Scientific American.

Steam versus all other Gases This has become a very important subject of appear to be the fact. late; and when we see such men as Ericsson, in America, and Du Tremblay, in France, or heater to supply the consumption of hotair. ing the apparatus to the cow. The flexible our common railroads than that now adopted spending thousands of dollars to find a sub- Any temperature that the heater could stand tific men.

The steam engine was at first called an atmospheric engine, because the inventors were sive power pressed into the air, but the friction trying to give motion by the pressure of the of so large and powerful an air pump wouldbe atmosphere, and only used steam in one end of very great. the cylinder. After the improvements of Watt, it was called a steam engine, because he ad- bountifully with a material that she condenses mitted steam to both ends of the cylinder. herself, if we only withdraw a little heat, com-Would it not be well to change the name once pressing 1700 volumes into one, so that while more, and call it a "Caloric Engine," for it is in this compact form a small force pump supcalorie and not steam that gives life and motion plies the loss, although the cylinder is throwto the machine. Viewing steam as the motor, ing off great volumes of steam. Nor should is the cause of many naturally turning their we omit the power saved by condensing the attention to other fluids more volatile than wa- steam-a process that looks more like gaining ter, and requiring so much less latent heat to power than anything else in practical physics. convert them into vapor—such as ether, alcohol, oil of turpentine, &c. The cost of these caloric engine. Steam, air, ether, or any fluid fluids would be an insuperable objection to or gas, is nothing but the gross matter for the their use, for although the vapor might be conheat to act upon, and in our present state of bly give their milk more freely after becoming densed, and the fluid worked over continually, knowledge, water possesses great advantages yet no machinery can be made so perfect that over everything else. The road to improvethe loss would not be considerable. But it can ment is to direct our energies to the cheapest by machinery. be shown that there is no advantage in using way to produce artificial heat, the best way to them, if they were as cheap as water, for the preserve it, and the most advantageous way to volume of vapor is in exact proportion to the use it. latent heat required to form it. The latent heat of ether is 300 deg., less than one-third that of water, and accordingly we find the vapor of ether occupying less than one-third the space of steam. The same is true of every old Solomon, for supposing there might be. To other vapor. The heat required to vaporize a fluid being the exact measure of the volume of Co., N. Y., the trouble of experiments, I will that fluid. In aeriform matter, the atoms are state that in the spring of 1847 a dairyman by forced so far asunder as to destroy cohesive attraction; we do not know what this distance is, but it is less than one-third for ether, as compared with water, and still less for some other substances. This property of matterdepends upon the cohesive attraction of the different kinds of matter, and not on the heat, which is always the same. A similar property belongs to solid matter, in that expansibility is in proportion to compressibility; thus a bar of steel will require double the heat to produce the same elongation required for a bar of brass, but will sustain double the weight before it is forced back to its original length.

The size of solid bodies is ever varying, depending upon the amount of heat in them, and the cohesive attraction of the different kinds of matter elevate the temperature enough to destroy this cohesive attraction; and we have gas, varying in volume in proportion to the force of the cohesive attraction that existed. This gas will now, however, occupy a space limited on the one hand by heat, and on the other by external pressure. The various kinds of matter, in its three forms-solid, fluid, and gas-are acted upon variously by heat. But heat itself-sensible, latent, or specific-like gravitation, is always the same. The only possible advantage of using any of these volatile fluids would be, that the engine might begin to play a little sooner, just as we can load a small vessel sooner than a large one; but to make their vapor occupy the same space, or expand with the same power as steam, the same amount of heat must be used, except a small advantage, in the heat being more occupied in expanding than making gas.

Atmospheric air is really the only competitor of steam, nothing else is cheap enough, it is even cheaper than water, and would be free from explosions by decomposition, as its elements are not chemically combined.

Let us bear in mind that steam once formed is equal to air or anything else,-much of the power of steam is obtained by heating it after it is formed. Now steam, air, and all gases are just alike—a volume of any of them will gain one part in three, if the temperature be raised 180 degs.-from freezing to boiling water,- ! ested, I send you the following, as my experino difference which gas it is, they are all alike. ence in milking by machinery: The advantage, then, of air or any permanent gas, is, to save a part of the heat that vapor- summer, for milking. It consisted of a vessel izes the water. It requires 1000 deg. of heat made of thick tin, in form and size of a large pondent, apparently an engineer, who appears dred persons were buried in the debris. Fearto form steam, which has an expansive force of watering-pot; it was furnished with an ex-15 lbs. to the square inch, as all gases must hausting pump nicely fitted on the top by a to the Railway Times of the 30th ult., contends have. Now 500 deg. will double the volume of screw joint, also a flexible tube attached to the that "it can be demonstrated to the convic- magining that an earthquake had happened, that steam, or any gas, giving it 15 lbs. addi- top by a screw joint fitted on the end of a short | tion of any practical man, that by a simple | iare reported to have run about in a frantic con-

stitute for steam, we are bound to believe that would only be a few doubles of volume, to force the subject is not well understood by all scien- back a fourth or an eighth, would be a great loss of power; nor could we afford to condense the air. True, we would get back the expan-

How fortunate that Nature supplies us so

Heat is then the grand motor in the steam J. G. H.

[For the Scientific American.]

The Mechanical Calf. "There is nothing new under the sun," and I am obliged to accept your wager in behalf of save your correspondent G. W. S., of Broome the name of Greenlee, in Crawford Co., Pa., applied to me to construct an apparatus for milking cows by atmospheric pressure, or through the medium of an air pump.

I detailed to him a variety of apparatus that knew would extract the milk if the cows could be broke to the new process. I however advised him that I did not think the process could come extensively into use on account of the expense, and the difficulty of keeping air pumps in proper order in hands unused to delicate mechanical apparatus. He, nevertheless, ventured boldly into the project, and footed the bills like a gentleman for three "Patent Milkers," holding about four gallons each, having two well-constructed air pumps to each, and four elastic rubber tubes, stop cocks, &c., affording me an opportunity to expend some of my best mechanical skillfor a couple of months. The apparatus was completed, and on gentle cows and easy milkers it worked beyond all my expectations, and my friend Greenlee began arranging his stables to milk his sixty cows by one great air pump, precisely on the plan detailed by your correspondent. But alas! for human hopes! the milk-maids are yet milking with their hands, and will continue to do so till some one has enterprise enough to manufacture without a patent, which was then duly applied for, model furnished, and long specifications detailing various appliances intended to cover every contingency, but the claim was rejected "for want of novelty, the same process having been applied to the human breast !" I denied the validity of the objections, as the apparatus as detailed was new and should have been patented; it was overruled, and my friend Greenlee, because he could not get a patent, neglected to milk even his own cows by machinery. I presume G. W. S. can get one of them for his experiments at half first cost, and with the thanks of one who spent some hundreds of dollars in such experiments.

Newark, Ohio. JOSEPH E. HOLMES.

The Mechanical Calf Once More.

I made an apparatus, seven years ago this tional force, so that if we could begin with air spout, intended by removing the tube by un- combination of machinery in common use, a dition.

at once, we would save 500 deg. This does screwing, as a discharge for the milk from the speed of 100 miles per hour can be obtained vessel. I had a stop cock in this spout to without any increase of tear and wear." But how are we to get the air into the boiler enable me to exhaust the vessel before applytube had four branches, each branch was furnished with a thimble of size and shape to receive the teats of the cow. This completed my apparatus for milking cows by machinery; it now remains to be told how it operated.

Well, I took it out to my friend, John Rinnard, near Westchester, who was kind enough 35 to 40 miles per hour. to let me try it on his cow. After exhausting the vessel I applied the thimbles to the teats and turned the stop cock. The suckers laid hold like a calf. The milk flowed into the vessel until all, or nearly all, was drawn from the cow, which required double the time it would to have milked the cow by hand.

I tried it on the same cow several times, and on different cows with the same results, and came to the conclusion that it would be of little or no use unless applied upon a large scale, as your correspondent suggests.

It is a gentle, easy way of milking, and the cows seemed to like it much, and would probaaccustomed to the process. On the whole, I am not satisfied that milking cannot be done Respectfully yours, Philadelphia, Pa. WM. H. HOWARD.

One Hundred Miles per Hour on Railroads. MESSRS. EDITORS-In your issue of August 11, you say, "Railroad trains will yet be runit is our opinion."

in your position in the community. You may a' per hour. The track is to be adapted to a peculiarly constructed locomotive, which is to be as light as may be compatible with requisite feet diameter. The vehicle is to embrace or constitute the engine, tender, and mail departarticles exclusively. The importance of the realization of auch a result you are fully qual-JOHN VANBLARCUM. ified to appreciate. Jacksonville, Ill.

[In alluding to the above remark of ours, referred to by our correspondent, the American Railway Times (Boston) of the 16th of August, in a very candid manner, said "there was no physical impossibility about the matter, but we doubt whether the present generation will witness any portion of the passenger traffic carried at that high rate, and the reasons are obvious. It will not pay, and the commercial question settles the question of speed. The expense of operation increases with great rapidity as the speed is increased, and the liability to danger and destruction is so greatly increased that few men feel like being hurled through the air at such fearful risk. Not until there is a radical and entire change in the superstructure and machinery used in the operation of railways, will the speed be increased to any considerable amount."

With some of these remarks we perfectly agree: with others we do not. The question of payability no doubt settles the matter, but with proper roads and machinery, higher speeds are just as safe as our present low speeds for higher speeds. Level and straight lines, was torn open. Su For the benefit of your correspondent G. W. do not involve a radical change. But higher from within. S., of Broome Co., N. Y., and all others inter- | speeds than those now adopted on our railroads will not pay excepting on lines running through very thickly peopled districts, and would not be Castel Nuovo, on the 20th July, where percussafe under the system of railroad management sion caps are made. The entire building was

We are no advocates of a higher speed on -perhaps it is a little too high for the present system; but we believe, and have asserted, that we have engineers who can build railroads and engines to run trains at the rate of 100 miles per hour as safely, though not so economically, as those running at the present speeds of from

The Farmer's Future.

An English correspondent of the New York Tribune, expatiates on the prospective introduction of steam power as an aid in agricultural operations, as follows :--- " The Farmers' Future will be found in the application of steam to the cultivation of the soil! We are rapidly coming to the conclusion here that the good old plow is a humbug. We begin to think that spade-husbandry applied by steam is the right thing; indeed, there are some among us of the opinion that a machine may be invented which should, in effect, plow, sow, harrow and roll altogether-a machine, in fact, which should make a seed-bed and sow the seed all at one operation. There has already been one steam-engine exhibited in this country which will walk anywhere, and do anything it is required to do. It has feet about the size of yours. Sir. and it puts them down upon the ground, one after the other, very much in the fashion of a dandy going up Broadway, only ning at the rate of one hundred miles per hour, the feet of the machine are fixed on wheels, and revolve regularly, instead of moving up and Instances of cars running from 80 to 100 down awkwardly, like his. This machine will miles per hour, cannot be news to gentlemen go through a plowed field very comfortably, and rather quicker than a good hunter will get not be apprised that there is now before the U. over it; and as it will drag a dozen plows after S. Senate a proposition for the construction of it, I do not see, for my part, why it should not speed locomotive," which the inventor is be made to carry, as part and parcel of itself, a confident will attain safely 400 to 500 miles mechanism that will readily convert the untilled ground into a seed-bed. Well, then as to drainage. I saw a machine the other day that would dig, drain, and lay down sixteen strength, to have four to six wheels ten and a half feet of piping per minute, the pipes being rather more regularly and satisfactorily laid than any skilled workman can lay them. ment, and to carry an engine and an attendant. The machine labored under the disadvantage The object is to transport mail matter and light of being cumbrous, and of being made to be worked by a stationary engine. But having got thus far, it seems to be only one step further to give us steam application to the soil so as to enable twenty times the quantity of land to be put under cultivation by the same amount of labor, and at no greater cost than now. Then we may hope for a produce of cheap corn, the great desideratum in this land of sweat and toil, where it depends upon a shilling or two, more or less, in the price of food, not only whether a man can reap the advantages of his labor, but absolutely, too often, whether he can continue to exist.

Yes, to the application of improved machinery to the earth must we look for an accession of home comforts, of world-wide prosperity, of universal happiness ! To Thee ! O, bountiful God of Nature, we offer our first thanks that Thou hast given us the great seed-bed whereon we live and move, and whence we have our being. To Industry be given our next best tribute, and then let us thank Art and Science that teach us how to make the best uses of the means so bountifully placed at our disposal."

A War Balloon.

Experiments are said to have been ordered at Vincennes, France, on an incendiary halloon of immense size, to see if it can be usefully emon railways. Fewer accidents take place on ployed at the seige of Sebastopol. A first ex-English railways than on ours, and yet the periment was made not long since, but the speed on them is a third higher. A radical balloon, after being filled in the court-yard of change of road and machinery is not required the fortress, caught the towers in rising, and bsequently the ballo more solid roads, and more powerful engines, repaired and again filled; but after a short are all that is required for higher speeds-these time it burst open, owing to the pressure of gas

Explosion of Percussion Cabs.

Anawful explosion at Naples occurred in the generally pursued. A very intelligent corres- blown up, and it is said that at least two hunto have studied the subject carefully, writing ing that another revolution had broken out, the soldiers rushed to arms, whilst the inhabitants,