AGRICULTURAL INVENTIONS.

Mr. William D. Ferguson, of Blue Mound, Ill., has patented an improvement in check-row corn planters of that class in which the seed-dropping slide receives motion from a rope stretched across the field, so constructed that they can be operated to drop the seed at uniform distances apart by means of a smooth rope.

Mr. Solomon P. Baughman, of Herring, O., has patented a simple device for regulating the depth of the furrow made by the plow. It consists of a clevis whose inclination is adjusted by a jointed screw on the plow beam.

A combined plant setter and fertilizer distributer has been patented by Mary I. Goldsmith, of The Plains, Va. The object of this invention is to facilitate the operation of setting tobacco and other plants, and applying fertilizers thereto.

Mr. John W. Witt, of Grenola, Kan., has patented attachments for connecting plows to sulkies which are so constructed as to be used with a right-hand plow and a left-hand plow, and which will allow the plow to work with entire freedom and to be raised and lowered as circumstances may require.

Mr. Henry Parker, of Gananoque, Ontario, Canada, has patented an improved potato digger so constructed as to raise the potatoes and soil from the ground, separate them, and deposit the potatoes upon the top of the ground at the side of the digger.

Mr. Lovell A. Richards, of Grayson, Cal., has patented an improved feeder for thrashing machines, so constructed as to feed the stalks of grain to the thrashing cylinder regularly and continuously, and to prevent the machine from being choked or jarred by irregular feeding.

Mr. Julius Hartmann, of New York city, has patented an improved reversible plow which is constructed so that it can be reversed at the end of the furrow, can be adjusted in height as may be necessary, and is provided with a carriage that can be adjusted in width to suit the furrows.

In potato diggers as commonly constructed scoops and vibrating screens have been used, but they have generally been only partially successful in separating the potatoes from the dirt, in consequence of the great accumulation upon the apron, which not only hinders the separation, but adds to the weight and draught of the machine. Mr. Henry Arnold, of Peru, N. Y., has patented a potato digger in which any accumulation of soil upon the screen or apron is prevented by commencing the separation at the moment the potatoes and dirt are taken up.

The Pressure of Wind.

In a paper before the American Society of Civil Engineers, Mr. C. Shaler Smith gives the results of many years' observations of wind pressure and its effects. He has personally visited the tracks of destructive storms as soon as possible after their occurrence, for the purpose of determining the maximum force and the width of the path of the storm in every instance. The most violent storm in Mr. Smith's records was at East St. Louis, in 1871, when the wind overturned a locomotive, the maximum force developed in so doing being no less than 93 lb. per square foot. At St. Charles, in 1877, a jail was destroyed, the wind force required being 84·3 lb. per square foot. At Marshfield (Mo.), in 1880, a brick mansion was leveled, the force required being 58 lb. per square foot. Below these extraordinary pressures there were sundry cases of trains blown off rails, and bridges, etc., blown down by gales of wind of from 24 lb. to 31 lb. per square foot. Mr. Smith observes that in all his examples he has taken the minimum force required to do the observed damage, and has considered this as the maximum force of the wind, although, of course, it may have been much higher. Some of the hurricanes were very destructive, the one at Marshfield having cut down everything along a path 46 miles long and 1,800 feet wide, killing 250 people. Mr. Smith has formed the conclusion that notwithstanding these examples, 30 lb. per square foot is sufficient wind pressure to allow for in a working specification. As reasons for this conclusion, Mr. Smith expresses doubts as to whether a direct wind or gale ever exceeds this pressure. Whirlwinds may exceed it, but the width of the pathway of maximum effort in these is usually very narrow. Mr. Smith has only found one example, already quoted, wherein the path of pressures over 30 lb. per square foot exceeded 60 feet wide. This pressure is in itself very unusual, and, referring more particularly to railway bridges, it is stated that a loaded passenger train will leave the rails at this pressure of wind, and consequently not much could be gained by making the bridge strong enough to resist a storm which would blow a train off it.

Clocks in the Earthquake.

The most curious circumstance connected with yesterday morning's earthquake was the stoppage of all of the pendulum clocks hanging against eastern walls, showing that the vibration was north and south. Clocks hanging against other walls were not affected. In the jewelry store of Charles Haas there is a calendar clock, which on Saturday night was about five hours fast. It was impossible to put the hands back without disarranging the gearing, and the only way in which it could be regulated was to turn the hands forward until they marked the right time. As this process required about 15 minutes, and was exceedingly tedious, Mr. Haas, when he left at 9 o'clock, stopped the pendulum, intending to regulate the clock on the following day. The earthquake saved him the trouble. When he came to his store yesterday morning the timepiece was ticking away like a pawnbroker, and what is still more remarkable, it was correct to a second. The town clock is propelled by a pulley and tackle, and consequently such a mild convulsion as that of yesterday morning did not disturb the serenity of its equanimity. The final cataclysm will probably set the old Janus-faced chronometer back a few moments, but earthquakes never will. No material damage was effected by the trembler, as far as we can learn, except the shattering of a few nerves and the loss of sleep attendant upon the excitement. The plastering of ceilings in several houses was badly cracked, crockery thrown from shelves, chimneys toppled from lamps, besides numberless unimportant occurrences of a similar character. At the jail, Officer Fields thought, upon awakening from a sound sleep, that the prisoners were trying to break out. The prisoners thought somebody was trying to break in.—*Stockton (Cal.) Independent, April* 11.

Explosion of Gas on Coal Ships.

There can scarcely be a doubt that many of the coal-laden vessels that annually leave our ports and are no more heard of are destroyed by explosions of gas. Therefore the caution which lately emanated from the Marine Department of the Board of Trade, and which appeared in our columns, pointed out the necessary measures that should be taken for preventing explosions of coal gas, as recommended by the Royal Commission appointed to inquire into the spontaneous combustion of coal in ships, should not pass unnoticed as such warnings usually do. But there are other considerations in connection with coal cargoes that shippers and captains should be acquainted with. There are some descriptions of coal that give off a great deal more gas than others, and consequently require more attention on a voyage. Soft, bituminous coal on its transmission from the colliery to a port, and then thrown down the hold of a vessel, is much broken, and getting to something nearly akin to slack, gives off the gas freely, while such would not be the case were the coal hard and in large lumps. Some vessels having cargoes of soft coal are more dangerous than a colliery, for, while the latter is ventilated by copious volumes of fresh air being sent to dilute the gases, the coal on board a ship is kept from the air, the hatches being fastened down as if they were for that express purpose. After being kept in that state it may be for weeks, something is required, the hatches are taken off, and the object is sought for with a light, at which the gas at once fires, dealing destruction around, so that not a vestige of the vessel may be left to tell of the catastrophe. There is also the spontaneous combustion of coal to guard against, and in respect to which we believe not much attention is paid, while some descriptions are liable to take heat and fire the same as is the case with hay-stacks at times.

One of the means recommended by the commission for ascertaining the state of a hold of a vessel having a heavy tonnage of coal was the use of the thermometer, so as to ascertain the temperature. For our part we think that the hatches should be frequently removed, and some means adopted for having communication with the coal lying at the top and intermediately to the bottom, so that the gas could find its way to the atmosphere, which it would do if it had the means and was not confined. But where the gas is pent up, especially as is the case where the coal is small, it only requires the means of escape and a naked light to lead to a conflagration that would soon destroy a vessel and everything connected with it. Ventilation is not more necessary in a mine than on board a coal-laden ship, so far as the cargo is concerned, and this should be strictly laid down by rules on the part of owners, for the danger resulting from the gas in coal, either from explosions or spontaneous combustion, are either not sufficiently known or sufficiently guarded against.—*Colliery Guardian.*

Testing Malts for Acidity.

At the risk of being charged with repeating in this column what has already been several times urged, we again draw the attention of brewers to this subject. The existence of abnormal acidity in malt is not only injurious in itself, but this very excess of acidity undoubtedly hastens changes in the resulting wort and beer, which tend to their ultimate destruction as drinkable fluids. From the commencement of the malting season till the warmer weather of spring sets in, the development of acidity in malts proceeds but slowly, but after April, and especially in malts which have been stored for some time, the amount of acidity will be found to have increased. To determine with accuracy the absolute quantity of acid in a sample of malt is an operation attended with some difficulty, and requires the skill and appliances of a practical chemist; but a valuable comparative test for acidity can be made by any brewer with but few appliances, and with but little knowledge of chemical manipulation. We say comparative test in contradistinction to an absolute test, because the former will really give the brewer all the information he requires; he wants to compare one malt with another, and he is generally able to fix his own standard of excellence. Therefore in testing malts for acidity (and the remark applies equally to other qualities) all that is necessary for the brewer to do is to submit them all to precisely the same treatment. Two infusions of the malt are prepared, one with cold water and the other at the average mashing temperature, say 160° Fah.; all samples to be tested must be treated in exactly the same manner as regards quantities, time, and temperature, and they are then passed through a filter paper, and the acidity determined in each by means of a standard alkaline solution, using delicate litmus papers as the indicator. It is not well to operate upon too small a quantity, and in practice 1,000 grammes to a liter of water will be found convenient. Every sample of malt must be crushed to the same state of fineness, and for this purpose an ordinary coffee mill answers admirably. The water used in making the infusions should be pure distilled water, unless a water of very constant composition, such as is supplied to London, is at hand.

The standard alkaline solution is best made with ammonia, and can be of any desired strength, but of course very dilute; it may be titrated so that every cubic centimeter corresponds to 0·01 per cent of lactic acid, but any other strength will do equally well, as the tests we suggest are only for the purpose of comparing samples of malt one with another. The acidity of the cold infusion gives the actual amount of acid existing in the malt, but that of the hot infusion gives, in addition, the amount of acid developed during the mashing process. From the experience derived in the examination of many hundred samples of malt, we are able to assert that the presence of an excessive amount of acidity in the hot infusion is an almost sure sign of unsoundness in the malt. The difference in the acidities of the cold and hot infusions ought never to exceed one-fourth of the acidity of the cold infusion; thus, supposing a malt gives a cold infusion requiring 20 cubic centimeters of the standard solution to exactly neutralize it, the hot infusion ought not to require more than 25 c. c. This method of comparative testing may also be extended to the color and gravity of the resulting worts, and much useful information as to the quality of the malt can thus be obtained.—*Brewers' Guardian.*

Overworking the Undeveloped Brain.

"Overwork," properly so-called, can only occur when the organ upon which the stress of the labor falls is as yet immature, and, therefore, in process of development. When an organ has reached the maturity of its growth it can only work up to the level of its capacity or faculty for work! Fatigue may produce exhaustion, but that exhaustion will come soon enough to save the organ. Repeated "efforts" may, under abnormal conditions, follow each other too rapidly to allow of recuperation in the intervals of actual exertion, and as the starting point will, in each successive instance, be lower than the previous state, there may be a gradual abasement; but even this process should not seriously injure a healthy and well developed organ. In short, a great deal of nonsense has been said and written about the "overwork" of *mature* brains, and there are grounds for believing that an excuse has been sought for idleness, or indulgence in a valetudinarian habit, in the popular outcry on this subject which awhile ago attracted much attention. Nevertheless there can be no room to question the extreme peril of "overwork" to growing children and youths with *undeveloped* brains.

The excessive use of an immature organ arrests its development by diverting the energy which should be appropriated to its growth, and consuming it in work. What happens to horses which are allowed to run races too early happens to boys and girls who are overworked at school. The competitive system as applied to youths has produced a most ruinous effect on the mental constitution which this generation has to hand down to the next, and particularly the next-but-one ensuing. School work should be purely and exclusively directed to development. "Cramming" the young for examination purposes [college students at this time of year take heed.—ED.] is like compelling an infant in arms to sit up before the muscles of its back are strong enough to support it in the upright position, or to sustain the weight of its body on its legs by standing while as yet the limbs are unable to bear the burden imposed on them. A crooked spine or weak or contorted legs is the inevitable penalty of such folly. Another blunder is committed when one of the organs of the body—to wit, the brain—is worked at the expense of other parts of the organism, in face of the fact that the measure of general health is proportioned to the integrity of development, and the functional activity of the body as a whole in the harmony of its component systems. No one organ can be developed at the expense of the rest without a corresponding weakening of the whole.—*Lancet.*

Vanadium Ink.

Berzelius found that by treating an infusion of galls by a solution of vanadate of ammonia, in place of sulphate of iron, he could produce an ink of remarkably good quality. At the time of his discovery, in 1831, it was of no practical interest, because the vanadates were very costly. At the present time their cost has been so much reduced that his recipe can be employed for ordinary inks, which have the additional advantage of presenting great resistance to most reagents and destructive materials. Gum arabic can be dispensed with, and the chance of moulding or alteration thus reduced.—*Chron. Industr.*

To Harden Finishing Varnish.

A newly varnished carriage is liable to spot. To prevent this, some wash the carriage two or three times in clean cold water, applied with a sponge instead of using a hose; this will help harden the surface, and prevent it, to some extent, from being injured by the mud or water getting splashed on the job. Never let mud dry on the surface, and then wash off expecting to see no spots on the varnish. You will certainly be disappointed, and the only way to remedy the evil will be to have it revarnished. Soft water is better than hard water for the washing of carriages, as the lime which is in the hard water is very liable to injure the varnish.