to every practical farmer everywhere. All prairie countries are more or less subject to drouths at some season of the year; but in a climate where there is so little frost as in western Texas, there is plenty of time and plenty of rain to raise one crop, at least, during any year.

The time is fast approaching when western Texas will, in spite of the Mexicans and Indians, be as numerously inhabited, and her soil as successfully cultivated, as any other part of the State. The present inhabitants are well calculated to bring about these results. They know the value of the country, and if Congress will not protect them they will protect themselves. They are encouraging a healthy emigration, which is daily increasing from all parts of the older States, as well as from foreign countries. They are calling loudly for internal improvements; many of these have been authorized, well calculated to develop the vast resources of the country. Some have been commenced, and others are approaching completion, the effects of which are beginning to foretell the future of this nature-favored region. When peace shall have been restored and secured on our frontier and swords beaten into plowshares—when the steam plow shall be the champion and the reign of Ceres shall succeed that of Mars—then shall we see that planting and farming can be done to advantage in western Texas. It is now already known to some that the finest Sea Island cotton can be produced anywhere on the coast within reach of the sea breeze, at the rate of a bale to the acre, a sample of which I send you enclosed.

D. S. Howard.

Corpus Christi, Texas, April 26, 1860.

A STEAM AND AIR ENGINE–ELECTRICAL PHENOMENON.

Messrs. Editors:—While I was in Mulhouse (France), in 1858, a local company owned a steam engine of 12 horse-power, which was furnished with a boiler having only 8 horse-power of heating surface. As it became an urgent matter to increase the power, which was shown by the dynamometer to be 660 kilogrammes (1450 lbs.) lifted one meter (40 inches) in a second, an air-pump was added to the engine, the capacity of which pump was double the diameter and stroke of the feed-water pump with which it acted in concert. This arrangement brought the effective horse-power of the engine up to 750 kilogrammes lifted one meter in a second. The engine was kept running one-fifth faster, and the same pressure was maintained in the boiler; but it required more fuel, although not an increased proportion, to the gain of power. The necessary quantity of feed water was reduced by about one-eighth.

I was reminded of this case by having seen it recently stated in the Scientific American that only about one-fifth of the heat of coal is absorbed in boilers. In the case alluded to, the air was fed in through a pipe commenced near the top of the chimney, thence descending through it, growing gradually warmer, and finally entering as feed into the boiler at its bottom Perhaps such an arrangement may be found profitable in other cases, even when the boilers are not small. It was claimed for this plan that, besides the additional volume of elastic gas in the boiler, the steam was not so easily condensed in the pipes and cylinders as formerly; it being held in suspension by the heated air. This arrangement will not answer for condensing engines, as the vacuum air-pump would have too much work to perform, and the condensation of the steam would be much slower.

I have recently observed that if two pieces of raw india-rubber are held in close contact for some time, a brilliant line of light is seen at the joint when they are drawn asunder in the dark. If this is caused by electricity, it is not due to any of the three sources of electricity usually recognized, namely, friction, evaporation and chemical action.

E. Rose.

P. S.—Answering to the call for scientific help for the Polytechnic Association of the American Institute, in your city, I should be happy to furnish it if any member will be willing to act as my oral representative.

Ottawa, Ill., May 31, 1860. E. R.

[The engine described by our correspondent was converted into a combination steam and hot-air motor, and considerable saving was effected in utilizing the waste heat that had before escaped up the chimney, by applying it to warm the air that was fed into the boiler. The electric spark produced by the pieces of india-rubber (see last paragraph before the postscript) is undoubtedly due to frictional electricity.—Eds.

PULLING PINE STUMPS.

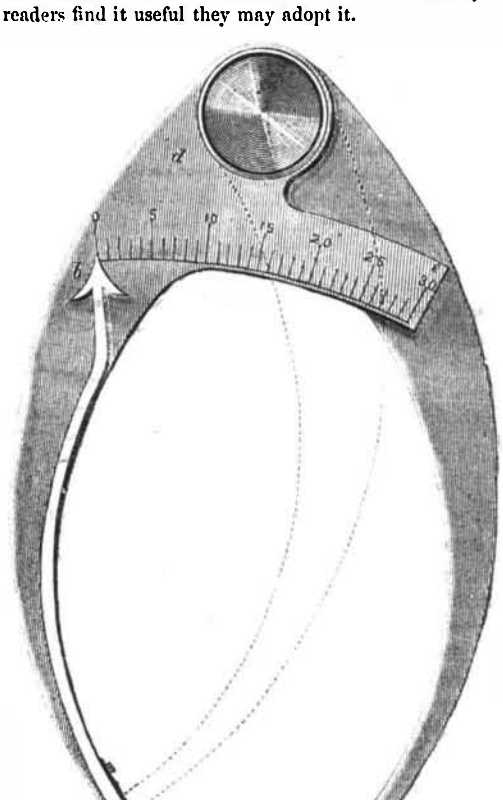
Messrs. Editors:—Our pine stumps in this section of the country are very troublesome and formidable. It is greatly to the interest of planters to have them removed. The process of digging and cutting or burning is too slow; we have a great many of them and require some machinery to work them with. Do you know of anything invented that will answer the purpose? The largest stumps are from 2 to 3 feet in diameter—most of them perfectly solid—with long, lateral roots, besides a long tap root firmly imbedded in a clay soil. The lateral roots, like the stumps, are of solid, light wood—large and long. Can you recommend any machine that will remove them from the soil? C. W. Dudley.

Bennettsville, S. C., May 28, 1860.

[There are a number of existing patents for stump extractors, many of which have been illustrated in the columns of the Scientific American, and it seems to us that the wants of our correspondent are met in some of them. We hope the matter may receive attention from those who can afford the desirable relief.—Eds.

A CUBAN INVENTION–IMPROVED CALIPERS.

Messrs. Editors:—Should you attach any importance to the invention of that instrument whose description and sketch I include in this letter, and think it worthy of occupying a place in the columns of that most excellent paper, the Scientific American (which comes to throw light even in the most remote corner of this island), you may publish it in order that if any of your readers find it useful they may adopt it.



The object of the invention is the construction of an instrument that will measure objects with greater precision than can be done with the common calipers. For this purpose the index, *a b*, girating at *c*, at the end of the leg, *c d*, of the calipers, has its arms, *a c c b*, in the proportion of one to ten. The arc, *b c*, which forms a part of the leg, *c d*, is divided arbitrarily into any number of equal parts, numbered as in the drawing.

To find out if two bodies are of equal dimensions, it will be sufficient to observe, when measuring them, whether the end of the index points to the same division on the scale; if such be the case, it is certain that both bodies are alike. As the smallest difference in the size will be augmented *ten times*, it will be made more sensible to the eye, and the measurement will be nearer to the exactness desired.

The spring, *f*, serves to keep the short arm of the index in contact with the body measured. The leg, *g*, put in the position marked by the dotted lines in the drawing, will make the instrument available for measuring inside diameters. Julius Deprez.

Colon, Cuba (W. I.), April 25, 1860.

PHILOSOPHY IN AN EGGSHELL.

Messrs. Editors:—It appears to me that the difficulty suggested by your very *wise* correspondent from Lancaster, Pa., relative to the heat of the butt end of an egg, is capable of a very simple solution. The difference of thermal sensation between the large and small ends of an egg, when applied to the tongue, is due to the fact that the large end of every egg possesses a small air-chamber, designed for the supply of the chicken, or at least supposed to be. Now, this portion of air is a good non-conductor. When, therefore, the tongue is applied to the shell, it is almost instantly heated, and such heat not being readily conveyed away by the air, the sensation of heat is felt. When the tongue is placed at the other end, the fluids within, being good conductors and in direct contact with the shell, convey away the heat rapidly from the shell and tongue, and then the sensation of cold is experienced. That this is the correct explanation is, I think, evident from the fact it is not at the *very first* touch of the tongue to the egg that the difference is experienced. A perceptible moment of time elapses ere the sensation of warmth is detected, and so, too, that warmth extends only over a small spot, answering exactly to the air-chamber, and not permeating the whole bulk of the egg, as would be the case with any "vital spark." Those persons who try the experiment will notice this. I, for one, do not consider it "a wonderful fact."

So also with the sugar question. The light proceeding from the friction or fracture of sugar is wholly electric, and the apparent sparks are only electric scintillations. I was surprised when, a week or two ago, I saw the question asked; for I thought all were familiar with the fact. If the readers of the Scientific American will attempt to produce these "sparks" on the night of some damp, warm, summer day, they will find it next to impossible to do so, thus showing that the electricity has been dissipated by the moisture in the atmosphere. I well remember (when a boy) once amusing myself on a dark winter evening, by striking out these sparks of electricity. I was then longing for an electrical machine, but the purchase of it being beyond my means, I resorted to some large lumps of loaf sugar (as I had read that it was highly electric when rubbed or abraded), and I was much delighted with the resultant light and glow. Are not these explanations correct ones? R. W.

New Berlin, N. Y., May 26, 1860.

GRIST MILLS AND MILLING.

Messrs. Editors:—On page 307 of the present volume of the Scientific American you published the letter of a correspondent in Baltimore, giving some practical information on the subject of milling. Having built about 40 flouring mills during the last 14 years, I believe that a few suggestions from me on the subject will be useful to many persons.

My present mode of constructing mills is to give stones 4 feet 8 inches in diameter, 160 revolutions per minute, and a 4-feet pair 170 and sometimes 190 revolutions per minute. In the early part of my career as a millwright, we used to run stones with a much slower motion than we do at present. My experience has led me to prefer the faster motion, because the grain is thereby passed more rapidly from the eye of the stone to the grinding or flouring surfaces, and the grain is thus ground more rapidly, and also more evenly. I have found that with large stones and a slow motion, it was very difficult to keep a sufficient amount of grain under the grinding surfaces. With 4-feet stones running at the rate of 190 revolutions per minute, I find that 1,200 pounds of wheat can be ground per hour; all things being in good order, and ample power furnished for the purpose. I now use 4-feet stones in most of the mills which I am building, and prefer those to any other size, as I believe they do as good work and grind as fast with the same power as larger stones.

My mode of manufacturing corn meal is to use a reel about 5 feet long, covered with No. 19 wire cloth, which makes finer meal than the coarser cloth that has been more commonly used for bolting. We make Graham flour by the same bolt, which takes off the coarse bran. I use 60 feet of bolting surface for wheat flour, so as to get out the whole flour in the wheat and separate it from the bran.

I. B.

Binghamton, N. Y., May 31, 1860.