

centers, and the actual mean loss of strength recorded on the Essen plates amounted to 38.05 per cent, and on the Yorkshire to 42.95 per cent; the difference showing unmistakably the value of the softer iron, and that the ultimate stress borne is much affected by this quality.

Disks 12 inches in diameter and $\frac{1}{2}$ inch thick were then subjected to a bulging stress by being pressed into an aperture 10 inches in diameter by a bulger. The difference in favor of the Essen plates was 17.8 per cent. In resistance to a bending stress also the results showed favorably for Essen plates in both hot and cold bending tests. Some plates showed cracks when bent at angles of 50°, while many of the Essen specimens bent as much as 180° before cracking. These results are of great importance to architects and engineers in determining the relative values of soft and hard irons for their purposes.

THE NEW DIVINITY.

It has been claimed that modern socialism, although professedly atheistic, is in reality the beginning of a new religion. The testimony received by the Congressional Labor Committee seems, in the main, to bear out the assertion. However conflicting, in every other respect, might be the views of the socialistic reformers that thronged the committee room, they all seemed to be in substantial accord on one point, namely, the source from which relief from all industrial troubles was to come. Their sublime confidence in the beneficent capacity and character of this new divinity would have been beautiful if it had not been so absurdly ridiculous—ridiculous as every phase of fetish worship must be to those who have passed beyond it.

The troubles that afflict the poor are traced by socialists chiefly to the oppressions of capital made possible by the maladministration of government, itself corrupted by human selfishness and dishonesty. In the interest of hereditary wealth and position government does no end of wicked things, and neglects to do justice to the poor in almost everything. Indeed, in whatever governments may undertake to do, jobbery and favoritism on the part of those empowered to direct the work invariably result in a squandering of the means provided, and almost always in an increase of the burdens of the poor, with no compensating benefit. Down with the Government! Oust the rascals that in the name of justice plunder the public treasury, and share the spoils with the rich, who use their ill-gotten gains for the oppression of their betters, the producers!

This is the socialistic cry, from Russia to San Francisco. Yet, like the poor savage of Ashantee who makes a god of the snake that bit him, the one unanimous demand of the socialists before the Labor Committee was that government should undertake to do everything.

By what process of mental jugglery the idea of government is separated by them from human agency and made a god to do impossibilities—incorruptible and of unerring wisdom—there is no means of telling; yet the fact remains that these unfortunate victims of government, according to their own account, want nothing so much as more government. In the name of liberty they demand the most absolute of despotisms. Denouncing the incompetence and rascality of all men in power, they would turn over to government (and so, of course, to the control of officials) all the means of wealth, all the processes of production, all the distribution of this world's goods. In future years this feature of the socialistic movement will, we believe, be looked upon as one of the most curious and unaccountable of epidemic delusions.

With not a few of the objects of the socialistic reformers we are in hearty sympathy. To no small degree they are working at, if not working out, the true aims of American institutions, as they themselves will discover in time, when they come to know more about our institutions. When to their zeal they add knowledge—practical knowledge, not idle dreams and mischievous misapprehensions—they will see, as others do now, that they are largely fighting shadows of their own creation. And they will discover too that it is sheer madness to make a divinity of the popular will, as expressed by government—the necessarily rude adjustment of conflicting individual wishes and interests, executed by fallible individuals. A government of the people, for the people, by the people, may be the very best government possible for a free people; but to make a god of it, putting upon its shoulders all powers and all responsibilities, in the hope of ushering in the millennium thereby, as socialists threaten, is a scheme worthy only of the madhouse.

THE WEST AS A FIELD FOR MANUFACTURES.

The rapid progress of manufactures westward during recent years has been noticed in this paper frequently. Already the Western markets are to a great extent commanded by Western industry; and the tendency is to make that part of the Union each year more and more independent of the factories of the East and of Europe. Thus far in the competitive struggle two factors have told strongly in favor of the Western manufacturer—nearness to market, and a closer knowledge of and sympathy with the special wants of his customers. There is another factor which promises to help still more the development of the manufacturing industries of the West, a factor which Eastern men have been slow to appreciate; and that is the superior natural facilities of that region, especially the Northwest, arising from the abundance and permanence of its available water power and the even greater abundance of coal. In the SCIENTIFIC AMERICAN SUPPLEMENT Number 140, will be found in full a notable

article from the Chicago *Journal of Commerce*, with relation to this matter. The Northwest is shown to be especially rich in rivers affording large and uniform currents and abounding in valuable mill sites. Wisconsin, Minnesota, and Iowa have a score of such rivers furnishing available power equal to that of the most prominent power furnishing rivers of the East. In any of these States can be found rivers like the Des Moines of Iowa, or the Fox of Wisconsin, able to run all the machinery in New England and New York. The force available at Minneapolis alone is estimated at 120,000 horse power. In the three States mentioned, the *Journal* counts fifty rivers from 150 to 600 miles in length, which possess every requisite as first class mill rivers; and each of these has numerous tributaries a hundred miles or less in length, abounding in valuable mill sites; rivers fed by lakes and other natural reservoirs, which supply a strong and almost unvarying current the year round. Besides, owing to the natural advantages of the bed rock of Western mill sites, the average cost of dams and other structures for commanding water power in the West has been only about two thirds that of similar constructions in Eastern States.

The extent to which the water power of the Northwest is already utilized is but imperfectly appreciated even in the West. "In the single industry of the flouring trade," says the *Journal*, "we find its rivers turning the wheels of two thousand of the twenty-five hundred flour and grist mills. A thousand manufactories of agricultural implements and machine shops are already established, and the wagon and furniture factories are legion. Woolen and cotton mills, tanneries and nail factories, and in fact all the higher grades of manufactories have already discovered the advantages which our rivers offer for their location." The Mississippi valley must ultimately furnish homes for ten times as many people as the whole of the United States now contains. As that time approaches these splendid facilities for manufacturing enterprise will make the Northwest the busiest and wealthiest region in the world. With every new manufactory the need of sending corn and wheat and beef and pork half way round the world to find a market will be lessened, to the farmer's gain and the general advantage of the commonwealth. Indeed the combined advantages of the Northwest, in possessing a fertile soil, abundant mineral wealth, a plenty of available water power, a healthy climate, and a vigorous and thrifty population, make it, it seems to us, a field for manufacturing and other industrial enterprises second to none in the Union. And the recent emigration to that region of thousands of thrifty mechanics and artisans from the East indicates very plainly that its industrial future is being rapidly determined in the right way.

PNEUMATIC ENGINES FOR STREET CARS.

The substitution of compressed air motors for horse power in street car traffic has for some time been under consideration by the Second Avenue Street Railway Company of this city, and it is now claimed that the prospects of a successful issue are most satisfactory. An experimental car was run over the Harlem portion of the road, August 3d, and behaved so well that the company propose to dispense entirely with horse power on that part of their road as soon as a sufficient number of engines can be constructed. Ultimately they hope, it is said, to extend the improvement to the whole distance from Harlem River to Peck Slip.

Externally the new self-propelling car resembles the ordinary street car, the compressed air reservoirs and other machinery being under the floor and out of sight. In the trial trips a speed of from sixteen to eighteen miles an hour was obtained. The movement of the car is controlled by a brace of levers on the front platform, and involves nothing, it is said, beyond the skill of an ordinary car driver. The capacity of the two reservoirs is sufficient to drive the car from Harlem River to Peck Slip and return. A seventy-five horse power steam engine at Harlem is used to charge the reservoirs, five minutes being sufficient to do the charging. The inventors of this method of propelling street cars are Messrs. Robert Hardie and J. James, of Glasgow, Scotland.

Another compressed air motor for street cars, the invention of Mr. Henry Bushnell, of New Haven, Conn., was successfully tested a few days since in that city. Mr. Bushnell's air receivers are tubes, the largest of which are twenty feet long and only eight inches in diameter (those of the Hardie & James car being two feet in diameter). There are four of these, two on each side of the car above the axles and next the wheels. Between them at the end of the car are four other tubes, each six feet long and six inches in diameter, inside measurement. The double cylinder engine which drives the wheels does not differ materially from a steam engine, except in the smallness of the cylinders, which are only $2\frac{1}{4}$ inches in diameter. By an ingenious device the cylinders are kept warm by a small air compressor attached to the running gear of the car. Great advantage is claimed by Mr. Bushnell for the long and slender receivers; a pressure of 2,000 lbs. per square inch giving in them a pressure of only 50 tons on the head of each tube, while the two-foot receivers of the Second Avenue car, he says, would have to stand a pressure of 180 tons with the pressure of 800 lbs. to the square inch claimed by the inventor. A gentleman who was present at a trial trip reports that the motion was easy and at times about twice as rapid as that of a horse car. The new vehicle obeyed the engineer promptly in starting and stopping. The distance traveled in going and returning was a little over a mile. At the start the gauge registered 1,800 lbs. At the return the pressure indicated was 1,500 lbs. When the air was allowed to escape from a

turned cock the roar was frightful and was as irritating to the ear as escaping steam. In running, however, very little noise is heard from the escape pipe, because the escaping air is made to pass through a mass of ordinary curled hair. This device Mr. Bushnell esteems one of the most important of his inventions. He has no doubt that it would prove equally efficacious in deadening the sound of escaping steam. In running the distance of four miles the pressure was reduced from 1,950 lbs. to 750 lbs.

Whether either of these motors will stand the test of winter use, with snowy or frosty rails, remains to be seen.

A FALSE ALARM.

The New York *Herald* of August 15th set off its regular Washington correspondence with the startling head lines: "Important Decision of the Attorney General. THOUSANDS OF PATENTS INVALIDATED." The text of the letter was quite as alarming as its title—to those who did not recognize its absurdity. Fortunately, however, few inventors or patentees are so ignorant of the practical working of the patent system as to be misled by such wild talk about the invalidation of "between forty and fifty thousand live patents." According to the *Herald* writer, the Attorney General's decision is in effect that "letters patent issuing to two or more persons, when but one of them is the real inventor, are void, and cannot be made valid by any act of the parties concerned or by the Patent Office."

The decision is in reality nothing of the sort, the unintentional misstatement of its effect arising from the omission of the words *as joint inventors* after "persons."

The occasion of the decision was this: In 1871 Joseph Barsaloux invented a device for stiffening boot and shoe heels. Before applying for a patent he sold to James & Lyon two-thirds of his right. In 1872 a patent was applied for, and in the application the three men were—"by the misadvice of their attorney and their own ignorance of the law"—described as joint inventors, instead of following the regular practice in such cases of naming the first as inventor and the others as assignees. The patent was issued in accordance with the terms of the application. Subsequently, in 1875, James & Lyon discovered their error and applied for a reissue to Barsaloux alone. In the opinion of the Commissioner of Patents the new patent asked for could not be legally granted, the original patent being void through no fault of the department, and the invention having been in public use for more than two years. His opinion was referred to the Attorney General for an authoritative decision, and the position taken by the Commissioner was sustained in the following terms:

"The error here presented consists of a false suggestion in the original application that the invention was joint. This, whether done through ignorance or by mistake, does not, in my opinion, afford any ground for the action prayed for. The patent issued upon that application must be deemed to be void, as a joint patent cannot be sustained upon a sole invention of one of the patentees (see 1 Mason's C. C. Ref., 473), and the department cannot by means of alterations or corrections confirm or impart validity to a patent which was originally void."

As will be readily seen, this decision imports no new principle or practice into the working of the patent system, and will have no such effect as the *Herald* writer describes. Unless the partners of an inventor have deliberately sworn to a falsehood, claiming to be joint inventors when in truth they were not, they need have no fear of the validity of their patent; and no competent patent attorney would allow such a mistake to occur through inadvertence.

THE WALLINGFORD TORNADO.

On the evening of Friday, August 9, a tornado swept over a portion of the village of Wallingford, Conn., killing outright between twenty and thirty persons, and wounding many more, some of whom have since died. Forty dwelling houses were demolished, besides a church, a school house, a factory, and fifty barns. Nearly all the dead were crushed by falling timbers. The tornado appears to have been confined to a belt of territory less than half a mile wide and two miles long, the whole damage and loss of life occurring on a strip of sand plains of small extent. Severe thunderstorms, in some cases attended with much hail, were general throughout New England that day.

Measured by the loss of life this is by far the most destructive tornado that has been experienced in the East; it was not, however, of unique severity. Some forty years ago the same region, almost the same locality, was swept by a whirlwind of even greater force, though fortunately it did not encounter any human habitations. Still earlier, in 1787, a more fatal and possibly in other respects more destructive tornado struck the country between New Britain and Weathersfield (directly north of Wallingford), and passed on to Eastbury, doing great damage; and it was noticed in the *Hartford Courant* of that time that a previous hurricane had swept substantially the same track, the centers of the two being only 33 yards apart. All these storms occurred in August.

There is a prevalent opinion that violent tornadoes are rare in the East, and that the unobstructed sweep of an open prairie country is needed for their full development. They are more common in the West, it is true; but it is probably due not so much to the more favorable conditions prevailing there as to the fact that the West is very large compared with the East. If equal areas be compared, the Eastern States will probably be found to suffer from whirlwinds as frequently as the West.