Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

☞ *The publishers of this paper guarantee to advertisers a circulation of not less than 50,000 copies every weekly issue.*

NEW BOOKS AND PUBLICATIONS.

THE BOOK OF ENSILAGE; OR, THE NEW DISPENSATION FOR FARMERS. By John M. Bailey. Billerica, Mass.: Published by the author. 8vo, cloth, pp. 202. Price $2.

In this very enthusiastic volume Dr. Bailey relates his experience with ensilage at "Winning Farm." He frankly admits that the method of preserving fodder in pits under pressure is not so much a new dispensation as one of the lost arts, which, after the lapse of centuries, has just been rediscovered and improved. It is, however, "destined to be the means which shall produce a revolution in modern agriculture." For his part he has simply put into practice in America a system which M. Goffart has demonstrated to be practical in France. How far Dr. Bailey's zealous championship of silos leads him to exaggerate—if at all—the importance of the system of ensilage, only time and wider experience can determine. It is certainly to be hoped that he is not mistaken in his estimate of its advantages. At all events experimental silos are not expensive, and farmers will run no great risk in cautiously giving the system a fair trial. For this work the information furnished by Dr. Bailey's experience will be of value.

THE VOICE.

This is a sixteen page paper, issued monthly, at Albany, N. Y., and devoted to voice culture, special attention being paid to stammering and other defects of utterance. The Voice is the official organ of the Music Teachers' National Association, and seems to be admirably adapted to aid the professional work of teachers of singing, reading, and elocution, as well as physicians who make a specialty of the diseases of the vocal organs, Edgar S. Werner, editor and publisher. $1 a year.

Notes & Queries

HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from $1 to $5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

(1) J. K. writes: In your answer No. 6, R. R. W., which of course is perfectly correct, it would be of great interest to the readers and R. R. W. to state that when in a storm the rain descends slantingly the resultant increase of lineal speed occasioned by the wind brings exactly the same quantity into the vessel. A. Suppose the wind strong enough to blow the rain horizontally, how much then?

(2) T. E. A. asks: 1. Will a telegraph sounder work on a line 600 feet long with ground wires without relays? 2. A. Yes.. What makes the annunciators drop when it is lightning in a telephone exchange? Is it the free electricity in the air? A. The current induced in the line by lightning. 3. Should not Leclanche batteries be closed at night when not in use? A. No; the Leclanche should not be kept on a closed circuit longer than is absolutely necessary, as it soon polarizes. 4. Is it not dangerous to use the telephone during thunderstorms? A. Yes, unless a very good lightning arrester with a very good ground is provided. Even then severe shocks may be expected.

(3) O. W. E. asks: Will water explode by continued use in a boiler after all the air has been boiled out of it? If so, what prevents the boilers of ocean steamships from exploding where surface condensers are used? A. No; but the ebullition will be very irregular and the boiling point be raised. In ocean steamers a certain small amount of fresh (or new) water is added from time to time, or the water submitted to aeration before being returned to the boiler.

(4) J. F. E. writes: I want to belt from a twenty inch pulley on to a two inch pulley, and want to find the material that will be the most positive or will not slip, the distance between the pulleys being only about two feet. What can I find as the best thing? A. A woven cotton or canvas belt would be best, but no belt can work successfully under the conditions given, if much power is to be carried.

(5) W. F. L. asks: What is the cheapest and best way to transmit one horse power four to ten rods—speed of shaft from which the power is to be taken twenty-five revolutions per minute? A. By a wire rope three-eighths inch diameter, if you can use large pulleys say about five feet diameter, on your shaft.

(6) E. T. asks: What size engine would be required to drive a side wheel, iron hull yacht, 30 feet long, 7 feet beam, fifteen miles per hour? A. It is not practicable to drive a boat the size you name fifteen miles per hour with side wheels. To accomplish it with a propeller, everything else must be sacrificed to speed.

(7) F. M. D. asks (1) for the best and cheapest way of making electric batteries. A. See SUPPLEMENTS 157, 158, and 159. 2. How much pressure will a copper boiler, 6 inches in diameter, 8 inches long, stand? A. It depends on the thickness of copper of which your boiler is made. 3. Where can I obtain a small cheap engine that will run a three foot boat? A. You might find one at an instrument or toy store.

(8) W. O. G. asks: What power can be obtained from 250 cubic feet of water per minute having 4 feet fall? Also, the diameter of undershot wheel which would give best results, and size of buckets for same? A. Your fall of water will give you about one horse power. The velocity of the periphery of the wheel should be about five feet per second. A good diameter for mill purposes would be 9 to 10 feet outer diameter, and the diameter inside the buckets, 6¼ to 7¼ feet.

(9) E. T. writes: On page 57 of the "Wrinkles and Receipts" it says: It may be fairly assumed that a non-condensing engine has on an average at least 2 lb. per square inch back pressure on the piston. By the application of a condenser it might be expected that there would be a negative pressure of 10 lb. per square inch on the back of the piston, so that the piston pressure would be increased by 12 lb. Question. How can there be a negative pressure of 10 lb. per square inch when there was only 2 lb. per square inch in the first place? In the example the piston pressure is increased 12 lb., whereas I can only make it 2 lb. increased. Which was taken from the back pressure? A. There is no such thing as negative pressure; we suppose you mean by 2 lb. back pressure, that much more than the atmosphere, or 14·75 lb. +2=16·75 lb. If now by the use of the condenser you reduce this total back pressure to 3 lb., it is evident you have removed 13·75 lb. back or resisting pressure to the work of the piston.

(10) S. B. asks: 1. What rule must I work by to figure out the horse power transmitted by belts and pulleys? A. For belts the formula $\frac{WS}{600}$ = horse power, is a very safe and and convenient rule where W = width of belt in inches; S = speed of belt in feet per minnte. With very short or narrow bolts divide by 800 instead of 600. 2. What do you consider to be the best book on the subject? A. Cooper on Belts and Belting. 3. Does Haswell treat on the subject in his pocket edition? A. Yes, briefly.

(11) H. W. S. writes: Our land is from three to five feet lower than the Hocking Canal, from which we wish to irrigate by means of underground pipes and hydrants. Could a hydraulic ram be used with success to force the water through the pipes? Suppose the main pipe is three inches, what size should the pipe next the canal be? Would it be better to run the water in an elevated tank. Could steam or wind power be used cheaper to produce the same or better effect? A. A hydraulic ram could be used with success; but of course the quantity of water taken from the canal will be very much greater than that discharged. If the discharge pipe be 3 inches diameter, the receiving pipe should be 7 inches to 7½ inches diameter.

(12) F. R. W. asks: 1. Can steel wire be galvanized in the same manner as iron wire? A. Yes; the steel wires for the Brooklyn bridge are galvanized. 2. Is there any way by which I can apply lead in solution to a tin roof so that it will adhere and prevent rust or leaking? A. We know of no way of doing this. Apply two coats of some good paint.

(13) F. A. D. asks: 1. Can a catamaran be built of solid logs or hulls, instead of hollow ones; say either of wood or cork, and of sufficient buoyancy for all practical purposes in rough or smooth water? A. Yes, but the hollow cylinders are to be preferred. 2. Can I melt brass for casting any small article without a regular furnace? A. Brass may be melted in an ordinary coal stove. Give it plenty of time and a good fire.

(14) D. B. asks: 1. What pressure per square inch will an upright copper boiler stand, shell No. 22, head sheets, No. 16, with four stays; boiler 16 inches diameter and 30 inches long, with 40 three-quarter brass tubes? A. 25 lb. per square inch. 2. Will the above boiler be large enough to drive a double engine, cylinder 2x4? A. No, except the engines are run very slow, say not more than 60 or 70 revolutions per minute. 3. Will it be safe and strong enough? A. Yes.

(15) L. S. writes: A friend and myself want to build a yacht 50 or 55 feet long. Have not had any experience in that line, and would like to get hull model, or drawings, if possible. We want something to work from, want it for speed. A. A model would cost about $30 to $40. 2. Which shall I use, iron or steel, for the hull? A. Steel would be the lightest and best. 3. What size engine do we require? Do you think the boat too small for double engine; if not, what size; also, size of boiler, shaft, and wheel? A. A double engine, 6 inch cylinder by 8 inch stroke. The dimensions of boiler would depend upon the kind. Wheel about 3 feet 8 inches diameter; shaft 2⅛ inches diameter.

(16) T. W. C. asks at what temperature a low pressure engine uses its feed water, and if a high pressure engine uses any hotter; or, in other words, does a high pressure engine use hotter feed water than a low pressure engine? Also, how does the steaming qualities of anthracite coal compare with Pittsburg coal? A. For low pressure engines about 100°, for high pressure from 160° to 200°, according to efficiency of heater. Pittsburg coal a little the most efficient weight for weight.

(17) H. C. S. asks: 1. Should small spiral springs be made from right to left or left to right? A. They may be wound in either direction. It is generally more convenient to make them right-handed. 2. What is used to prevent small steel spiral springs from rusting, same being applied after spring is made? A. Dip them in boiled linseed oil and allow it to dry on. 3. Can shellac be used in place of glue in cementing wood joints? Is it as strong, and how long does it take to set? A. Shellac will not replace glue. It takes a long time to set in the middle of a joint, and is not as strong as glue.

(18) H. A. B. asks: 1. Does the magnetic needle point direct to the North Pole and the North Star? A. On certain lines on the earth's surface the needle points toward the pole. Such a line now passes near Wilmington, N. C., Charlotteville, Pa., and Pittsburg, Pa. 2. Are there magnetic poles 23 degrees out of line of the geographical poles? A. The magnetic meridian in some localities varies from the geographical meridian 23° or more. 3. Which is the nearest star, and its distance? A. So far as is known the nearest fixed star is Alpha Centauri, in the southern hemisphere. It is more than twenty millions of millions of miles distant. No other star is known to be within double the distance.

(19) A. H. asks: How can I make a strong paste for fastening bills in a file book? A. Rice or starch paste is best. The following is well recommended: 4 parts (by weight) of fine glue are allowed to soften in 15 parts of cold water, and then moderately heated until the solution becomes quite clear; 65 parts of boiling water are now added, with constant stirring. In another vessel 30 parts of starch paste are stirred up with 20 parts of cold water, so that a thin milky fluid is obtained without lumps. Into this the boiling glue solution is gradually stirred, and the whole kept at a boiling temperature for a short time. After cooling, a few drops of carbolic acid are added to the paste. This paste is exceedingly adhesive, and may be used for leather as well as for paper and cardboard. It should be preserved in corked bottles to prevent evaporation, and in this way will keep good for years.

(20) J. A. S. inquires: 1. How to make a cheap and serviceable emery wheel. A. Turn wheels from well seasoned pine, of the form desired; place emery upon an iron plate heated to 200° to 212°; coat the wheels with glue prepared as for uniting wood, and roll the wheels in the warm emery. After the glue dries, the surplus emery is brushed off and another coating of glue is applied and the wheels are again rolled in the warm emery. The wheels should be allowed to become thoroughly dry before use. 2. How can I make emery sticks? A. Prepare sticks of such forms as you may require, and coat them as directed for emery wheels, or attach to them emery paper by means of glue or paste.

(21) G. H.—To prepare good cider, choose ripe, sound apples, sweat them in small heaps for a few hours, and wipe dry. Then grind them, place the pomace between layers of clean straw, or preferably hair cloth, in a suitable screw press, and apply the pressure. As the juice runs from the press strain it through a hair cloth sieve into a large open cask capable of holding all the juice to be expressed in one day. In a day, or sometimes less, the pomace will rise to the top and grow very thick. When little white bubbles break through it draw off the liquid through a spigot placed about 3 inches above the bottom, leaving the lees behind. The cider must be drawn off into very clean casks, and repeatedly racked off until the first fermentation is over, which is known by no more of the white bubbles, before mentioned, forming. Then add a gobletful of sweet oil to each cask, fill it up with cider in every respect like that contained in it, and bung up tight. Sugar or glucose is sometimes added at this stage—8 to 15 pounds to the barrel, according to the character of the apples used—sweet or sour. When the cider has attained the proper taste, add one-quarter to one-half pound of isinglass dissolved in some of the cider, and then about one-quarter pound (not more) of freshly prepared sulphite of lime (common preserving powder), and draw off, after shaking and allowing to settle, into very clean barrels, or bottle. The sulphite (which must not be mistaken for *sulphide*) preserves the cider perfectly.

COMMUNICATIONS RECEIVED.

On a Natural Gas Well. By R. B. S.

On Curious Meteorological Phenomenon. By T. J. F.