See "The Lathe and its Uses," and Knight's "Mechanism and Construction."

(32) N. N. B. asks: Does the north pole rise and the south pole sink from December 21 to June 21 (thus giving us the seasons), and *vice versa* from June 21 to December 21? Cannot it be properly said that the earth has three motions, namely, its diurnal rotation, its annual revolution, and its polar inclination? A. The earth's equator is always inclined 23° 17′ to the plane of its path round the sun. To illustrate this, make two balls of wood or cork representing earth and sun. Put a wire axis through the earth at an angle of 23½° into the pivot of a hanging weight, fastened to a stick which turns in a vertical plane around the sun. The action of gravity will then keep the cork earth's axis continually pointing in the same direction.

(33) F. G. S. asks: How can I make a white paint that cannot be softened by alcohol? A. Mix any powdered white pigment with water glass.

Is there an optical instrument in use by which I can measure distances at a glance? A. Take a spy glass, a wooden rod, and a fat spider. Toss the spider from hand to hand to make him spin. Wind the thread spirally on a forked stick or wire. Gum two parallel spider lines on a ring of metal or card board, and place this ring in the focus of the terrestrial eyepiece. Mark the space included between the spider lines on the rod, 100 feet distant. Then as the space on rod included between the spider lines at 100 feet is to the space included at an unknown distance, so is 100 feet to the distance required. Simpler methods are described in Wingate's "Manual of Rifle Practice."

(34) A. F.—The sun's amplitude at summer solstice depends upon the obliquity of the ecliptic, and not upon his distance, as you suppose.

(35) A. S. asks: Is there any means by which I can render canvas or heavy muslin airtight, so as to make a pair of bellows? A. Yes. See p. 379, vol. 30. In the end, leather would be much the cheapest.

(36) J. F. and others ask, in reference to S. E. S.'s query as to where he would arrive if he took a northeasterly course: Will you please explain how a man would arrive at the pole by traveling this course? It is our opinion that he would not, but would travel in a spiral direction, approaching nearer and nearer, but never reaching the pole. A. S. E. S. would come nearer to the pole than any of the north pole expeditions, because if he kept sailing he would be nearer than any conceivable distance; and unless we suppose his ship to be an inconceivably small one, some part of it would eventually reach the pole.

(37) P. M. C.—The moon's axis, during the eclipse, was very much inclined to the horizon, the latter being inclined to the equator, besides the inclination caused by the obliquity of the ecliptic and the inclination of the moon's orbit. These three causes, with the moon's motion from west to east, account for all correct observations.

(38) F. A. W. says, in reply to S. C. H., who asks as to the philosophical reason that a circular saw cuts better at a certain speed than it does if run faster: Circular saws of over 40 or 50 inches in diameter are or should be hammered to run at a certain speed. This is more important when the speed is as high as from 700 or 900 revolutions per minute. If a saw is so hammered as to do good work at 300 or 400 revolutions per minute, it will not do as good work at 900, for the reason that the high speed expands the outside or rim, causing it to dish, or "flop a sound," as sawyers sometimes express it. In such cases, and when it is inconvenient to reduce the speed, it will be necessary to guide the saw out of the log so as to cause the central part to rub against the log enough to heat it slightly, thus expanding the portion that needs hammering. An expert sawyer can in this way manage indifferently well, though at an expense of considerably more power. A large saw, to run well at high speed, should be hammered in the center part until it is slightly dishing, or, as it is variously expressed, "loose at the eye," or "rim-bound." It may be loose at the eye when it is the reverse of rim-bound, namely, too open at the rim, which is the most frequent trouble with such saws, and they all become so eventually from use, and then they should be re-hammered. I would not advise any one that has not had previous experience to undertake to hammer one, for the operation is a very delicate one, and requires considerable skill. A. We have known of several cases in which large saws seemed to do equally well under considerable changes of velocity, and we imagine that saws are quite as often run at different speeds as at those recommended by the makers. Within limits, however, our correspondent's views are quite correct.

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

A. J. R.—It is impossible to say whether a stone is lithographic, or suitable for printing from, from a small fragment.—H. C. T.—We have examined your queer specimen, but must request, before answering your questions, to know whether it is a manufactured or a natural product. How and where was it found? Is it genuine? If natural, has anything been done to alter it?—J. H. A.—The specimens contain iron pyrites in quartz.—We have received two specimens in an envelope, without any letter. No. 1 is magnetic pyrites or pyrrhotine, containing 40 per cent of sulphur and 60 per cent of iron. No. 2 is a mixture of small scales of black mica, carbonate of lime, and a rock composed of silex, iron, and magnesia.

J. C. C. asks: If it is high water at the Battery, New York city, at noon, how high will the tide be at Albany?—A. B. asks: What is the source of the disagreeable odor of corduroy, when that fabric becomes wet from any cause?—J. H. M. asks: How is the oil finish put upon melodeons and sewing machines, and what kind of oil is used?

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 Crystallization of Carbon. By C. T.
On Hydrophobia. By C. R.
On a Suicidal Scorpion. By J. B. T.
On the National Currency. By ——.
On Fruits and Electricity. By N. B.
On a Withdrawn Charge. By C. G. F.
On Gas Machines. By W. H. E.
On Smoke Consumption. By O. F. M.

Also enquiries and answers from the following:
S.—L. W.—J. B.—M.—H. V. M.—T. A. J.—A. J. N.—W. H. N.—H. T.—J. T. N.

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 wastebasket, 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 enquiries analogous to the following are sent: "Who sells the best garden seeds? Where can tobacco paper for fumigating greenhouses be obtained? Are there any agencies for imported raw silk in New York city? Who publishes the best work on electroplating? Where book on mechanical drawing is considered the best?" All such personal enquiries 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.]

INDEX OF INVENTIONS

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30,910.—PAPER FOLDER.—C. Chambers.
30,925.—BUTTON HOLE CUTTER.—F. C. Leypoldt.
30,929.—TOBACCO CUTTER.—W. H. Pease.
30,931.—SPINNING FRAME CYLINDER.—R. Plews.
30,961.—MOWING MACHINE.—J. Ten Brook. Twopatents.
30,971.—WATER WHEEL.—N. Johnson.
30,993.—WOOD PLANING MACHINE.—H. D. Stover.
30,001.—STRAW CUTTER.—W. Gale.

DISCLAIMERS FILED.

30,925.—BUTTON HOLE CUTTER.—F. C. Leypoldt.
30,961.—MOWING MACHINE.—J. G. Dunbam.
30,993.—WOOD PLANING MACHINE.—H. D. Stover.

DESIGNS PATENTED.

7,937.—CARPET.—R. Allan, Yonkers, N. Y.
7,938 and 7,939.—CARPETS.—J. Barrett, New York city.
7,940.—WALLPAPER.—J. O. Craig, Philadelphia, Pa.
7,941.—VASE.—W. G. Fletcher, Boston, Mass.
7,942.—SARDINE BOX.—A. Godfiliot, New York city.
7,943.—PICTURE BORDER.—W. T. Murphy, Brooklyn, N. Y.
7,944.—COFFIN HANDLE.—W. M. Smith, W. Meriden, Conn.
7,945 to 7,947.—CARPETS.—T. J. Stearns, Boston, Mass.
7,948.—GLASSWARE.—J. Bryce, Pittsburgh, Pa.
7,949.—SMOKING PIPE.—A. L. Dickinson, Englewood, N. J.
7,950 to 7,953.—OILCLOTHS.—C. T. Meyer *et al.*, Bergen, N. J.
7,954 and 7,955.—STOVES.—N. S. Vedder *et al.*, Troy, N. Y.
7,956.—PIPE STEM.—J. W. Fleischmann, W'mburgh, N. Y.

TRADE MARKS REGISTERED.

2,128.—FEATHER TICKING.—Bliss *et al.*, New York city.
2,129.—METALLIC POLISH.—D. D. Cornell, Hyde Park, Ill.
2,130.—DRAWERS.—J. J. Fitz Patrick, Philadelphia, Pa.
2,131.—FLOUR.—Lyon & Co., Boston, Mass.
2,132.—STREET LAMPS.—J. W. Bartlett, New York city.
2,133 to 2,135.—SPICES.—E. R. Durkee & Co., N. Y. city.
2,136.—SAUCES.—Johnson *et al.*, New Haven, Conn.
2,137.—BOOTS.—S. W. Rösenstock & Co., S. Francisco, Cal.
2,138.—BAKING POWDER.—D. S. Thompson, Chicago, Ill.
2,289.—GAUNTLETS.—Wade & Shults, Johnstown, N. Y.
30,961.—MOWING MACHINE.—J. Ten Brook.

SCHEDULE OF PATENT FEES.

On each Caveat	$10
On each Trade mark	$25
On filing each application for a Patent (17 years)	$15
On issuing each original Patent	$20
On appeal to Examiners-in-Chief	$10
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On filing a Disclaimer	$10
On an application for Design (3½ years)	$10
On application for Design (7 years)	$15
On application for Design (14 years)	$30

CANADIAN PATENTS.

LIST OF PATENTS GRANTED IN CANADA, DECEMBER 11 to DECEMBER 23, 1874.

4,187.—W. M. Conger, Newark, Essex county, N. J., U.S. Improvements in metallic shields and supports for use under stoves and analogous articles of metal, and in machines for producing such metal work by spinning, called "Improvements in Metallic Shields and Supports for Use under Stoves and Analogous Articles of Metal, and in Machines for Producing such Metal Work by Spinning." Dec. 17, 1874.

4,188.—S. G. Smith, Hollis, York county, Me., U.S. Improvements in machines for removing snow from railroads, called "Smith's Improved Machine for Removing Snow from Railroads." Dec. 18, 1874.

4,189.—A. Webber, Detroit, Mich., U. S., and A. McCormick, London, Ont. Improvement in carriage springs, called "Michell's Carriage Spring." Dec. 18, 1874.

4,190.—W. Irvine, Rochester, Monroe county, N. Y., U. S., and S. Trees, Toronto, Ont. Improvements on horse collars, called "Irvine's Adjustable Horse Collar." Dec. 18, 1874.

4,191.—G. D. Chisholm and S. Douglass, East Flamboro, Wentworth county, Ont. Useful device for preventing