

SCIENCE AND INVENTION.

Work of the World's Busy Brains in Discovering, Inventing and Creating.

NO CHANGE IN MAN'S STATURE.

There is scarcely any belief more persistent than that men have degenerated...

Shovel Plow. Robert L. Burnett, Hatchers, Ga., has obtained a patent for a shovel-plow...

Prospector's Pick and Ax. James McMahon, Revelstoke, Canada, has patented a mining implement...

Charles J. E. Kellner, Fort Worth, Tex., has patented a stirrup of a single casting which embraces the sides...

William J. Walton, Rock Island, Ill., has patented a device for holding fish-ropes which has one curved hook and a forked clamp...

Charles P. Leavitt, Miami, Fla., has a device for reducing the motion of boats or ships which makes the hull of...

John H. Kendall, Illinois, Ill., has patented an animal stock for horse-shoeing and other purposes which consists of a bar supported above the animal...

Francis O. Hanson, Chicago, Ill., has patented a fireproof stairway which is a combination of stringers, bars connecting the same, an arched plate extending between the stringers and a concrete body...

John Whitehead, inventor of the torpedo, died Nov. 14, at Shreveport, England. Whitehead got his idea of a self-propelling torpedo from an officer of the Austrian artillery...

The recent classification at the British Patent Office shows that cooking is the popular subject of invention, having been the subject of 3,575 British Patents in 48 years...

Thomas F. Gaynor, New York, N. Y., has patented an expansion auger. This has at the end of the shaft a lead-screw and a single cutting flange having a lip which can be adjusted so as to cut any sized hole desired.

James S. Hull, New South Wales, Australia, has patented a pneumatic horse collar which has a pair of independent inflatable pads.

Edward J. Tiede, Buffalo, N. Y., has patented an adjustable depth gage for brace bits which can be attached to any bit.

Mop-Head.

Edgar O. Loeber, Los Angeles, Cal., has patented a mop-head to use any old sort of rag and readily fasten it to the handle.

Brazing Compound. John W. Ball, Woodbine, W. Va., has patented a brazing compound consisting of the following ingredients by weight: Muriatic acid, six parts; zinc, one and one-half parts; water, two parts, and pulverized borax, one part.

Orchard Heater. Charles S. Brown, Utica, N. Y., has patented an oil stove to ward off frost, and which consists of a shallow pan in which the gas engine has run continuously, and was supposed to contribute to the battery any surplus electrical power generated such as while going down hill when more power is produced than used.

Combined Shovel and Poker. Joseph W. Maxwell, Louisville, Ky., has patented a combined shovel and poker which has a handle so arranged as to admit of the implement being used alternately for either purpose.

A New Power Grader. This grader is the invention of a railroad builder in the State of Washington. Its operation, which is extremely simple, will be understood from the illustration. The scraper, which is a sort of steel box with a cutting edge at the sides and bottom, is seven feet wide, eight feet long and 36 inches deep.

Insect Destroyer. Linn Tanner, Cheneville, Ia., has patented an insect destroyer comprising a sled with guiding handles at the rear and carrying a tank and front bars to guard a burner.

Boat or Ship. Charles P. Leavitt, Miami, Fla., has a device for reducing the motion of boats or ships which makes the hull of a parabolic spindle form and composed of staves laid side by side with rods extending across the hull and supporting structure.

Animal Stock. John H. Kendall, Illinois, Ill., has patented an animal stock for horse-shoeing and other purposes which consists of a bar supported above the animal.

Fireproof Stairway. Francis O. Hanson, Chicago, Ill., has patented a fireproof stairway which is a combination of stringers, bars connecting the same, an arched plate extending between the stringers and a concrete body.

Fan Attachment for Bicycles. Diedrich Stahli, New York, N. Y., has patented a fan attachment for bicycles which has two perforated brackets through which a rod runs to hold a fan which is operated by a small drive-wheel operated by the motion of the front running wheel.

Pneumatic Tire. Arthur S. Allen, Brookline, Mass., has patented a pneumatic tire which has embedded in it intermeshed, oppositely-rotating, pneumatic tires.

Depth Gage for Brace Bits. Edward J. Tiede, Buffalo, N. Y., has patented an adjustable depth gage for brace bits which can be attached to any bit.

Her Relief. The old patriarch and his wife from the hills of Indian Territory were riding on a railroad train in the Choctaw Nation for the first time in their lives.

GASOLINE OMNIBUS.

Introduction of a New Stage for Fifth Avenue, New York. There is now on trial on Fifth Avenue, New York, a combination gasoline-electric motor car which, if it proves practical and economical, will take the place of the Fifth Avenue stages now drawn by horses.

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MINNESOTA AT NASHVILLE.

As indicated in one of Gen. Thomas's dispatches, the attack on Hood's position would doubtless have been made Dec. 10 but for the extraordinary condition of the elements.

"City Point, Va., Dec. 8, 1864. 'Your dispatch of 8 p. m. just received was possible to complete the task of the importance of immediate action. I sent him a dispatch this evening, which will probably urge him on. I would not say relieve him until I hear further from him.'"

"Nashville, Tenn., Dec. 8, 1864. 'Lieut.-Gen. Grant, City Point: 'Your dispatch of 7:30 p. m. is just received. I can only say in further extension why I have not attacked Hood that I could not concentrate my forces and get their transportation in order in shorter time than it has been done, and am satisfied I have made every effort to get the army ready to move.'"

"Washington, D. C., Dec. 9, 1864. 'Lieut.-Gen. Grant, City Point: 'Your dispatch of 8:30 p. m. of the 8th is just received. I had nearly completed my preparations to attack the enemy to-morrow morning, but a terrible storm of freezing rain has come on, which will make it impossible for our men to fight to any advantage. I am therefore compelled to wait for the storm to break.'"

"Washington, D. C., Dec. 9, 1864. 'Lieut.-Gen. Grant, City Point: 'The order for Hood's relief had been made out when his telegram of this p. m. was received. If you still wish these orders telegraphed to Nashville, they will be forwarded.'"

"Headquarters, Armies of the U. S., City Point, Va., Dec. 13, 1864. 'Major-Gen. John A. Logan, U. S. Volunteers, will proceed immediately to Nashville, Tenn., report by telegraph to the Lieutenant-General his arrival at Louisville, Ky., and also his arrival at Nashville, Tenn.'"

"Nashville, Dec. 14, 1864; 8 p. m. 'The ice having melted away to-day, the enemy will be able to-morrow morning. Much as I regret the apparent delay in attacking the enemy, it could not have been done before with any reasonable prospect of success.'"

"These are but a few of the many dispatches, all of like tenor, with which Thomas was overwhelmed at this time, but they clearly indicate the character of the crisis, the nature of which was to be decided by the impending battle at Nashville. A defeat of Thomas's army meant the probable further advance of Hood to the Ohio River and beyond. It was surely the highest duty of Thomas to make certain his success so far as precaution, preparation and skill could assure it, yet he was subjected to this fire in the rear that would have daunted any man who was not endowed with the high qualities of character and the great military skill which ever distinguished him in an emergency of the 'Rock of Chickamauga.'"

"The troops of the Second Division of Smith's Corps, who had not advanced as rapidly as McArthur's Division, for the reason that fortified positions of the enemy were sooner encountered, and perhaps were more stubbornly defended. In consequence of this condition there occurred a considerable interval to the left and rear between the two divisions as the advance of the Second Division was therefore swung to the left, and participated with the Second Division in an assault upon the rebel position. The position of the enemy, in the course of which his commander, Col. Hill, a much respected and most accomplished and gallant officer, was killed. Most fortunate for the service, there was a capable and skillful officer at hand to take his place in the person of Col. Wm. R. Marshall, of the 7th Minn., who thereupon assumed the command of the division. The First Brigade of McArthur's Division had been diverted somewhat to the right in pursuit of a body of the enemy, and the Second Brigade was consequently considerably in advance of and somewhat isolated from the rest of the division. It seemed for the moment that the Second Brigade would have a fight on its own account with the advancing body of the enemy referred to, whose numbers rendered such an outlook somewhat discouraging. The battle was fought on the 15th, and the Second Brigade performed most essential service in aiding to check the enemy's advance until a division of the Twenty-third Corps came up on the right. Whether the Second Brigade was now temporarily attached to Couch's Division of the Twenty-third Corps, or whether Couch's Division was attached to the Second Brigade is not known, but it is certain that the Second Brigade or made reports to the other. The commander of the Second Brigade could see readily enough what was to be done, but he does not seem to have been in command on his immediate right, and hence awaited development in that direction, in the meantime deploying two companies of the Twenty-third Corps, and a considerable number of prisoners and arms were captured. The movement in pursuit was continued until a condition of exhaustion in our men began to mani-

As indicated in one of Gen. Thomas's dispatches, the attack on Hood's position would doubtless have been made Dec. 10 but for the extraordinary condition of the elements. A storm of sleet freezing as it fell had covered the earth with an icy crust, on which neither men nor animals could keep their feet in their efforts to move over the rolling and hilly surface that characterizes the topography of the country in the vicinity of Nashville. A large number of horses had been disabled in attempts to place cavalry in position, and many serious accidents to the men had occurred while moving to their posts in view of the performance of their duty in maintaining the guard and picket lines. This ice embargo was raised by a moderation in the weather on the 14th, and orders were issued in the evening of that day for an advance against the enemy early on the morning of the 15th.

The disposition of Gen. Thomas's forces and their initial movements as directed in his General Order for the day were substantially as follows: A detachment of the Army of the Tennessee, after forming his troops on and near the Harding pike in front of his present position, was ordered to move on the left of the enemy's left. Maj.-Gen. Wilson, commanding Cavalry Corps, with three divisions will support Gen. Smith's right. Brig.-Gen. J. J. Wood, commanding Fourth Corps, will form on the Hillsboro pike to support Gen. Smith's left, and operate on the left and rear of the enemy's left. Maj.-Gen. Schofield, commanding Twenty-third Corps, will occupy the trenches from Fort Negley to Lawrens Hill, and will occupy the interior line in rear of his present position. Brig.-Gen. Miller, with the troops forming the garrison of Nashville will occupy the interior line. Also the Quartermaster's troops under Brig.-Gen. Donaldson. The troops occupying the interior line will be under the direction of Gen. Steedman, who is charged with the immediate defense of Nashville during operations around the city.

As the battle progressed these dispositions were of course modified, changes being made as the situation changed as they relate to or in some manner affect the movements of Gen. Smith's Corps, to which the Minnesota regiments were attached. It will be noted that in Gen. Thomas's disposition of his forces he apparently made ample arrangements for the defense of Nashville in the event of a reverse, and it will also be noted that Gen. Smith's command was designated to make the main assault upon the enemy.

Beginning of the Battle. At 6 a. m. of the 15th the army left its entrenched position and moved on to a thick fog hung over the country and enveloped both armies, but the rising sun and a moderate southern breeze lifted the mists, and by 10 o'clock Gen. Thomas ordered his army to make a vigorous assault on the enemy's left. The enemy in that part of the field was apparently unprepared to meet so determined an advance as was offered, and made but a feeble resistance to Smith's initial attack, retiring in fairly good order until a line of redoubts was reached about two miles from the rear of where he was first encountered. Here a more stubborn resistance was offered and our advance brought to a momentary halt. Gen. Thomas's orders were to test the mettle of his division, which included the four Minnesota regiments, in an assault upon two of the redoubts that were particularly spiteful in their position, and which were to be taken from the front. This division had made something of a specialty of that kind of work in former conflicts of the war, and had become expert in the art of detaching a thick fog hung over the country and enveloped both armies, but the rising sun and a moderate southern breeze lifted the mists, and by 10 o'clock Gen. Thomas ordered his army to make a vigorous assault on the enemy's left. The enemy in that part of the field was apparently unprepared to meet so determined an advance as was offered, and made but a feeble resistance to Smith's initial attack, retiring in fairly good order until a line of redoubts was reached about two miles from the rear of where he was first encountered. Here a more stubborn resistance was offered and our advance brought to a momentary halt. Gen. 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