Now I think if he would try shooting twenty shots, first from a sporting rifle with a crooked stock which should "fit" him, and then with any army rifle, the needle gun, or other (they are all too straight), he would find a decided difference in the comfort and ease of aiming in favor of the former, and immediately abandon his position.

P. S. YENDELL.

Dorchester, Mass., Nov., 1866.

[Our report of Mr. Wiard's remarks on the Prussian needle gun was only a report. We no more indorsed his views than those of any one who presents them before the association. We believe the ideas of our correspondent to be correct. We have had some experience with fire-arms, and do not accept the opinions of any one man as conclusive. In regard to the heavy muzzle, we do not agree with Mr. Wiard, nor in his advocacy of a nearly straight stock. He says that "in the ordinary musket a considerable angle is formed (between the barrel and end of the breech), and in consequence a muscular effort is required to bring the gun into position for taking aim, and the force of the recoil is not so easily resisted.

We believe, with our correspondent, that the angle of the "ordinary musket," instead of being too great, is not enough. Certainly it is easier to bring the eye to a sight when this angle approaches the difference between the hight of the shoulder and that of the eye, than otherwise. As to the recoil, also, we differ from him. In a straight-stocked piece the recoil is delivered from the breech of the barrel directly to the shoulder, while in a curved stock it must traverse the curve of the stock, which then acts as a spring, receiving and holding a portion of the recoil.

Mr. Wiard, however, approved of a straighter stock because it compelled more care in taking aim. We do not agree with him in giving the Prussian needle gun any advantages over American breech-loaders.—EDS.

Scattering Shot-Gun.

MESSRS. EDITORS:—In your issue of Oct. 27th, a correspondent gives his remedy for a scattering shot-gun. For the benefit of those who may think of trying the discovery, I will give my experience. I was induced to try it on one barrel of a double duck gun with thick barrels, No. 11 gage. I accordingly followed the direction by tinning the muzzle to the depth of a quarter of an inch, then ground it true and even to the thickness of thin card paper. On testing the gun with No. 5 shot, I found the shot not well distributed, but in clusters The tin lining was much grooved and roughened by the discharge. On a second trial, the distribution of the shot was more satisfactory. The third time I discharged with No. 2 shot. The result was, the cross-piece between the muzzles which retains the ram-rod was carried away, and the muzzles, as far as the extent of the tin, expanded out the whole circumference as true as it could be formed by hand; at the same time the interior of the muzzle was restored to its original size. I doubt if in all cases so perfect a bell-muzzle as the gun now has, after removing the tin, could be so easily obtained without incurring the risk of a scattering in the opposite direction to the one aimed at. H. P.

Boston, Nov. 26, 1866.

Liquefaction of Carbonic Acid Gas.

In answer to the inquiry of a subscriber, we give the following information on the subject of liquefaction of carbonic acid gas. When carbonic acid gas is compressed at the temperature of the freezing point of water, with a power of 40 atmospheres, that is, 600 pounds to the square inch, it liquefies, 500 pints being compressed to the volume of a single pint; consequently the space allowed for the liquefied gas must be only one 500th part of the volume of the gas developed, and it takes exceedingly strong vessels to hold it, as its pressure at our summer temperature is double that amount, namely 1,200 lbs. for the square inch at 90° Fah., a tension far exceeding the resistance of our strongest high-pressure steam boilers.

The apparatus commonly used for the liquefaction of carbonic acid, consists of two very strong closed retorts, made of heavy copper, lined inside with lead, and outside strengthened with iron; one retort serves to receive the charge of bicarbonate of soda and sulphuric acid, the other to receive the developing gas, by means of stopcocks and connecting tube; this retort being placed in ice, condenses the gas to its liquid state. It is a very dangerous experiment when not made with a perfect apparatus. Hervy, in Paris, was killed by the explosion of a very strong iron retort of which the sides were more than an inch in thickness; it burst like a bombshell, by the pressure of the too rapidly developing gas. The enormous rate of condensation will not cause surprise, when we consider that the condensation of steam into water is more than three times as great; namely, to one 1700th part of its volume.

The liquefied carbonic acid gas is lighter than water, on which it floats, and which it freezes at once, when brought in contact with it; it shows in the most exalted degree the cooling properties of all very volatile liquids, as alcohol, ether, gasolin, etc. When drawn from the retort by means of a stop-cock, the carbonic acid partially retakes its gaseous state, but in this change it robs so much heat from the remaining liquid, that its temperature descends so low, that its further evaporation is most powerfully checked, and the result is the solidification or freezing of about one-quarter of the gas escaping. This snowy-like substance will retain a temperature of about 100° below zero, Fah., and when it is dissolved in ether and thus forced to melt, the temperature will go lower still (to 140°) for the same reason that the temperature of common ice and snow is lowered (to 0°) by forcing it to melt by the addition of salt. This mixture of solidified carbonic acid and ether will produce the same sensation to the skin as a red hot iron; it coagulates and hardens the blood instantly by the intense cold, producing a blister and intense inflammation.

European Railway Tariffs.

It appears from a report prepared for the British Royal Commission on Railways, on a comparison of the fares charged per hundred miles on the railways of the principal European states, that the average rates of Great Britain and Ireland for first, second or third-class cars, are greater than on either of the continental lines.

In the first-class carriages traveling is cheapest in Bavaria, where the fare is but $2 25 per hundred miles. This is nearly one dollar less than the average first-class tariff of the eighteen countries mentioned. Other states that charge below the average, are Prussia, the Rhine, Sweden, Belgium, Wirtemberg, Denmark, Saxony, Switzerland and Portugal; while Russia, Norway, Spain, Austria, Italy, Holland, France and Great Britain, exceed it. In the last named Kingdom the excess nearly equals the average, the rates being $4 62 per hundred miles.

Traveling in second-class cars is cheapest in Wirtemberg, being 1·66 cents per mile; the English charging nearly four times that amount for the same distance. The average is 2·33 censt—the list of countries exceeding, and those falling short, being, with few exceptions, the same as of the first-class carriages.

The fares in the third-class cars range from 75 cents per hundred miles, in Russia, to $2 00 for the same distance in the United Kingdom; the average is $1 50.

In the report, Prussia, Sweden, Italy, and England, are noted as having express trains, for first and second-class carriages only. Traveling on these trains is enjoyed at an additional expense of two English shillings over the regular fares. It should be stated concerning those countries where charges are so low, that if the roads do not actually belong to the state, the shareholders receive considerable government assistance, in consideration of their being obliged to adopt a low tariff.

A NEW mechanical excitant of vital action is called the "iron treatment." It consists in incasing the limbs in iron "tights" to which one or two thousand oscillations per minute are communicated by machinery. The operation sends the blood to the extremities with almost intolerable force and heat, and must be very easily overdone. Gov. Morton of Indiana, is said to be trying the experiment with apparent benefit.

MISCELLANEOUS SUMMARY.

A MICROSCOPE, with double the power of any previously constructed, has lately been completed in England, magnifying 15,000 diameters.

TEN or eleven distinct shocks of earthquake were recently experienced at Sorel, C. E., occupying a period of 30 or 40 seconds altogether.

THE Government standard of penetration for the Enfield rifle ball is twelve half-inch elm planks which have been soaked forty-eight hours in water; distance 30 yards.

THE great suspension bridge over the Ohio river, from Cincinnati to Covington, Ky., was opened to foot passengers on the 1st inst. It will not be fully completed for vehicles until the first of January.

THE principle of rotation in tanning vats is again attracting the attention of leather-manufacturers. It is asserted that the action of tannin is increased 500 per cent by keeping the hide slowly moving through the liquor.

THE total earnings of railways in the United Kingdom, says the London *Times*, amount to a good £40,000,000 a year; and if we allow even fifty per cent for working expenses, there will remain £20,000,000 to represent profits.

THE revolution in trade anticipated through the working of the Atlantic telegraph, begins already to be realized. English orders on the California markets for wheat pass under ocean and over land, and advices of the purchase return by the same path, within the business hours of a single day.

A FLOATING railway, the invention of M. Freland, of Bordeaux, has just been patented in France. It is described as likely to be of considerable service in loading and unloading vessels in ports having insufficient quayage accommodation, or where the depth of water does not permit ships of heavy tunnage to enter, except at high tide.

VAST as are the dock works at Birkenhead, the present dock space can be easily increased by some additional 90 acres of water space, with 18,000 yards of lineal quay space, which would afford loading berths of 3,000 feet each to upward of sixty vessels. Upward of a million and a half has been spent in dock works at Birkenhead since 1863.

THE project of a ship canal to connect Lake Huron with Lake Ontario, by way of Lake Simcoe and the Severn river, is again looking up. The county of Simcoe has guaranteed half a million of dollars to aid in the work. By cutting across an isthmus about forty miles wide, the upper lakes will be brought from 300 to 400 miles further eastward.

THE Prussian War Office has published a statement to show that it was not the superiority of the needle-gun, but of the men who carried it, that gave victory to the Prussian arms in the late war. The total consumption of cartridges during the campaign was only seven to each infantry soldier. In the bitterest engagement the highest figure was 13 per man of those present. During the war 900 cannon were brought into play, and each gun fired 40 rounds.

THE New Orleans *Times* announces a large manufacturing scheme in the South-west. The "Chatawa Water Power and Manufacturing Company," organized under a charter from the State of Mississippi, has secured nearly all the water power on the Tangipahoe river, sufficient to turn innumerable spindles. This little stream empties into Lake Ponchartrain, about 30 miles north-west of New Orleans. The first enterprise proposed is a paper mill, which will be pioneer in that part of the Union.

THE Agricultural committee of Sologne, France, has awarded the gold medal offered some time since to the inventor of a process which should enable French wines to be conveyed by land and sea, and preserved in any climate, without alteration in flavor. M. Pasteur, who receives the award, has succeeded in establishing the fact that the heating of ordinary wine to the extent of 50 degrees centigrade, is sufficient to kill all microscopic vegetation, or the ferments by which it is produced, without affecting color or flavor, and to insure the preservation of the wine in closed vessels, for an indefinite period. The various morbid changes in wines are found to be due to various stages or phases of microscopic vegetation, which M. Pasteur has accurately described.