

Correspondence.

Unit of Labor?

To the Editor of the SCIENTIFIC AMERICAN:

Can any reader of the SCIENTIFIC AMERICAN state "the unit of labor"? The day's labor is not a unit. The expression means some labor, but it is indeterminate.

Similarly, the wheat from an acre of land means some wheat, but the unit of wheat, as the bushel, enables us to state the quantity.

Labor is a force. All we use is the result of labor. Our civilization is also the result of labor.

Without the unit of labor, we can have no coefficient of labor. Thus we are unable to state intelligibly the one force, or power, that produces everything.

A. BRADY.

Titusville, Fla., December 28, 1899.

True Inventor of the Telegraph.

To the Editor of the SCIENTIFIC AMERICAN:

I have just read an article in your issue of December 30 entitled "The True Inventor of the Telegraph," and purporting to have been written by Heileman Wilson.

He refers to and quotes the well-known letter of "C. M.," published in the Scots Magazine, 1753; and concludes that "it must be admitted that 'C. M.' was the inventor of the electric telegraph, and that every step made since that time, however wise and valuable, can be viewed in no other light than an improvement on the idea of an unknown man."

I dissent wholly from Mr. Wilson's conclusion. It does not appear that C. M. ever tried an apparatus or even made an apparatus embodying the ideas of his descriptions; and he consequently could not know how it would work, or whether it would work at all. Mr. Wilson at an earlier point in his article says: "It was reserved for a Scotchman, living at Renfrew, to suggest that messages might be sent by electricity along wires passing from one place to another." Here he uses the correct term. Unquestionably C. M. made a suggestion; but he did nothing more. It is, however, not the man who suggests that a certain thing may possibly be done, but the man who finds a way to do it, and does do it, who is the inventor.

No one as yet has invented the art of "Seeing by Electricity," but many persons have made suggestions as to how it may be done; and some have asserted that they have done it. When that art and a means for carrying it out shall have been invented, the people who have made the suggestions will of course be duly trotted out as prior inventors.

Mr. Wilson apparently relies too implicitly on his memory, which, however, should have told him that Plymouth is entirely out of the line of communication between London and Waterloo.

The Wellington anecdote is a very familiar one to me; but heretofore the delayed words have invariably referred in all versions of the anecdote I have seen to the battle of Salamanca. THOMAS D. LOCKWOOD.

Boston, Mass., December 31, 1899.

THE number of emigrants from Germany has fallen off within the last few years, and seems to be continually decreasing. In 1898 the number was but 20,960, which is the smallest since the existence of the empire. The table shows the emigration since 1881:

| Year. | Number of Emigrants. |
|-----------|----------------------|
| 1881..... | 220,900 |
| 1887..... | 104,780 |
| 1891..... | 120,090 |
| 1895..... | 37,490 |
| 1896..... | 23,820 |
| 1897..... | 24,630 |
| 1898..... | 20,960 |

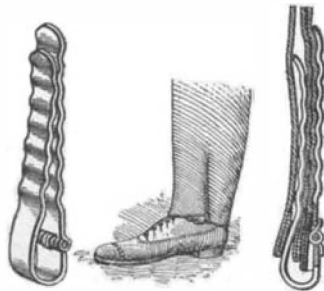
The emigrants for the year 1898 are distributed as follows: United States, 17,232; the remainder of America, 1,094; besides Brazil 785, and Canada 208. Africa received 1,092; Asia, 223; and Australia, 163. Upon comparing the figures for the emigration with that of the total German population, one finds, for 1898, 38 emigrants per hundred thousand as against 43 in 1897 and 232 in 1891. The cities of Bremen and Hamburg gave the largest proportions.

DURING the year 1898, 1,465 persons were inoculated for hydrophobia at the Institut Pasteur at Paris; of these, only 3 succumbed. This gives a mortality of 0.20 per cent. In the following table these figures may be compared with those of the preceding years:

| Year. | Number Treated. | Died. | Per cent. |
|-------|-----------------|-------|-----------|
| 1886 | 2,671 | 25 | 0.94 |
| 1887 | 1,770 | 14 | 0.79 |
| 1888 | 1,623 | 9 | 0.55 |
| 1889 | 1,830 | 7 | 0.38 |
| 1890 | 1,540 | 5 | 0.32 |
| 1891 | 1,559 | 4 | 0.25 |
| 1892 | 1,790 | 4 | 0.22 |
| 1893 | 1,648 | 6 | 0.36 |
| 1894 | 1,387 | 7 | 0.50 |
| 1895 | 1,520 | 5 | 0.33 |
| 1896 | 1,308 | 4 | 0.30 |
| 1897 | 1,521 | 6 | 0.39 |
| 1898 | 1,465 | 3 | 0.20 |

A SIMPLE TROUSERS CLASP.

We present in the accompanying illustrations a novel form of clasp invented by Dr. Avediss B. Herald, of Washington, D. C., by means of which trousers can be held in position when wrapped about the leg. The clasp comprises essentially a base plate and a clamping plate hinged together and formed with corrugations alternately with one another, so that the ribs or projections of one plate will enter the sockets or depressions of the other. The base plate has its tip turned out so that it will properly clasp the trousers and avoid injury to the leg. The clamping-plate has its butt end outwardly swelled and returned so as to afford room for the seam at the end of the trousers-leg and to set the two corrugated plates at an angle to each other when



A NEW TROUSERS CLASPING DEVICE.

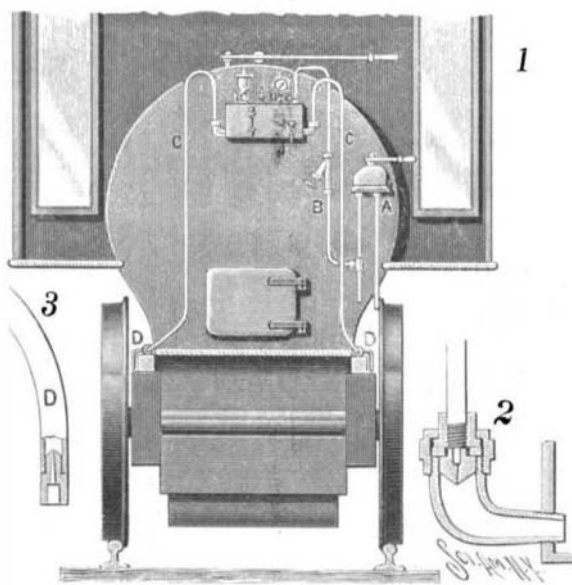
the clasp is closed. About the pintle of the hinge connecting the two plates, a wire spring is coiled with its ends extended to operate the clamping-plate.

The trousers having been folded or wrapped as usual, the clasp is applied so that the base-plate fits within the trousers-leg and the clamping-plate in the loop formed by the fold. The tension of the clamping-plate forces the fold toward the base-plate, thereby securely holding the trousers in place.

AN AUTOMATIC LUBRICATOR FOR LOCOMOTIVES AND MARINE ENGINES.

The lubricating device which forms the subject of the annexed engraving is designed to supply oil continuously and regularly to the bearings or journals of locomotives and marine engines by means of compressed air. The novel features of the invention are found in a peculiar form of nozzle employed, which effectually prevents foreign matter from clogging the pipe. Fig. 1 of our illustrations is a rear elevation of a locomotive cab, showing the device applied to the boiler. Fig. 2 shows part of a feed-pipe and its nozzle. Fig. 3 represents one end of a drip-pipe together with its nozzle.

The oil is contained in a tank secured to the boiler, and provided with a valved feed-cup, a gage-glass to indicate the level of the oil, a cock to permit the escape of air when filling the tank, a gage to indicate the air-pressure in the tank, and a faucet to allow the oil to run off when desired. Connected with the tank near the bottom are outlet pipes which supply oil to feed-pipes, C. Each outlet pipe, as shown in Fig. 2, tapers in-



BANGS' AUTOMATIC LUBRICATOR FOR LOCOMOTIVES AND MARINE ENGINES.

wardly and contains within its wider, outer end a nozzle formed with a conical inner end and provided with a straight outlet and a tapering inlet. Wherever a box is to be oiled, the feed-pipe, C, is provided with a T-fitting, with one arm of which a drip-pipe, D, is connected, extending over the oil-receiver. The drip-pipe, as shown in Fig. 3, is provided with a nozzle similar to that already described, the tapering end likewise facing the direction of supply. The oil is forced through the feed-pipe, C, by compressed air, controlled from the engineer's valve, A, to which an air-pressure and an air-vent pipe of the usual construction lead.

Owing to the peculiar formation and arrangement of the nozzles, the foreign matter contained in the oil will be deflected to either side of the nozzle, leaving the

bore free. An obstruction which enters the contracted end of the bore is forced through the nozzle into the enlarged portion and thence outward, thus insuring a continuous supply of lubricant to the bearings.

The lubricator is the invention of Edwin D. Bangs, of Milwaukee, Wis.

Automobile News.

A large soda water manufacturing firm in New York city has just put into service a very heavy automobile wagon weighing 5,600 pounds. It is driven by electricity.

An automobile club has been formed at Bologna, Italy. There is also one at Nice. According to The Motor Car Journal, there are now 2,173 members belonging to the Automobile Club in France. In one week 99 new names were enrolled.

The Park Commissioner of New York city is issuing permits to automobile owners to the number of two or three a week. Up to the present time only electric carriages have been permitted to enter the Park, as it is thought the gasoline carriages are noisy.

The tour from London to Edinburgh will take place in March. The route will be arranged so as to pass through a large number of places, in order to attract the general attention of the country. There will be several one-day exhibitions at the most important towns.

The Automobile Club, of Chicago, has been organized, and articles of incorporation have been filed. From the large and rapidly increasing number of automobiles in use in Chicago, the club is expected to be a great success. It is proposed to arrange races and tours for automobiles.

Park Commissioner Clausen, of New York city, has granted a permit to a woman to run an automobile vehicle through Central Park. At first he was in doubt as to her ability to manage an automobile, but she invited him to take a ride, and he sent his secretary instead. The latter was speedily convinced of her ability, and the permit was issued forthwith.

The Newport, R. I., plant of the New England Electric Vehicle and Transportation Company is most complete, and vehicles are let with or without drivers. The vehicles are stored in what were formerly horse barns. Ample facilities for charging the storage batteries are provided. The summer colony was most enthusiastic over automobiles, and the demand was so great that it was impossible to care for the carriages during the day only. An electric motor drives an air compressor, which is used to inflate the tires.

A motor carriage has recently been introduced in France which combines many novel features. It is normally propelled solely by an oil engine, but on hilly ground is helped by an electric motor. The oil engine works at constant speed, and when the vehicle does not absorb all the engine power, the excess drives the motor as a dynamo and charges the accumulators. Then the accumulators are only used occasionally and they are kept fully charged. The engine is direct connected to the dynamo-motor, which is shunt-wound, and this is in turn used to start up the engine. The changes in speed are effected mechanically.

On March 1, 1900, the Automobile Club of America will take possession of the famous Kingsland Point, located almost in the middle of the Tappan Zee, on the Hudson River, near New York. Here was built the famous Philipse manor house, in the cellar of which may be found port-holes for cannon. John Brisben Walker has given the use of the Kingsland mansion to the Automobile Club of America, free of rental, for a year. It is twenty-six miles out of New York, and as the roads leading from New York to it are perfect, it will make an ideal run. A terrace, protected by a stone wall, projects into the Hudson in front of the mansion, and in the summer is filled with plants. The entire point is covered by trees of large size, and there is a pavilion over the water. The entire property has 233 acres.

The Fifth Avenue Coach Company, which recently purchased the old Fifth Avenue stage line, has taken the first step toward substituting automobile vehicles for the present stages. A trial of an electrically propelled stage was made January 2, 1900, from the company's stables at Eighty-eighth Street, and it took only thirty-two minutes to run from the stables to the south side of Washington Square, and the return trip was made in thirty-five minutes. There is one seat on the outside for the driver, and at the rear of this is a seat broad enough to accommodate three persons. The inside is finished in oak and will seat eight persons. It is equipped with four inside roof lights, two outside lights, one on either side of the driver's seat, and one portable emergency light, all of course being electric. The vehicle is propelled by a storage battery consisting of 22 cells, the whole weighing 1,500 pounds. The total weight of the vehicle is 5,500 pounds, and the maximum speed is 9 miles per hour. Of course the stage is small and is not exactly what would be used on the line, but it is sufficiently large for experimental purposes.

Science Notes.

Prof. Roentgen has at last decided to accept a call to the University of Munich.

The German Bundesrath has decided to regard January 1, 1900, as the official beginning of the new century.

On December 20 the University of Pennsylvania's Free Museum of Science and Art was formally opened to the public.

According to *The Engineer*, the horses of the Scots Greys, now at the seat of war, have been dyed khaki color, in order to render them less visible to the enemy.

Prof. Virchow has just celebrated the fiftieth anniversary of his labors as Professor Ordinarius in the University of Berlin. He is now in his seventy-eighth year.

Nearly \$30,000 has been raised for a monument to Lavoisier, and it will be unveiled during the Paris Exposition. An open space behind the Madeleine is the site which has been selected.

An English firm that makes scientific instruments now sells quartz fibers commercially. They are especially suitable for suspending heavy magnets, and finer ones suitable for galvanometer suspension are also supplied.

In Finland the newspapers have suffered severely from censorship and suppression. According to Public Opinion, a concern has been formed entitled the "Finland Newspaper Press Censure Insurance Company." It guarantees an indemnity not exceeding 60 per cent of the loss of the gross income incurred by suspension. The premium is 5 per cent of the gross income.

According to *The Philadelphia Ledger*, the police of a small Pennsylvania city were much mystified by finding boys fast asleep and in a semi-conscious condition stowed in vacant houses, sheds and brickyards. It was finally discovered that the boys had gotten into this condition by inhaling the fumes of gasoline, and some of them have really become gasoline drunkards.

The Druggist's Circular translates the following from a French contemporary. It states that if a few drops of a solution of indigo carmine are added to milk, the color produced by it disappears under the action of the microbes in the milk. He determines the age of milk by the duration of the tint; thus, if fresh milk it lasts about twelve hours at 15° C.; five hours at 15° to 20° C., and four hours at 20° C. Where there are several decigrammes of the lactic acid to the quart of milk, the tint vanishes almost instantaneously. This, of course, can apply only to milk which is not protected by an anti-ferment.

In a theory of wind instruments proposed by F. Larroque, it is assumed that the tubes of brass instruments consist of a conical part with its vertex at the mouth of the player, and an enlarged portion at the further end. The effect of the enlarged end is to emphasize the higher harmonics, for the pitch of the note is not altered if the cone is continued in its regular shape to the end of the tube. The portion situated between the cone and the brass resounds to the notes produced in the tubes and strengthens them while increasing the expenditure of wind. An increased expenditure of power implies an increased prominence of overtones.

Consul Hughes sends the following from Coburg, October 23, 1899: A simple method of preventing rot and other diseased conditions of winter seed potatoes is in use by the peasants of Thuringia. Those potatoes that rot easily in the cellar in winter are made better able to resist disease conditions and cold by being laid in a sunny place, as far apart from each other as possible. They are turned over morning and night until they become thoroughly green, and are then placed in the cellar for the winter. Potatoes treated in this manner do not rot and can withstand a great amount of cold without freezing. Early potatoes thus treated do not sprout in the cellar, and so retain their full strength. In February, the potatoes are taken from the cellar and put in a partially warmed room until planting time. When planted, they will sprout stronger and quicker than potatoes not so treated, and the crop will be larger and better.

A few weeks ago we described a large poster which was pasted on the pavement between the car tracks at Battle Creek, Mich. A correspondent writes us that this is remarkable, merely as a piece of what might be called the playful side of the printing business, but that it is an abuse of the word "poster." He calls our attention to some very remarkable posters. About 1883 a poster was designed and issued by a Cincinnati firm which contained a hundred sheets each 30 x 40 inches in size. The poster was nearly 85 feet long and 10 feet high and the pictures consisted of one single scene—a circus interior. It was a complete single picture from end to end. There are a large number of 36, 40 and 48 sheet posters produced annually, but larger ones than this are rare on account of the difficulty of posting. One or two great circus companies use regularly posters containing sixty-four sheets bearing a single complete scene.

Engineering Notes.

Four hundred and seventy-two miles of new lines were opened in Japan during the year ending March 31. There are now 2653 miles of railroad in operation.

Benzine motors are being tried for driving canal barges in France. The motors are of about 12 horse power and drive twin propellers. The speed is said to be considerably greater than where horses are used on the towpath.

It is said that the government purchases about 10,000 typewriters per annum, and the administration is about to make a systematic attempt to secure a considerable reduction in the price of the machines by clubbing the orders together.

The American Line has arranged with the underwriters for extensive repairs to the steamer "Paris." The boat will be refitted with new engines similar to those of the "St. Louis," and she will be ready for service within a year. The name of the vessel will be changed and she will be called after some American city.

The Philadelphia and Reading road has recently installed a novel method of ventilating several of the smoking cars. It consists of three two-bladed vanes suspended from the top of the ventilators and operated by a small motor actuated by wind created by the motion of the train. The result is a continuous circulation of air, and the smoke and bad air are taken out through the ventilators. The fans may be disconnected when desired.

The Russian government is preparing to construct a new railroad going from the south of European Russia to Turkestan. It is intended to connect the commercial centers of Russia with Central Asia by the shortest route. Two projects exist, and neither of them has been finally decided upon. Either one would be less costly than the Siberian railway, and the natural resources of Turkestan territory are scarcely inferior to those of Siberia.

The new bridge which will connect Boston with Cambridge has been designed with a view to artistic effect, and, according to *The American Architect*, if the present plans are carried out, as is probable, the structure will not only be interesting, but creditable to both cities. The bridge is to be adorned with lighthouses near the center, and two towers near the end. As the length of the bridge will be considerable, this will prevent a crowded effect.

A list of guns in possession of the Boers has been published on what is said to be trustworthy authority by the *National Zeitung*. According to this account, the Boers have eight 7.5 cm. Krupp guns, sixteen 7.5 cm. Creusot guns, eight or nine Maxim-Nordenfolt field guns, twenty-four 3.7 cm. automatic Maxim guns, eight 12 cm. field howitzers—four from Krupp and four from Creusot—four 3.7 cm. Krupp mountain guns, four 15.5 cm. Creusot guns. In all, with old guns, the Boers possess some eighty or ninety pieces of artillery. During recent years the Boers are said to have bought 40,000 Mauser rifles, and 25,000,000 cartridges, as well as a large number of Martini-Henry rifles.

The "Pioneer," the first regular sleeping car built by the Pullmans, has been definitely retired from service, says *The Railway Age*. On one other occasion it was retired, but was again pressed into service for the transportation of troops during the war with Spain. It was built about the year 1858 in the shops at Bloomington, Ill., at the cost of \$18,000, and made its first trip on the Chicago & Alton Railway. The cost of construction was at that time regarded as extravagant, but the immediate popularity of the accommodations afforded by it, created the demand for the present system. The car appears shabby, small and inconvenient, but the fundamental ideas embodied in the construction of the present luxurious cars seem present to a surprising extent in this prototype of modern cars, so that the name "Pioneer" appears to have been prophetic.

The inventor of the "Raddatz" submarine boat and two engineers recently had a thrilling experience in their odd craft. For some weeks Mr. Raddatz has been engaged in surveying the bottom of Lake Michigan off the entrance to Milwaukee Harbor. At one place the boat was sunk in what afterward proved to be a depression in the bottom. Supposing that the ground was comparatively level, Mr. Raddatz ordered the craft ahead, when suddenly she thrust her pointed prow into a submarine bank. As the vessel was moving at a speed of four miles an hour, the shock was quite severe. The boat was stuck fast, and it was only after half an hour of the vigorous use of the propeller that she was loosened. The same day they were caught by sticky clay three miles from the entrance of the harbor. The occupants of the boat were caught much longer than before. Fortunately no injury was done to the machinery, and the trouble was caused by permitting the vessel to rest too heavily on the sticky clay. Finally the boat succeeded in lifting itself clear of the dangerous bed. The surveys which have been made with the submarine boat have amply demonstrated its usefulness.

Electrical Notes.

The Southern Railway is having 41 locomotives built in Richmond, and each is to be equipped with an electric headlight.

In laying a new fire alarm cable between Randall's and Ward's Islands and the main line of New York, a locomotive was used in hauling the cable into place. The engine performed the work with ease.

At the Henry celebration held by the citizens of Albany, December 16, President Verplanck Colvin of the Albany Institute read a letter from President McKinley in which he spoke most highly of the good work done by the late Joseph Henry in developing telegraphy.

In the electrical extraction of mercury the cinnabar ore is crushed to a fine state of division and is then treated with a hot solution of sodium sulphide containing sodium hydrate. The electrolytic vats are of iron and may be used as cathodes. The anodes are made of steel.

The extension desk telephone is constantly growing in favor. It saves the annoyance and delay of having to rise and go to a general office telephone. As the message comes over the general telephone line, the business man having the extension desk telephone can answer the call or not as he may see fit.

Tests of wireless telegraphy are being made across Lake Michigan. There is a car ferry operated by the Ann Arbor Railroad, and at present they are obliged to telegraph between the two ferry houses by way of Chicago, and the delays are enormous. It is hoped that wireless telegraphy will solve the problem of rapid communication for them.

The cost of the Yukon telegraph lines was about \$137,000. The distance from Lake Bennett to Dawson is 740 miles. There were no horses engaged in carrying on the work of construction, most of the carrying being done by scows on the river. According to *The Electrical World*, \$400 was taken in for messages on the first evening the lines were opened.

It has been discovered in St. Paul that electric ground connections made by attaching wires to water pipes not only ruin the pipes themselves, but also seriously interfere with the operation of the water meters. In one case the meter failed to register, notwithstanding the fact that large quantities of water flowed through it. The officers of the Water Board have ordered the removal of all electric wires from the water pipes.

The Manhattan Elevated Railway Company of New York has announced that the contract for the generators for the new power plant and the apparatus for the sub-stations has been awarded to the Westinghouse Company. The first of the dynamos is due for delivery in ten months, so that there is a probability that a portion of the Manhattan Railroad will be operated by electricity next year. Electrical equipment on the Kings County Elevated Road in Brooklyn is now completed so far as the Coney Island section from the Bridge up is concerned, and the cars make excellent time.

In connection with the transmission of current of high potential by the Union Carbide Company, of Niagara Falls, the current is stepped down from 11,000 volts to 2,200 volts at the works by means of seven transformers each of 2,500 horse power capacity, says *The Engineer*. These transformers are double the size of the largest hitherto constructed. The total weight of each unit is twenty-two tons, of which one-half is made up by the sheet iron used in the core. The clamps for holding the latter together weigh nearly two tons. The inclosing case is about 11 feet high and 8½ feet by 4½ feet in plan. The transformers are immersed in oil, which is cooled by water circulating through 650 feet of piping. The energy in the form of heat which must be disposed of in this way amounts to over 40 horse power at full load.

Commercial Intelligence quotes from the *Elect. Zeits.* that an association of farmers in the district of Ochsenfurt (Bavaria) is erecting large electrical works near the village of Bütthard, in Lower Franconia, which will be entirely devoted to agricultural uses. The current is produced close to the village of Schäfersheim, a distance of 11 kilometers, requiring for its creation a force of about 150 horse power, which is supplied partly by steam and partly by water, and conducted as current of 5,000 volts to the villages of Bütthard, Laudenbach and others, where it finds the most varied use. Movable electromotors for driving thrashing machines, chaff cutters, bruising mills, etc., are supplied, and connecting boards for the conducting wires are placed at every farm. The motors are of very simple construction, and can be easily handled by any of the farm hands. The electric light will be widely used in all the villages named, and on account of greater security with regard to fire in the lighting of agricultural buildings, it is daily increasing in use among farmers.