to the subject of propelling balloons in any required direction; and so various and numerous were the projects and devices, that to describe them would require volumes. One man arranged a series of balloons upon a horizontal platform or flat boat, with broad horizontal wings at the sides, and an arrangement of sails at each end. Another arranged a series of balloons vertically, one above another, with various projecting arms and halliards for changing their relative positions. Many different plans were projected, in which horizontal planes were employed capable of being inclined for the purpose of producing horizontal progress by the inclination of the planes in one direction while the balloon was ascending, and in the opposite direction when the balloon was descending; the balloon being made to ascend and descend by alternately discharging the gas and the sand ballast.

The most rational and sensible plans projected, were those in which broad wings were employed in the manner of oars; the wings being thirty feet long, and the blade part about six feet wide; in rowing with them the blade was feathered, or brought to a horizontal position, while being moved forward.

The most ridiculous projects were those—and they were many and diverse—in which sails and rudders were employed, or at least, appended to the balloons. It is difficult to understand how people of any intelligence could have overlooked the fact that when when the entire apparatus was floating passively with the air current, neither sails nor rudders could be affected thereby, or exert any influence on the course of the balloon. But many persisted in experiments; and especially after the introduction of steam-power, several complicated and expensive plans, more ingenious than judicious, were introduced for the purpose of aerial traveling; and many plans were projected for flying by means of wings, without the aid of hydrogen. Capt J. Morey, of Fairlee, Vt., invented a winged machine that would fly by the force of a coiled spring. After ascertaining that no steam arrangement could be made to furnish sufficient power to support the weight of a steam-boiler, he invented a very ingenious and scientific engine, in the operation of which, atmospheric air was expelled from a light metallic cylinder, by the explosion of the vapor of alcohol and spirits of turpentine combined, and mixed with about seven times its volume of common air; atmospheric pressure from without being employed to furnish the required power. Petroleum and gasoline were not then known, otherwise this invention might have succeeded better. As it was, he succeeded in propelling a boat with good speed, and was at one time offered $50,000 by a Philadelphia Co. for the right of his invention, but with the materials which he had, he could not produce the explosions with sufficient rapidity, or perfect a vacuum quick enough to operate the wings of a flying machine.

Prior to this, the effect of oblique revolving fans was discovered, and many were employed in aerial experiments. M Landelle invented a very expensive apparatus, consisting of a light boat about fifty feet long, with two tall masts or poles, upon each of which were mounted four horizontal fan wheels, similar to modern four-bladed propeller wheels, but much larger and lighter; and these were to be revolved in contrary directions by steam power, for the purpose of elevating the machine with its contents, and holding them suspended in the air, while other similar propelling wheels were adjusted at the stem, working vertically for the purpose of propelling the ship forward. This craft was furnished with rudders for steering, and a large horizontal wing, thirty by twenty feet, attached to each side of the hull, for the purpose of steadying it, and regulating its position. Below the hull, suspended by cords from each wing, was a boat-shaped car, which, with its contents, served as ballast, to keep the ship in an upright position. The steam engine was situated in the center of the main boat. The two rudders—one at each end—were judiciously formed and arranged, being very long, and each consisting of four broad leaves, two vertical and two horizontal, with a long stem in the center. Such, at least, was the project; but the voyages accomplished, or experiments made with this aerial ship, are not found in history.

On the 7th of January, 1785, a famous areonaut by name of Blanchard, accompanied by Dr. Jeffrier, an American gentleman, started in a balloon from the cliffs of Dover, England, for the purpose of sailing over sea to Calais, France. The balloon was well inflated with hydrogen, and furnished with what appeared to be an ample supply of ballast. They rose majestically, with a favorable breeze; but when they had proceeded nearly half way, they came into a vein of rarefied and chilly air, that refused to support the balloon, and they began to descend towards the middle of the channel. They threw out their ballast gradually until it was all exhausted, and then commenced throwing over all their bottles and books, next their grapples and cords, and lastly a portion of their clothing. But having nearly reached the French coast, the balloon began to ascend again, and rose to a considerable hight, so that they passed over the highlands, and, by letting out a portion of gas, they landed near the forest of Guiennes.

In consideration of this aerial feat, the King of France presented M. Blanchard with 12,000 livers, as a token of appreciation of his skill and perseverance. But the phenomenon of the sudden descent of the balloon, has never been satisfactorily explained. The balloon being wafted by, and moving in unison with the breeze, must have been surrounded by the same air, at the time of its descending tendency, that it was at the commencement of the voyage. It might have been the effect of electricity, which is known to move altogether independent of aerial currents, and which might have suddenly rarefied the air in the vicinity of the balloon, depriving it of its ordinary buoyant power; or in some inexplicable manner a vertical downward current, diffusing itself upon the sur face of the ocean, might have overcome the buoyancy of the balloon.

Professor John Wise, of Lancaster, Pa., and several other popular aeronauts, have promulgated the theory that a balloonist might travel to any part of the world, by taking advantage of the various air currents at different altitudes of the atmosphere. And many announcements have been made by different aspirants for fame, of intended aerial voyages to Europe. These have been published and reiterated, and set times appointed for starting. But the uncertainties of the weather, or of finding congenial currents to waft them to the desired landing place; the difficulty of replenishing the balloon with gas by the way; the difficulty of ascertaining the direction and speed of the balloon, in a dark, cloudy night, and many other difficulties, appear to have deterred the bold aeronauts from attempting the voyage. To thus expose their lives to imminent dangers would have been worse than useless, when, even if successful, there was not the least possible prospect of anything useful being derived from the hazardous precedent. In fact, the apparent dangermust have been of serious magnitude, to have discouraged Professor Wise, who has been the most daring high-flyer the world has ever produced. Upon one occasion he was bold enough to ascend to a hight of thirteen thousand feet, and there burst his balloon to demonstrate the truth of a favorite theory. He made his ascent from Easton, Pa., in the midst of a terrific thunder-storm, and rose to the hight of two miles and a quarter, and while the storm flashed and raged furiously a mile below him, he deliberately burst his balloon, thus permitting the gas to escape, and consequently he began to descend rapidly until the rush of air caused the lower part of the balloon to cave into the upper hemisphere, thus forming a mammoth parachute, whereby he was lowered down safely to terra firma, though in the midst of wind and rain. On several subsequent occasions he successfully repeated the experiment, minus the thunder and rain.

Correspondence.

The Editors are not responsible for the Opinions expressed by their Correspondents.

Friction and Percussion.

MESSRS. EDITORS:—On page 246 of your issue of October 16, there is an article on "Heat, and its Relation to Friction and Percussion," apropos, and in favor of the vibratory theory.

While I am not at all disposed to take issue with the writer, "Spectrum," I must beg to differ from him in deductions from some of the cases offered. He holds that the heating of a nail held upon a grindstone is the result of the percussion arising from the jumping of the iron from one particle of the stone to the next, and estimates, indirectly, that in the majority of instances heat claimed to arise from friction is the result of percussion instead.

Let "Spectrum" hold an old-fashioned brass-headed tack or a smooth brass button between his thumb and finger, and rub it briskly up and down the grain of a planed pine board until he can guess at the amount of percussion produced, and, in my opinion, he will drop the button if he does not the theory, before he finishes the calculation.

The heat conductibility of the metal suggests an illustration relative to the heating of the nail by rapid blows of a light hammer, when slower, but heavier blows failed to raise the temperature of a nail, alluded to by "Spectrum."

Several years ago a hammered horse nail machine, now in successful operation at Falls Village, Mass., came near proving a total failure because the nails would cool before they were finished; and it was finally discovered that in slow hammering the long contact of the hammer with the heated nail conducted away the caloric, while sharp, quick blows tended to raise rather than lower the heat.

Will "Spectrum" please inform me why it is that while iron can once be heated in this way by percussion, but, if suffered to cool, the heat cannot be reproduced in the same manner, until after the iron has been heated by the absorption of foreign caloric? Then the experiment can be repeated.

New Albany, Ind. C. C. H.

How to Observe the Sun.

MESSRS. EDITORS:—On page 139, present volume, your article, "Storms in the Sun," shows conclusively that visible disturbance there is instantly followed by electric disturbance here.

A regular daily record of the visible state of the sun, compared with our meteorological records, might lead to important discoveries.

Believing that a simple means of observing and accurately recording solar phenomena would induce amateurs as well as professionals to keep such records, I respectfully propose the following method, which I have never heard of being thus used by any one before: Take an astronomical refracting telescope, with Huyghenian eye piece, into a dark room, direct it on the sun through an aperture, push in the eye piece until it is between the object glass and its principal focus; now place a fine white screen at some distance from the eye piece and focus sharply; a large, clear, well defined, erect image of the sun is thus obtained, which may be enlarged or diminished at will; arrange the aperture, increasing or decreasing the light until the finest details are visible. The sun can now be examined without darkening glasses, and by several persons at once.

For uniformity of record, I would suggest the adoption of one regular size, say a circle inscribed within one square foot, divided into square inches. The spaces being numbered from right to left, and from top to bottom, the exact position of any disturbance observed could thus be easily ascertained and recorded.

The above is a very powerful and convenient combination offering advantages rarely obtained, except by very costly instruments; for instance, to-day with a 36-in. achromatic, 6 inches in diameter, taking the image in its principal focus as one, I threw an image of the sun on the screen, magnified 900 times, a faint spot appeared to be only one, but on increasing to 80,000 times it was resolved into five separate and distinct spots.

I know of no other combination that will give a like result so cheaply. JOS. VOGLE.

Tuscaloosa, Ala.

Steam Generators.

MESSRS. EDITORS:—In your American Institute notice of my Steam Generator, on page 282, your remarks are correct so far as they go; but permit me to add that the principle upon which this invention differs from all other attempts to produce steam without having any water standing in the generator, is, that the steam in the generator is made to let the water into it, and to graduate the quantity in the exact ratio demanded, so as to keep up any given supply and pressure required—limited only by the capacity of the generator. If 50 pounds of steam be required, the overflow valve, on the water stream the pump is throwing, is set at that number of pounds, and when the pump is set in motion all the water it injects is immediately evaporated into steam, and as soon as it reaches, say, 51 pounds, it resists any more being fed into the generator, and passes back through the overflow valve into the tank, the resistance being the least in this direction.

The steam now being used reduces the pressure, releasing the water in the pipe so that it discharges just the amount of water necessary to keep up the supply demanded.

Albany, N. Y. THOMAS MITCHELL.

The Fossil Man of Onondaga.

MESSRS. EDITORS:—In your last issue I notice a letter written by Prof. Boynton in regard to this supposed antique man-image.

It now seems that though Dr. Boynton was not humbugged into the belief that the stone was really a fossil, he made almost as ridiculous a mistake in his Jesuit theory.

The image turns out to be the handiwork of a Canadian stone cutter named Geraud; who fancying himself a second Michael Angelo, "fashioned an image in likeness unto a man," but unluckily the artist died before achieving immortality.

This is an age of speculation and parties "on the make" saw a speculation in the eyes of poor Geraud's St. Paul. Gerand had scarcely been himself buried, before his statue which he fashioned in secret, was spirited away and interred also in a spot judged fitting to carry out the plot of the fraudulent schemers.

A year elapsed and poor Geraud was almost forgotten, while the one or two individuals to whom his secret had been confided had ceased to think either of him or his statue of St. Paul, when in digging a well or something of that sort, the feet of the entombed saint were discovered by the astonished (?) diggers. Inch by inch the entire image was unearthed; the speculators built there a tabernacle and reaped there large profits from a gullible public. It is said that they made more money in three days than they ever saw before in all their lives, and certainly, as a joke, as well as a speculation this scheme is the best thing achieved since Barnum's palmiest days.

Hereafter, it will be wise not to admit exhumed saints into good society until their antecedents have been well ascertained. G. B.

Syracuse, N. Y.

[There are contradictory reports about this matter. We were at first inclined to suppose the matter a humbug, but we do not feel authorized to so pronounce it in the absence of further information.—EDS.

The Prize Offered by the Swiss Government for a Time and Percussion Fuse.

MESSRS. EDITORS:—In one of the late numbers of the SCIENTIFIC AMERICAN, I observe an inquiry by a correspondent relating to a certain prize offered by the Swiss Government for percussion fuses. They want what they term a "universal fuse." I send you an article bearing on the subject taken from the *Neue Freie Presse*, of Vienna, dated the 5th Oct., which conveys all the information that is required.

Hanover, Germany. C. G. MUELLER.

"The military department of the Swiss Government has given notice, that it will pay a premium of 10,000 francs for a fuse which will possess the following qualities—a full-sized model being required. The fuse must be a time and percussion fuse. The adjustment as to time should be manageable entirely by hand; the time of burning should be at least ten seconds, and admit subdivisions of one half and one fourth seconds, the latter being also the time for the shortest adjustment. The fuse should be so constructed that it can be made ready for firing only by uncovering and time adjustment; the jarring motion of the carriage should not be able to produce accidental ignition; the fuse should be adaptable to the hollow projectiles which are used in the Swiss army. The construction should be sufficiently solid so that no premature discharge in the barrel can take place. The composition of the fulminate should be well enough protected against atmospheric influences, that after a number of years no material variation in the time of burning can be perceived The method of construction should not be laborious and expensive, and the corrrectness of the process be easily regulated."

Fresh-Water Wells near Salt Water.

MESSRS. EDITORS:—In answer to your correspondent, J. Q. Adams, page 263, current volume, I offer the following explanation: The sand is saturated with rain water which, notwithstanding the tides, will be intermixed with sea water very slowly, because the minute spaces between the sand grains prevent immediate mingling, and successive rain falls will repel the slowly advancing sea water before it reaches the well. Therefore at a certain distance from the shore the sand is always saturated with fresh water which can be obtained and used in the manner described by your correspondent.

HUGO BILGRAM.

Philadelphia, Pa.

Fire from Steam Pipes.

MESSRS. EDITORS:—About twelve years ago, when in charge of a pattern shop in New York city, I had a steam glue heater for the use of the shop, and, having noticed a pine block lying upon it for several days, I picked it up to throw it away, but noticed it was partly charred through. It excited my curiosity, and I decided to replace it and watch it; but after watching it, and having the night watchman look after it nights for about a month I gave it up. By that time it was completely charred through, not like a piece of charcoal from a pit or kiln, for it had a dark-brown color, but would ignite and burn as easily as a piece of charcoal made from the same kind of wood. I have since always been careful in putting in steam pipes to keep the pipes from coming in contact with the wood work.

With clean wood, I think there is little danger; but with wood containing considerable pitch, or saturated with oil, I think danger from spontaneous combustion is imminent. Though requiring care in putting up, I consider steam pipes the safest and most economical means of heating a factory, store, or dwelling, and have advocated their use in different ways during ten years of engineering practice.

Marquette, Mich. A SUBSCRIBER.

INFLAMMABLE GAS-ENGINES.

[By. F. A. P. Barnard, L.L.D., Commissioner to the late French Exposition.]

The enormous force developed in the explosion of gunpowder could hardly fail early to occupy the minds of the ingenious, with the effort to make it available for the uses of industry. Accordingly, we find that this problem formed a subject of study with such men as d'Hautfeuille, Huyghens, and Papin. But the intense energy of the force and the suddenness of its action seem to have discouraged the attempt to apply it directly as a motive power. The earlier experimenters occupied themselves with the endeavor to turn it to account by indirect means. The expedient which appeared to them most promising was to use it for the purpose of creating a vacuum. In fact, if a comparatively small charge of gunpowder be exploded in a closed vessel furnished with valves freely opening outward, the enormous expansion of the gaseous products of the explosion, an expansion due to the excessive heat developed, will drive out the atmospheric air through the valves, while the gases, contracting almost as suddenly as they expanded, will leave the vessel nearly void. It was first proposed to apply this principle to the elevation of water. A very simple apparatus suffices for this purpose. Let there be placed, for instance, such a vessel as has just been supposed, some fifteen or twenty feet above the level of a reservoir; a tube, open at both ends, communicating between this vessel and the reservoir will be all that is needed. So soon as the air has been expelled from the vessel by whatever means, the water of the reservoir will rise under the pressure of the atmosphere and occupy its place. This water may then be discharged at the superior level, and the apparatus will be ready for the repetition of the operation. In order to prevent the return of the water to the reservoir, when the orifices of discharge of the upper vessel are opened, the tube may have valves in it opening upward but closing under a downward pressure, or, what is simpler, it may be recurved at the upper extremity and enter the explosion chamber by the top. Such was the application of this power suggested by d'Hautfeuille. Huyghens perceived that it was capable of being turned to more varied uses. He proposed to employ a cylinder with a movable but air-tight piston to serve as an explosion chamber, with a view to obtain a reciprocating motion. In fact, by blowing out the air contained in such a cylinder through valves properly disposed, the atmospheric pressure could be made to force the piston downward, and thus indirectly to move the arm of a lever to raise a weight or to turn a crank. The valves suggested and perhaps actually used by Huyghens for this purpose were sufficiently rude. They were nothing more than open but flexible leather tubes, which, after allowing the air to escape, were expected to collapse under the pressure from without, and prevent it from re-entering. Papin substituted for these a much more efficient and neater contrivance. This was to make an opening in the middle of the piston sufficiently large for the free escape of the air, and to cover this with a bell. The bell, yielding to the upward pressure, permitted the air to pass out, but, dropping immediately after into its place, effectually prevented its return. But none of these expedients sufficed to make a practically useful gunpowder engine.

In 1791, John Barber, a British inventor, patented a project for a new motive power, which may perhaps be regarded as embracing the germ idea of the modern inflammable-gas engine. This project, however, for it amounted to nothing more, was of the crudest sort. The motive force was to be derived from the direct action of a powerful current of flame, which he proposed to create by the combustion of inflammable gas mingled in explosive proportions with common air. The gas was to be generated by the destructive distillation of any combustible substances in a tight vessel. From the generator it was to be conducted into another chamber, called the "explosion chamber," common air being simultaneously introduced into the same vessel by a different channel. Under such circumstances combustion would of course be explosive, generating a powerfully outrushing stream of flame, which might be maintained as long as the gas should continue to be supplied. As the plan was only to employ the "*vis viva*" of this stream to turn a wheel or a windmill, the unpractical nature of the scheme needs not to be pointed out.

In 1794, another British inventor, by name Robert Street, patented a gas engine, founded on principles somewhat more rational than those which seem to have guided Barber, inasmuch as he clearly perceived that if heated gas is to be made the medium of applying mechanical power, it is through its elasticity, and not through the momentum of its mass, that we must expect to see the useful effect produced. But inasmuch as Street proposed to make the cylinder of the engine itself the generator of the gas by which the engine was to be driven, his scheme in a practical point of view was not a whit less visionary than that of Barber.

These early, and, as they seem to us now, absurd projects, though they bore no fruit, and were probably never even subjected to a serious experimental test, deserve mention in the history of this subject, as marking the progress of an idea destined at length to be successfully wrought out. Indeed, considered as an idea merely, it was successfully wrought out only a few years later. The gas engine, in every essential particular, such as it is at the present time, that is to say, actually realized in a form available for purposes of industry, was invented as early as 1799, and patented in France by an ingenious artisan named Lebon. Nevertheless, this machine was not a success. It attracted no notice in the scientific world, and inspired no confidence in the industrial. After the lapse of about half a century it was re-invented, and re-invented, doubtless, quite independently; the resemblance of the modern machine to that of Lebon being so complete that a description of one of them might easily be supposed to have been taken from the other. At the date of Lebon's invention illuminating gas had not yet come into general public use, but the mode in which he proposed to prepare the gas for his engine was precisely that which is now in universal use in the works of the great city gas companies. Having thus provided himself with a sufficient reservoir of this essential material, his plan was to introduce a certain charge of this into the cylinder of his engine beneath the piston, and simultaneously through another channel to admit a proper proportion of atmospheric air. The mixed gases were then to be exploded by means of the electric spark, their consequent dilatation furnishing the desired motive power. The inventor seems to have overlooked no provision necessary to secure the perfect success of his plan. The engine was entirely self-regulating. It operated two pumps, one of them designed to introduce the supply of gas, and the other that of air. According to the descriptions, by which only we know it, it would seem to have combined every feature important to secure success, and yet, as already stated, it was not successful. Its failure is probably to be attributed to the influence of several causes, which, in the progress of improvement in the industrial arts, and the simultaneous advancement of experimental science, have since ceased to exist. In the first place, as just remarked, inflammable gas had not yet been introduced for purposes of general illumination; and the preparation of gas for the engine must have been troublesome and disproportionately expensive. Electrical science, moreover, had not then reached such a state of perfection as to be in condition to suggest an apparatus for producing the spark required to inflame the gases, capable of operating with the unvarying certainty indispensable in such a machine; and finally, the mechanic arts were probably yet unequal to the requisitions of a problem involving the peculiar difficulties which the construction of this engine presented. In point of fact it can hardly be doubted that mechanical difficulties were among the principal obstacles which prevented the full realization of a project which, abstractly considered, seems to have been entirely feasible. Many other inventors since Lebon, have occupied themselves with gas engines. Until within the past ten years, none have succeeded in establishing their inventions in the confidence of the industrial world. Of machines of this class which have left no trace except in history, it is unnecessary here to speak with minute detail. There is one of them, however, which deserves a passing mention, as having been distinguished from the rest by a feature which may be characterized as more bold than practical. This consisted in the proposed substitution of oxygen gas instead of atmospheric air in forming the explosive mixture by which the piston was to be driven, and hydrogen instead of coal-gas; the proportion being that required to form water by combination; so that after explosion the vacuum of the cylinder might be complete. It is true that immediately after the explosion, the water of combination would exist in the state of vapor, and that this would have a momentary elasticity so great as, by its direct action, to drive the piston to the end of the cylinder. But this vapor would be almost instantaneously condensed, especially if the cylinder were kept properly cooled; and a vacuum being thus formed practically perfect, the piston, on the opening of the valves for the admission of a new charge of gas to the opposite side, would be urged by the full pressure of the atmosphere upon its entire surface. If this idea could be practically realized, it would certainly be attended with very sensible advantage. In the gas-engine as now constructed, there is necessarily a period during each stroke in which the effective force is zero. This is the case during a great part of the time of admission of each successive charge of gas, which continues for one half the length of the stroke. If during all this time there should be a vacuum in the opposite end of the cylinder, the engine, instead of being powerless, would be actuated by a positive working force upon the piston equal to one atmosphere; an advantage which more than doubles the efficiency as yet secured in any motor of this class. The project here described was patented by James Johnson, a British inventor, in 1841.

Mr. Tresca, in an interesting article published in the Annals of the Conservatoire, has expressed surprise that subsequent inventors have not occupied themselves more with this idea of Johnson. But in point of fact, the plan is much more plausible than feasible. To say nothing of the trouble and expense of generating the gases, which in the case of oxygen, especially, would be sufficient to defeat the economical object, the violence of detonation of the pure gases in the proportions suggested would be such as to endanger the safety of the machine, or to render the power unmanageable. It is also perhaps questionable whether, in practice, the condensation could be determined so as to take place at the moment desired. If the piston were free to take on the velocity of a projectile discharged from a gun, no doubt the pressure would follow it to the end; but if, owing to the connections by which the force is to be utilized, the motion of the piston is comparatively slow, the collapse may occur before it reaches the limit of its course. In such a case the vacuum would be injurious. In order to reduce the violence of the explosion, the quantity of gas employed in each charge might be diminished, and the charge might be allowed to dilate to some extent, as it would naturally do in consequence of the movement of the piston, before being fired. But these expedients would reduce correspondingly both the direct effect of the gas, and the indirect effect of the vacuum which it is sought to utilize. It is not very surprising, therefore, considering all the difficulties in the way, that no successful gas-engine has yet been constructed, deriving its power from the explosion of hydrogen with oxygen.

Three engines present themselves in the present Exposition which derive their force from the combustion of inflammable gas. Two of these employ the direct pressure of the gases as dilated by combustion. The third reverts to the principle which chiefly occupied the earlier inventors, viz., that of using the gases only as a means of clearing the cylinder of air, and rendering available the pressure of the atmosphere. It is to this last, which, though not earliest in the order of invention, revives the idea which belongs to the earlier period of this history, that attention will be first directed. This prominence of position may also be considered as due to this machine, since it was rewarded by the jury with a gold medal, while the other two just mentioned received a less honorable distinction.

Sewing Machines Driven by Electricity.

It seems that the subtile force of electricity, which has annihilated space in intercommunication, is now to be called in to ameliorate the condition of that large and meritorious class of community, women who support themselves by work with sewing machines, and to make the operation of the sewing machine in the family no longer a task but a luxury.

All who have witnessed the operation of Gaumé's Electro-Magnetic Engine, ourselves among the number, are convinced that it must eventually be largely employed as a motor for this purpose. And all philanthropists must join us in wishing success to an invention so well calculated to do good.

As we will shortly illustrate and describe this machine at length, we will not at this time enter into its details. Suffice it to say that the numerous obstacles which have barred the way to success in this field seem all removed, and that the cheap compact motor so long sought is at last obtained.

Although involving well known principles of electric science, there has been much ingenuity displayed in their application, and in its scientific as well as practical bearings the machine is well worthy of earnest attention.

The manufacturers of this machine are represented by Mr. H. C. Covert, 535 Broadway, New York, at which place the machine may be seen in operation.

The Hotchkiss and Buss Brick and Tile Machine.

This machine, a notice of which, with illustration, was published on page 337, Vol. XIX of the SCIENTIFIC AMERICAN, has, we understand, taken premiums at the Ohio, Indiana, and Missouri State Fairs, and at the previous Fair of the American Institute.

The machine is a low priced one, an important consideration for men of small capital. It is so constructed as to be exempt from damage by roots, stones, etc., and makes as perfect a finished brick as we have ever seen. The bricks are not pressed into shape, but are cut from a mass of clay, previously rendered homogeneous in the clay mill and formed into a flat sheet of the proper thickness. It is as well adapted to the manufacture of tiles as of bricks.

For the details of its construction we refer the reader to the descriptive article referred to, which will give a better opinion of the machine to practical men than anything short of inspecting it in actual work.

A very large saving over hand labor is effected by this machinery, and we regard it as worthy the earnest attention of practical tile and brick makers who are anxious to obtain a cheap, durable, and effective machine.

PROFITABLE FARMING.—A gentleman called at our office a few days since with a very ingenious machine for gathering cranberries, for which we are soliciting letters patent. While explaining his invention, he incidentally remarked that he had over one hundred acres of cranberry land which he bought some years ago for 50 cents per acre. He has recently refused $20,000 for eight acres. It should be bore in mind, however, that it cost a good deal of time and money to get the land in condition to bear the cranberry successfully.