a revolving ring of liquid metal, let the box rest and watch the motion as the metal subsides. If there is about enough quicksilver to make a complete ring of the size of a goose quill (no precision needed), the liquid metal will seem obviously moving in a direction exactly opposite to its real course so as to deceive almost any beholder. The effect is due to the wavy motion of the quicksilver. A. The observation that the waves in mercury, when running in a rough channel, will propagate in a direction opposite to the current has been made before, but your simple manner of illustrating it deserves commendation.

(30) C. C. K. asks: Is there a south polar star similar to the north polar star? A. The north polar star in the Little Bear is not exactly over the north pole, but at a small distance. At the south pole the nearest star is 10° further off, and is in the constellation *Hydra*.

How do explorers tell the hights of mountains? A. Explorers as well as aeronauts measure the hights of mountains by means of the barometer, which gives tolerably reliable indications, as the air pressure decreases with the hight we ascend. Your way of telling the hight of clouds would be good if you only were sure that the cloud you see is the one from which the rain descends.

(31) M. H. R. says: It is a common observation among country people that a new moon is a wet or a dry one, according to the upright or horizontal position of its horns, and also that the moon affects the weather by its rising farther north or south than usual. Are not all of the changes of the moon, as to position in regard to itself or the earth, subject to a natural and, generally speaking, unerring law? A. The position of the horns of the moon depends on the relative position of moon and sun: if immediately after the noon, she shows herself vertically above the setting sun, the horns will be upright; if southward of the sun, the horns will be more nearly horizontal. That the moon affects the weather, causing an atmospheric tide wave as well as an ocean one, is undoubted; but the "unerring law" has not yet been discovered. Let us hope that the continued labors of the Weather Bureau will in time solve this problem, which is quite complex. The course of the moon is repeated, eclipses and all, every 21 years; but we have not the same weather every 21 years, which shows that other influences have to be taken in account, which observations in the future may reveal to us.

(32) J. H. asks: Can anything be added to ink made from nutgalls and sulphate of iron that will cause it to be black when first used, without injury to it? A. Try an addition of logwood.

(33) S. L. L. asks: Has the name carbonic acid recently been changed to carbonic dioxide? If so, why? A. Carbonic oxide is the compound formed by the combination of carbon with one equivalent of oxygen (CO). Carbonic acid is carbon in combination with two equivalents of oxygen (CO_2). The former is sometimes called the monoxide, and the latter the dioxide, of carbon.

(34) C. P. asks: I want to know the cheapest and simplest apparatus for compressing air in a receptacle of two quarts capacity. I would like to get the density of five or six atmospheres. A. Use an air pump.

(35) J. S. asks: Will paper keep a number of years, free from damage, even if placed in an excessively damp and dark hole, if it be inclosed in an airtight lead or glass case? A. If the paper be placed in a perfectly dry glass vessel, which is afterward hermetically sealed, it will be preserved indefinitely, or as long as the glass envelope remains intact.

(36) J. A. asks: Can I use a tin baking pan for a photographing bathing sink without injury to the chemicals? A. No.

(37) H. M. asks: Does the sun's heat shrink or expand seasoned wood? A. The expansion of the woody fibers by heat is more than counterbalanced by the shrinkage due to the consequent evaporation of the moisture and other bodies in the sap cells, therefore the wood, as a whole, shrinks.

(38) E. T. D. asks: Which is the most certain and quickest mode of discharging colors from cotton prints and delaines? A. Use chloride of lime.

(39) N. A. B. asks: How can I determine the electromotive force of a galvanic battery? A. To one not familiar with the science of electrical measurements, such determinations may be somewhat problematical. The following method of Poggendorff's, for the measurement of electromotive force, is perhaps the simplest and most comprehensive. In this method the more powerful battery, E, is joined up in circuit with a resistance coil, r; and the other battery, E′, and a galvanometer are connected to the same coil, so that both batteries send a current through r in the same direction; by increasing the resistance of r it is easy either to make the current of E overpower that of E′, or to obtain such an equilibrium that E shall remain inactive, and no current pass through the galvanometer in either direction. When this is effected, we have the following ratio: As the total resistance of E and r is to the resistance of r, so is the electromotive force of E to that of E′, or $E' = E \times \frac{r}{E+r}$.

Can metallic silver be obtained by heating the nitrate in a crucible? A. Yes, by the addition of a small quantity of borax and resin.

(40) S. R. A. says, in answer to correspondents who ask how to destroy ants: Take a pasteboard box with a good lid, so that it can be made dark; cut a small hole near the bottom, put in about two tablespoonfuls of sugar, and set it away in some dark corner of the cupboard. Allow it to remain two or three days; take a quantity of hot water in a dish pan. You can guess the rest. Repeat the process until the supply of ants is exhausted. The same bait will last all the summer. Allow the ants to run out at the hole they entered, and then knock them off by striking the box, with the hand, a quick light blow.

(41) J. E. A. says, in answer to several correspondents: The reason why the screws now in use do not utilize the power is because the pitch of the screw doubles from the outside in nearing the shaft half way. If you turn a thread upon a rod a little more than half the altitude deep, then turn it down to one half the diameter, the pitch will be twice what it was before. If the pitch of the blades of a screw be at a greater angle than ⅛ of a circle, or 45°, it would impede its revolution. If a screw be 24 feet in diameter and the pitch 45° from the outside, then it would be an entire loss of power; if 22½°, there would be loss at all but the outside 6 feet. By setting the pitch in the inside or nearest the shaft, and twisting the blade from the outside to the required pitch, there would be no loss of power. Another principle is that the revolution of the screw and the pressure of the blades against the water would cause the water to flow away from the end of the blade; this would cause the screw to fall back, and not hold what it would naturally gain. This can be easily remedied by having the blade of full width at the end, and turning it over a few inches, making a rim on the back side of the blade: the water will then only flow away backwards from the side, as it should do.

Minerals, etc.—Specimens have been received from the following correspondents, and examined, with the results stated:

A. M. S.—No. 3 is a tannate of gelatin, and will doubtless answer all your requirements. It is probably made by steeping sheet gelatin in a solution of tannin, and then subjecting it to pressure. —F. W. P.—It is mica.

J. C. H. asks: How is the pretty imitation of pearl in ladies' dress buttons and parasol handles produced on tin or other metallic sheeting?—E. M. asks: How is a dry or magic shampooing powder made?—C. M. K. asks: Are the trimmings called Hamburg edgings made by machinery or by hand?

COMMUNICATIONS RECEIVED.

The Editor of the Scientific American acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:

On the Keely Motor. By W. J. J.
On the Spider's Web. By T. H.
On a Glass Oil Can. By A. B.
On Western Lands and Emigration. By T. E. L.
On Keely Transactions. By G. H.
On Boiler Incrustations. By B. B. S.
On Fishing Sinkers. By P. B. T.
On Large and Small Axles. By T. W. P.
On Gold Coinage. By J. R.
On Bee Culture. By L. E. C.

Also inquiries and answers from the following:
J. M. S.—J. C.—W. A. C.—F. W. D,—G. A. D.—M. E. —R. A. C.—J. S. C.—K. W. C.—J. W. M.—G. R. B.—F. N. M.—D. P. H.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of inquiries analogous to the following are sent: "Who sells a self-registering device for indicating the flow of water over a weir? Who sells books on aeronautics? Who sells drive well tubes? Whose is the best ice-making process? Whose is the best burglar alarm? Who sells lamp chimney cleaners? Who makes the best rock drills? Where can steatite (soapstone) be bought?' All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

[OFFICIAL.]

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DESIGNS PATENTED.

8,560.—Carpet.—J. Fisher, New York city.
8,561.—Carpet.—T. J. Stearns, Boston, Mass.
8,562.—Bird Cage.—F. T. Fracker, New Britain, Conn.

SCHEDULE OF PATENT FEES.

On each Caveat ... $1
On each Trade mark ... $2
On filing each application for a Patent (17 years) ... $15
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On application for Design (7 years) ... $15
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CANADIAN PATENTS.

List of Patents Granted in Canada August 7 to 19, 1875.

5,049.—C. Munn, Cairo, Ill., U. S. Veneer cutter. August 13, 1875.
5,050.—T. Kater, Hamilton City, Ont. Pianoforte. August 13, 1875.
5,051.—C. W. Lewis, Boston, Mass., U. S. Compound for destroying insects. August 13, 1875.
5,052.—H. M. Wells, Toronto, Ont. Window blind fastener. August 13, 1875.
5,053.—T. O. A. Bayley, Hamilton, Ont. False top for box stoves. August 13, 1875.
5,054.—D. S. Bailey, Dover, Me., U. S. Elevator. August 13, 1875.
5,055.—A. R. Koerber, Berlin, Ont. Reed orchestrion. August 13, 1875.
5,056.—W. Abercrombie, Hamilton, Ont. Sash clamp. August 13, 1875.
5,057.—C. F. W. E. Dittmar, Boston, Mass., U. S. Gunpowder. August 13, 1875.
5,058.—T. B. Wilson, Manchester, England, *et al.* Furnace.—August 13, 1875.
5,059.—W. H. Wright, Saugerties, N. Y., U. S., *et al.* Railway truck. August 13, 1875.
5,060.—A. Sanborn, Higganum, Conn., U. S. Swivel plow. August 13, 1875.
5,061.—G. E. Nutting *et al.*, New York city, U. S. Steam drill. August 13, 1875.
5,062.—R. Thomas, Toronto, Ont. Cooking stoves. August 13, 1875.
5,063.—C. D. Van Allen, Guelph, Ont. Regulating air-dash churn and washer. August 13, 1855.
5,064.—J. P. Foote, Baltimore, Md., U. S., *et al.* Rudder brace. August 13, 1875
5,065.—W. H. Gonne, Chatham, Ont. Sash pulley. August 13, 1875.