, when each patent cost something over £200. The subjects dealt with included steam engines, marine propulsion, cooking, the artificial manufacture of ice, artillery (the steam gun), and, perhaps the most important of all, the method of engraving by pressure, by which the identical plates from which postage stamps are printed were for a long time produced. Jacob Perkins received three gold and two silver medals from the Society of Arts, of which he was a member, for his inventions. His son, Mr. Angier Mark Perkins, was also a member of the Society, and as an inventor, hardly less distinguished than his father. He developed the system of heating by high pressure water, in connection with which the firm of A. M. Perkins & Son has long been known. He also applied the same principle to the construction of fixed and portable baking ovens, which are largely used, the latter especially for commissariat purposes.

Mr. Loftus Perkins, the son of A. M. Perkins, and subject of this notice, possessed his full share of the hereditary genius of his family. His most important inventions were in connection with high pressure steam engines. To him must undoubtedly be given the credit of being the pioneer in the use of high pressure steam, and indeed the pressures which he used with perfect safety have never been attained by any other inventor. He appears to have been the first to enunciate and employ the principle of using steam at a pressure such as that of 500 lb. on the square inch, and expanding it several times, so as to obtain a very large amount of power from a very small amount of steam. One of his engines was placed in the steam yacht Anthracite, and after the engine had been made the subject of a very careful and elaborate test by Sir Frederick Bramwell, the Anthracite crossed the Atlantic to New York and returned, steaming the whole way—the very smallest steamer which has ever done this. The object of the experiment was to show, in a striking manner, the great economy of fuel obtained by the use of the Perkins engine and boiler. The high pressure engine was, however, not a commercial success, for whether from ill luck, or from whatever cause, it did not appear to work satisfactorily except in Mr. Perkins' own hands, or in the skilled hands of those trained by him. He also applied the high pressure engine to traction on common roads, and an experimental engine, constructed for the purpose, made many successful road journeys. The latest subject to which his attention was devoted was the artificial reduction of temperature for industrial purposes. The Arktos, or freezing apparatus, invented by him was fully described in the fourth lecture of Mr. H. Graham Harris' Cantor course on "Heat Engines other than Steam." The apparatus is one of the class in which ammonia is employed, a great reduction of temperature resulting from the vaporization of the liquid ammonia produced by liquefaction of the gas after it has been driven off from its solution by moderate heat. The special feature of the Perkins apparatus was that there were no moving parts in it. The incessant labor which he devoted to the perfection of this invention brought on a severe illness about a year ago, and from this he never recovered, though he had the satisfaction of seeing the invention in perfect working order before he broke down.

Mr. Perkins was born in 1834. Following the example of his grandfather and his father, he became a member of the Society, which he joined in 1877. From 1881 to 1883 he served upon the Council. Among those who know him he was regarded with feelings of the warmest affection, for his kindly nature, his genial manners, and his generous character endeared him to all with whom he came in contact.—*Journal of the Society of Arts.*

THE best way to bore rubber stoppers is to use a sharp-edged brass tube as thin as possible, and lubricated with soap and water. The hole will be a little smaller than the tube. It may be done by hand, or the tube may be chucked in a lathe. The tube is to be rotated and pressed against the stopper.