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.

NEW BOOKS AND PUBLICATIONS.

FARLEY'S DIRECTORY OF THE HARDWARE TRADE. Farley, Paul, and Baker, Philadelphia.

This is a handsome octavo volume for office use, giving the addresses of the prominent hardware dealers throughout the country. The index and advertisements cover much more than the ordinary directory addresses, being guides to the most important manufacturers of hardware in the country.

DICTIONARY OF USEFUL ANIMALS AND THEIR PRODUCTS. By P. L. Simmonds, author of the "Commercial Products of the Vegetable Kingdom;" the "Commercial Products of the Sea," etc. Published by E. and F. N. Spon, London and New York.

This volume is a handy pocket book, containing in dictionary form a large amount of convenient information in its double columned pages, in relation to animals and their food, and other products of use to man drawn from animal sources.

HYDRAULIC TABLES, FOR THE CALCULATION OF THE DISCHARGE THROUGH SEWERS, PIPES, AND CONDUITS. By P. J. Flynn, C.E. D. Van Nostrand, New York.

These tables are based on Kutter's formula, and are reprinted from Van Nostrand's Magazine. The volume is intended to facilitate the calculation of velocities, the discharges, the slopes, and the dimensions of sewers; and the tables are calculated for circular and egg shaped sewers and conduits, giving their outside as well as inside dimensions, and providing a basis for calculation for amount of materials.

THE CHICAGO HERALD COOKING SCHOOL. By Jessup Whitehead, author of "The Oven and the Range" and other books. *Daily Herald* Publication, Chicago, Ill.

The writer of this handsome illustrated octavo of 126 pages with an analytical index of 100 more pages, is evidently a professional cook, and probably a "home man." There is a flavor of appreciation in his descriptions that cannot be assumed. The author is evidently a lover of the good things he so pleasantly describes. The recipes are plain and easily followed.

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 the office. Price 10 cents each.

Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their identification.

(1) C. G. H. writes: About ten days since the chief engineer of our fire department made a test of the water pipes, the conditions about as follows: Four hydrants were opened at the same time, with the following streams: 1½ inch, 1¼ inch, 1 inch, three-fourths of an inch, and shut off as nearly as possible together and as quick as it could be done. The pressure was or is 135 pounds per inch. How much would it increase by shutting off as was done? As there is considerable argument on the subject, some think the pressure would only return to the same point at which it was when the hydrants were opened, others, it would be more, and we have decided to leave it to you. The hydrants were supplied by a 6 and 4 inch main. A. Sudden shutting off of outlets in long mains is considered injurious, as it subjects the pipes and valves in the vicinity to what is called a water ram by causing a great and sudden increase of pressure, due to the momentum of the water under motion. The usual construction of hydrants is intended to prevent sudden shutting off, by the use of a screw. The amount of increase of pressure depends entirely upon the length and comparative size of the main and the suddeness of shutting off. Under extreme conditions, such as an opening nearly the size of the main and shutting off with a large cock instead of a screw valve, the water ram would carry up the pressure to two or three times the original pressure, or burst the pipe.

(2) G. S. writes: I have a cellar, 10x12x6, out in the country—Jefferson—which is dug three feet in the ground, no ditches in the neighborhood, which always contains soil water, it was masoned with the wrong sort of water lime, I understand. How can I make it water tight, and what can it cost? A. If your cellar is in the low prairie that is water soaked, hydraulic lime will not save it. Such cellars have to be built of brick saturated with asphalt, sides and bottom. This is somewhat difficult even here, where there are professional water tight cellar builders. Better raise the whole cellar above water level, or cut a drain if possible. 2. The inside of my house was grained and varnished; the varnish sticks everywhere; I was told said varnish was thinned down with oil, and I varnished it over with good varnish but without any avail; it still sticks and I can not remedy it, how can I harden it? A. For your sticky varnish clean it off thoroughly with turpentine, and revarnish with good varnish thinned with turpentine, with a little drier added.

(3) J. writes: I want to lay a wrought iron pipe 800 feet long from a pond to supply a 4 inch stand pipe for a hydraulic ram. This pipe I want to lay as a siphon to carry the water over a hill, lifting the water ten feet. The lower leg of siphon to be six feet below the water in the pond. How large a pipe must be laid to carry six gallons per minute? Will air get in and stop the siphon, or will it be constant in action? A. Theoretically a pipe 1½ inches diameter should furnish more than 6 gallons per minute; but we would advise not less than 1¾ inch pipe, as you cannot rely upon the pipe being perfectly tight. If there be leaks in the pipe, air will likely accumulate in the highest point, and at that point there should be a stop cock or plug, by which the air can be let off and the pipe recharged.

(4) H. D. M. asks: What sort of a wheel and what polishing powder do I want for polishing agates? A. A felt buff, and rouge used wet. Buff sand rouge can be had at any jeweler's tool store. The grinding to a required surface can be done upon a grindstone. Grind with the stone very wet. If much is to be cut off, a copper or lead lap with emery and water will do the work quickly. The splitting by sawing is a tedious process, and hardly pays for an amateur. It can be done with a thin copper disk supplied with emery and water. It is better to get a lapidary to split with a diamond disk. You can split many minerals with a chisel and hammer by a little management. Agates will split fairly in various directions.

(5) J. E. L. writes: We have now in use a 48 inch "Stout, Mills, and Temple" turbine wheel, with 72 inch flume, 36 inch draught tube. Now if we replace the 48 inch wheel with a 60 inch wheel, will we get more power, and will we use more water, and will there be any change in speed? A. You would get no more power with the 60 inch than with the 48 inch wheel, using the same amount of water. The periphery of the 60 inch must run the same as the 48 inch, so the revolution would be reduced as 48 to 60, and your gearing would have to be correspondingly altered. If you have the water, use more on the 48 inch wheel, or get a 48 inch wheel that will use more water; in this case you would not have to alter your gearing; with either a 48 inch or 60 inch wheel you must use more water to get more power.

(6) R. W. M. writes: Some time ago I asked you how to take copies of a medal by a plaster of Paris mould. You referred me to SCIENTIFIC AMERICAN SUPPLEMENT No. 17, which I ordered at a book store and duly received. I made a mould of plaster of Paris according to directions, and made an alloy of four parts tin and one part antimony as directed, but I can get hardly any impression at all, and all along the edge of the medal which I cast is full of superfluous metal, and thus the edge is not round, as it ought to be. Would you please tell me through your paper (SCIENTIFIC AMERICAN) how to get the impression and not have the superfluous metal on the edge of the medal? Please answer as soon as possible. A. Your composition is not fluid enough for medals. A composition of 69 parts lead, 15 parts antimony, 16 parts bismuth or old type, will make a fair cast. Fusible alloy, 19 parts tin, 13 parts lead, 40 parts bismuth, makes a better and finer impression and more suitable for plaster moulds. Make the plaster casts of each side of the medal separate. Trim and solder the pieces together with a fusible alloy that melts in boiling water. You can only get rid of the fins on the edge by careful moulding and dressing down the face of the mould

(7) J. H. F. writes: My boy has asked me to explain "why his whip cracks." If you see fit to answer in Notes and Queries, I would be pleased. A. The doubling of the lash itself produces an accelerating speed in the cracker, so that by the time it arrives at the end of its stroke, its velocity is very great. Its sudden check and return produces a blow upon the air of great intensity which we hear and designate as a crack. The form of the lash, its gradual taper and the tipping with a small, fibrous, braided and knotted end are mechanical devices for facilitating the action of the lash, and for wear. The fibrous or frayed end adds much to the strength of the "crack" by spreading a large area to act upon the air.

(8) W. writes: Please give me your estimate of the value of a spring I have, and its capacity. The water is never failing, it fills a 3 inch pipe, and has a fall of nearly 100 feet. What horse power will it furnish for small machinery, such as sewing machines, elevators, electric light, etc.? Would there be power sufficient to unload vessels from a wharf? A. We call the head 100 feet, and supplying all the water which will pass through a 3 inch pipe under this head, you should get about 30 horse power with a good turbine wheel.

(9) F. K. asks: What is the best to burn in a small steam engine to heat water for generating steam? I want to use some kind of oil, but don't know which would be the best. A. For very small engines good cold strained lard oil is the best and safest. A boiler large enough to require from one to four full size kerosene lamps can be arranged with metallic chimney for the whole so as to avoid the use of glass. This is done in the kerosene cooking stoves, which you may find on sale at the hardware or stove stores. An inspection of one may put you upon the right track for your wants.

(10) T. A. S. writes: I have noticed one or two inquiries relative to the destruction of red ants. Your readers can rely upon the fact that five cents' worth of powdered borax will drive them all away. There is no danger in this method, and a spoonful sprinkled anywhere infested by them will give your correspondents every satisfaction.

(11) E. M. asks: Is there more power in two cylinders 2 inches bore, 3½ inches stroke each, both working on same shaft, than a cylinder 4 inches bore, 4½ inches stroke? And what is the difference in steam space and power? A party claims more power in the two cylinders on account of double or 7 inch stroke. A. Working at the same speed and under the same pressure, the 4 inch cylinder by 4½ inches stroke is more than double the power of two cylinders 2 inches diameter by 3½ inches stroke.

(12) F. C. S. asks: What is hydrofluoric acid? A. Hydrofluoric acid is the chemical compound arising from the decomposition of calcium fluoride (fluorspar) by concentrated sulphuric acid. It can be procured through any wholesale druggist.

(13) J. W. B. asks: Does a rain gauge, or say a tin bucket, catch as much water in a given length of time if the water falls obliquely as if it falls perpendicularly, the vessel to stand level? A. It does not; but as the wind does not blow steadily in force or direction, no permanent inclination will satisfy the requirements. Experiments have been made on swing gauges much after the style of a marine compass, so that the force of the wind would tip the gauge to face the falling rain. They did not prove altogether satisfactory, and we do not know that there is any now in use.

(14) G. M. E. asks what the pressure of wind is to the square foot going at the rate of 25, 50, and 100 miles an hour. A. According to Wolff's table:

25 miles	2·97	lb. per sqr. ft.
50 "	11·9	"
80 "	30·8	"

According to Smeaton:

25 miles	3·1	lb. per sqr. ft.
50 "	12·5	"
80 "	32	"
100 "	50	"

COMMUNICATIONS RECEIVED.

On Safety Lamps. By W. B.
On Hotel Fires. By J. K.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

August 21, 1883,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Abdominal supporter, C. A. Worden	283,784
Adjustable chair, desk, etc., J. A. Smith	283,430
Advertising table, automatic, A. G. Macdonell	283,498
Air brake, compressed, Thayer & Connelly	283,534
Air purifying device, O. B. Rowlett	283,724
Alkalies, manufacture of, E. W. Parnell	283,508
Amalgamator, H. T. Vanderhoof	283,540
Annunciator, electric, E. Flint, Jr.	283,590
Apple slicer, H. A. & W. Tripp	283,686
Assorting machine, S. M. Park	283,414
Axle box lip, car, J. R. Baker	283,691
Banjo tail piece, W. A. Scollay	283,519
Barrel finishing machine, W. L. Field	283,477
Barrel trussing machine, W. L. Field	283,476
Bedstead, folding, A. Hodgson	283,485
Beehive, D. Bailey	283,554
Belt tie, C. Kennedy	283,491
Belt tightener, automatic, F. W. Codding	283,572
Bicycle, H. Kellogg	283,612
Binder, self, W. N. Whiteley *et al*	283,445
Binder, temporary, E. J. Paxson	283,653
Bit. See Boring bit.	
Blacking box holder, C. E. Skinner	283,428
Blind and door spring, P. K. O'Lally	283,649
Blind slats, machine for making, J. W. Brainard	283,372
Block. See Pillow block.	
Boat. See Towing boat.	
Boiler. See Steam boiler.	
Boiler furnace, W. P. Hall	283,708
Boiler use, purifying water for, C. B. Dudley	283,472
Bolt lock, E. W. Sprague	283,725
Bolts, machine for cutting threads on, C. F. Steinmetz	283,680
Bolting chest conveyer, cut-off for, Kohnle & Hamilton	283,713
Book holder, T. A. Crabtree	283,576
Book holder, R. M. Lambie	283,495
Boot and shoe suspension hook, E. E. Ries	283,418
Boring bit, H. E. Fuller	283,705
Bottle stopper, M. L. Ballard	283,692
Bottle stopper, J. J. Christie	283,569
Bottle stopper, H. E. Spaulding	283,432
Bottle stopper, Thatcher & Johnson	283,436
Box. See Match box.	
Bracelet, S. Cottle	283,574
Brake. See Air brake. Car brake.	
Brake shoe, A. B. Todd	283,438
Branding bottle corks, machine for, P. Chenet	283,567
Breakwater, E. C. G. Thomas	283,683
Bretzel cutter, J. U. Segesser	283,522
Brick, burning, C. F. T. Kandeler	283,402
Brick machine, J. C. Anderson	283,366
Brick pressing machine, G. Canrell	283,565
Buildings, mechanism for raising lines to the upper parts of, G. O. Daw	283,580
Burial caskets, etc., lining for, Stansbury & Hedrick	283,526
Burner. See Gas burner.	
Burning crude petroleum, device for, Bury & Bidelman	283,465
Button and necktie retainer combined collar, L. Stein	283,523