Notes & Queries

R. M., of N. Y.—Your idea that the Indian summer is caused by the latent heat given off in the freezing of the great lakes we do not believe is sound. The temperature of the air must be below the freezing point in order to absorb the heat and freeze the water.

C. P. R., of Mass.—A new stove burns better than an old one, because it is clean. There are many places where the soot collects, which retards the draft, for air passes more easily over smooth than rough surfaces.

J. W., of Conn.—Substances loosely compressed are not so good conductors of heat as the same material tightly packed, for the reason that the continuity is diminished, and the air imprisoned in the interstices.

T. M. F., of Minn.—It is a well-known law that liquids transmit force equally in all directions, and with the same intensity.

W. W. S., of Conn.—It is perfectly practicable to heat water to very near the boiling point by the exhaust steam, but the heater must be properly made, otherwise it will cause back pressure, or, in other words, choke the exhaust. Steam from a steam hammer could be used as well as any other.

B. L., of N. J.—We do not know which is the best place for wages in this country. We are told that in California wages are about the same that they are in New York. In Oberstein, Rhenish Bavaria, they hire workmen for $1 50 per week. Avoid Oberstein.

W. B., of Ind.—You must decide for yourself whether it will pay or not to take out a patent. Yes; a thing that will run by wind, and make its own wind at the same time, is a veritable perpetual motion.

M. C., of Me., asks:—"Has the purchaser of part interest in a patent the right to manufacture and sell without the consent of the other owners, and appropriate the profits wholly to his own use?" Answer—Yes.

W. H. S., of N. J.—The address of the inventor of the plan for seasoning lumber about which you inquire, is H. G. Bulkley, Cleveland, Ohio.

G. T., of N. Y.—A rifle ball fired vertically upward would fall with the same velocity that it rose, in a vacuum but it will not in the air. The resistance of the atmosphere prevents the ball from rising so high as it would in a vacuum then further checks its velocity during its descent.

J. W. F., of Mo.—The inventive ingenuity of the country has been directed for many years to plans for warming air for dwellings, and we should suppose that some of these would be suited to your purpose. Bones are softened for agricultural purposes and made more soluble by immersing them in dilute sulphuric acid; but if the acid has been neutralized by lime, forming sulphate of lime, it will not act on the bone.

An Old Subscriber, of N. Y.—The reason why the St. John boiler explosion was less disastrous than is usual with Western boiler explosions, is, that the St. John was run with low pressure steam, while the Western steamboats are generally run with steam of very high pressure. The notion that some great mystery is involved in boiler explosions is incorrect; they always result from imperfect workmanship or careless management. In the case of the St. John, the sheet that gave way had been cut partly through, right along the line of fracture, by the chisel used in chipping off the overlapping sheet.

J. C., of N. Y.—To make toilet soap of common soap, mix with it vanilla or any other perfume that you prefer.

G. R. S., of N. Y.—The harder steel is, the more brittle it is, and as the temper is drawn it grows tougher. When very cold it is more brittle than when warm.

A. S., of Mass.—Round valves and hollow valve rods are not new.

J. A. S., of N. J.—Probably you can obtain a patent.

S. Z. A., of Pa.—"The Clock and Watchmaker's Manual" can be had of John Wiley, bookseller, New York.

A. J., of Wis.—The grant of a patent does not relieve a patentee from the payment of the local license fees or taxes in any city, county or State. Patentees must comply with local laws, the same as other citizens.

P. T., of Pa.—Run your circular saw 1,500 revolutions per minute. Your pulley should be 18 inches in diameter to get 800 revolutions.

C. H. M., of Ill.—For discussion of your questions we must refer you to Nystrom's work on screw propulsion—though no definite answers can be given to most of them.

W. M., of Mass.—Any person can obtain a patent in this country without declaring intention of citizenship. Natives of Nova Scotia must pay $500 fee for patent. New Brunswickers the same as American citizens.

W. W., of N. H.—Scrap tin crowded into rat holes is said to be effectual in driving them away.

TO OUR ADVERTISING PATRONS.

Advertisers are referred to the new list of rates at the head of the advertising page. Those who have paid in advance for a certain number of insertions will have their advertisements continued at the old rates till the time paid for is up. All new advertisements will be charged 40 cents a line each insertion.

Advertisers will accommodate us, and save expense to themselves, by making their advertisements as short as possible.

Correspondence

Index for Change Wheels in Screw Cutting.

MESSRS. EDITORS:—Believing that the following method of forming a table of change wheels for screw cutting lathes is entirely new, and that it will be interesting and useful to a large class of your numerous readers, I offer it for publication:—

—5—		—6—		—7—		—8—		—9—	
20	25	20	30	20	35	20	40	20	45
24	30	22	33	24	42	21	42	24	54
28	35	24	36	28	49	22	44	28	63
32	40	26	39	32	56	23	46	32	72
36	45	28	42	36	63	24	48	36	81
40	50	30	45	40	70	25	50	40	90
44	55	32	48	44	77	26	52	44	99
48	60	34	51	48	84	27	54	48	108

The numbers 5, 6, 7, etc., at the head of the table, represent the number of threads to the inch it is desired to cut. The two columns of numbers under the number 5 represent the different sets of wheels—each wheel being designated by its number of teeth—which may be used to cut five threads to the inch, four being the number of threads to the inch on the leading screw; the left-hand column representing the wheels on the stud, and the right-hand column the wheels on the leading screw. Thus, 20 and 25 form the first set, 24 and 30 the second set, and so on. The two columns under the number 6 represent the different sets of wheels which may be used to cut six threads to the inch, and so with the columns under the numbers 7, 8, etc.

Considering the first sets of the different columns, it will be seen that, while the wheel on the stud remains unchanged, the numbers representing the different wheels on the leading screw will form an arithmetical progression, whose common difference is equal to the quotient obtained by dividing the number of teeth on the stud wheel by the number of threads to the inch on the leading screw. This method of finding the common difference is a general one for any progression which may be formed of the numbers at the top of the right-hand columns. All the columns are also in arithmetical progression. The common differences of the first two columns are respectively 4 and 5; of the second two, 2 and 3; of the third two, 4 and 7; and of the fourth two, 1 and 4.

It will be seen that these common differences are the least two whole numbers having the same ratio as the number of threads to the inch on the leading screw and the number of threads to the inch it is desired to cut. Having found the first set—namely, 20 and 25—by one of the various rules which have been published in the SCIENTIFIC AMERICAN, we can then form the table almost as rapidly as we can write the numbers down, and to any desirable extent.

The table may be extended to the left so as to include the numbers 1, 2, and 3, if it is desired

JOSEPH SPOR.

Philadelphia, Pa., Nov. 14, 1865.

The Philosophy of a Top.

MESSRS. EDITORS:—Can you tell us why a boy's top will assume and maintain an erect position while spinning? A. S. C.

Suspension Bridge, Nov. 4, 1865.

[The same explanation that we gave, some time since, of the gyroscope, applies to a top. If you tie a stone to the end of a string and swing it about your finger, then while it is whirling, if a sheet of thin paper be held so that the stone will strike it at a sharp angle in a way to turn the stone from the plane of its revolution, the stone will resist this effort to turn it from its course, and will pass through the paper. If a sufficient number of stones are united to form a complete wheel, and the wheel is put in rotation, each one of the stones will resist any effort to change the plane of its revolution, and thus the whole wheel will resist any effort to change the plane of its rotation. When a top is rotating in an upright position, it cannot lean toward any side without changing the plane of rotation of all its parts; consequently, so long as it is rapidly rotating it stands upright.

When the axis of the top is inclined, the force of gravitation tends to draw it downward, and thus to change the planes of rotation of all its parts. If you will take a wheel and incline its axis, you will see that the struggle to resist this change will move the wheel forward, and will thus give to it a revolution around an imaginary vertical axis. Even in this revolution the planes of rotation are constantly changed, but the change is the less the more nearly the axis of the top coincides with the imaginary vertical axis about which it is revolving; hence it is subjected to a constant tendency to assume an upright position, and the more rapidly its rotation, the stronger is this tendency.

The resistance offered by a rotating wheel or disk to any change in the plane of its rotation is worthy of consideration in many applications of mechanism. This resistance tends to make a fly wheel run true, and, consequently, to so wear its bearings as to correct any slight error in its original hanging. It increases the resistance of locomotive and car wheels to the change in the direction of their motion in passing round a curve. It precludes the employment of Avery's engine for driving locomotives, and suggests that, if his engine should be used for this purpose, it should run on a vertical, instead of horizontal, axis. —EDS.

A Question of Boiler Feed.

MESSRS. EDITORS:—Having been a constant reader of your paper for a number of years allow me to ask you a few questions. We have an upright boiler for hot water, and connected to the boiler is about 1,500 feet of pipe, for the purpose of heating a building. The boiler is in the cellar, and is fed through a three-quarter pipe from a tank forty-five feet in hight, the water in the tank four feet deep, the pipe at the bottom of the tank, and about twenty pounds pressure of water. Attached to the boiler is a thermometer to tell the temperature of the water. Now the question is, can the water be heated more than 212° without backing up into the tank. Some think it is the same as an open boiler, boiling in the open air, and the water cannot be heated more than 212°; that if the thermometer indicates more than 212° it is not correct. I am of a different opinion. I think the water can be heated more than 212°—enough more to overcome the pressure from the tank; how much more I cannot say. It is a fact that the water has been 230° without heating the water in the tank. But I have not tried to see how much higher temperature I can get it without heating the water in the tank. Please let us know your opinion about it.

G. S. KINGSBURY.

Somerville, Mass., Nov. 4, 1865.

[It is plain that the pressure of steam must be greater than the weight of water in the pipe in order to force this water back into the tank. As the water is heated in the lower end of the pipe, it will expand, and will be forced upward by the colder water of greater density sinking down and displacing it; this circulation will convey heat from the boiler to the tank, and will tend to equalize the temperature of the two. The rapidity of the circulation, and, consequently, the rapidity with which the heat will be transferred, will depend mainly on the size of the pipe. The circulation will be obstructed by bending the lower end of the pipe upward, in the form of a U.—EDS.

Iron Making.

MESSRS. EDITORS:—I have before me your description of the Bessemer steel, and I have no doubt it must strike your readers that it reveals such radical defects in our present iron making as should awaken the inventive genius of chemistry. First, we waste coal and spoil the iron by supercarbonation. Next, we consume more coal to drive out the carbon to make the iron ductile. Finally, we bake it again in carbon, to restore some of the carbon it had at first and which we spent so much to drive out of it: and this makes it steel. From this it is to be inferred that a certain diminished portion of carbon imparted in the furnace would probably give us cast steel, and from this we could make wrought iron, with again less expense of carbon and labor. Malleable cast iron professes to be made by extracting carbon from pig-metal superficially, and, as steel men aver, so do malleable cast-iron men, that some nitrogen is necessary. Malleable cast iron has very extended uses, which would be trebled if it could be obtained of uniform quality. It is very unreliable in this respect; and the same is said of Bessemer steel. The fact that