

Scientific American

NEW YORK, DECEMBER 14, 1850.

Production of Cotton.

There is no article of agricultural produce, which engages so much attention, at present, as cotton; and no wonder. The magnitude of the cotton trade, so far as a relationship with manufactures is concerned, dwarfs every other. The stock, and production of American cotton, for five years, from January, 1845, was 14,150,000 bales. The stock consumed in that period was 14,812,000 bales, thus showing that the consumption was greater than the supply. A recent number of the Alabama Planter contains a circular, by Mr. G. G. Henry, factor, wherein it is stated, that although the cotton crop of 1849-50 was below that of 1848, yet it sold for \$30,000,000 more. Does not this show the magnitude of the cotton trade? He states that if the consumption of cotton goes on for the next five years in proportion as it has done for the past, there would be a deficit of supply amounting to 2,300,000 bales. The consumption in America will not be as great this year as last, by one-third the number of bales, at least; but, then, what signifies our consumption in comparison with that of Great Britain? We run over 2,000,000 spindles, England more than 17,000,000; and she paid \$71,440,975 for the raw material, last year.

It is long since the manufacturers of Great Britain began to try and rid themselves of dependence on America for a supply of cotton; but, as yet, they have not been able to do so successfully. At present there is more excitement than there ever was before, in respect to seeking other sources of supply; and they have turned their eyes towards the West Indies. A report has been published, of a meeting held in the Jamaica Bank, Kingston, where the question of the profitable culture of Jamaica cotton was discussed, and from the tone of it, we are confident that cotton cannot be cultivated profitably in Jamaica. The planters cannot get laborers to cultivate the crop, as one reason, and another is, it requires more cultivation to keep down the weeds than it does in any of our States.

For a long time great efforts have been made by the East India Company to cultivate cotton in that fertile region. American cotton agriculturists and American machinery were taken out there at great expense, and for many years, effort after effort has been made to increase the supply and improve the quality of Indian cotton, so as to compete with that of the United States; but all has been in vain. At a recent meeting of the Manchester Chamber of Commerce, the chairman, Mr. Thomas Bazley, stated that they were paralyzed for the want of cotton—that they were dependent upon one source, America, and that they were incurring a cost of ten millions sterling more, at the present time, than they should pay for the raw material, and he advised the meeting to look to the East Indies for supplying their future wants. Before India can raise cotton to supply England, the cotton lords of Manchester and Glasgow have a work to perform almost equal to transporting the Himalaya mountains in ship-loads to the Mersey. The whole polity of the country, in taxes, customs, building of docks, deepening rivers, making railroads, and making the natives honest traders into the bargain, have all to be accomplished before the East Indies can be rendered a cotton producing country, to compete with America; and, during the time this reform is working out, will America be standing still? No: she will be shooting still further ahead. The article on Georgia Railroads, on another page, will show what energy and enterprise is now displayed by the cotton growing States, in the way of internal improvements, the development of their natural resources, to facilitate transit, and thereby encourage the cultivation of cotton up in the interior, where, without railroads, the culture of it would be unprofitable. It is our opinion that our cotton cultivators have but precious little to fear from the East Indies. The native dealers of cotton, in India, are such scoundrels that they cannot be trusted in the least.

It is not long since that 8,500 bags were seized because adulterated with foreign matter, and the parties who were guilty, confessed that the crime, although penal, was a regular, long-continued system. The British merchants will never be able to make much out of such men until they become christianized.

The only apparently reasonable offset to decrease the consumption of cotton, is the manufacture of more linen. If flax could be cultivated, and as easily manufactured as cotton, then it would supersede it, in a great measure; but it never can be: the separation of the woody from the fibrous parts of flax will always be an expensive operation. The cotton culture has nothing to fear from the linen, nothing. The linen trade was the great trade seventy years ago; America had not then exported her first cotton bale. The increase of the cotton trade has been a natural result, it has overshadowed the linen in importance, and we cannot divine a reason why it should not, and must still continue to be the great staple production for manufacturing purposes.

Agricultural Chemistry.

Plants contain various chemical substances. By burning a plant we find in the residue an ash, which contains a certain class of plant constituents—while another class escapes in the form of gas. The first is the mineral constituent, the second the organic; the latter contains only four substances, viz., carbon, hydrogen, nitrogen, and oxygen. The former is more extensive, containing sulphur, phosphoric acids, alum, magnesia, potash, and soda. Without these substances the plant could not flourish, and just in proportion as they are applied, so is the plant luxuriant. The inorganic constituents can have but one source, and that source the soil in which the plant grows. It is different, however, with the organic constituents, which have two sources drawn from the surrounding atmosphere. The atmosphere is the great reservoir of the organic constituents of plants. Two of them, nitrogen and oxygen, exist in large, while the others, carbon and hydrogen, exist in small proportions. It must be understood, however, that all soils also contain a certain quantity of organic matter, which contain the same constituents, and are in many instances very important sources of those substances which form the food of plants. It is not enough that these substances should be in the soil; it is necessary that they should be in a state available to the growth of the plant, viz., in a soluble condition. The necessary constituents become soluble very slowly, and just in sufficient quantity to support that degree of vegetation which the economy of nature requires. Manure should contain all the substances in the exact proportion required by the plant, so that no waste might occur. It has, as yet, been impossible to carry out, practically, what is true theoretically. Theory and experiment have shown that the whole constituents of manure are not equally important. Nitrogen has been found to be the most important constituent of manure, because it is not so plenty as the others. It is true that the atmosphere contains great quantities of nitrogen, but then the plant also requires it most. In 100 lbs. of atmosphere there are 77 lbs. of nitrogen, but not more than $\frac{1}{4}$ of ammonia—hence the great source of ammonia, the right food for the plant, is the decomposition of animal and vegetable substances. In the management of the farm-yard, there should be two objects kept in view, to wit, the produce of the greatest amount of nitrogen, and the conversion of it into ammonia. The principal source of the two important constituents of plants comes from plants themselves, and that which is obtained from animals, comes from the plants on which the animals have been fed. It is a very important matter to keep manure free from air and moisture. The manure heap of every barn-yard should be covered by a roof.

To produce ammonia quickly, the manure should be heaped up, while it is produced more slowly when the fresh manure is plowed in the soil. By a knowledge of this, farmers can make their manure act fast or slow, as

they choose. Every farmer should depend on his own barn-yard for his fertilizers, and to produce these in the greatest abundance, and at the least expense, should engage his attention. The production of ammonia, as shown, is the grand object and this is formed by heaping up and fermenting animal and vegetable substances. To preserve the manure under roof is to save what has been already formed, and it is far cheaper to do this by covering in, than using gypsum without covering in. The reason why open barn-yards are common, is owing to the expense of covering them in; and another fact, in connection with this, is the want of a true knowledge respecting the value and the nature of the manure. As nitrogen is the prime plant-constituent to be provided artificially, and as ammonia must be served up as the food of the plant, and as this is very volatile—a test for showing what farmer is more enlightened than another, is his barn-yard.

In the last number of the "Rural New Yorker" there is an article entitled "Shade as a Manure," wherein it is stated that a correspondent of the "Plow, Loom, and Anvil" has advanced a new theory, that "the excrements of animals is not manure; that the residue of putrefaction is the aliment of plants." Neither Mr. Skinner nor Mr. Moore, we believe, entertain any idea of the novelty of this doctrine. It is wrong, in one sense, and right in another, as every man who has studied agricultural chemistry knows. The great difficulty, with some, in studying cause and effect, is, they don't dig deep enough. By what we have set forth above, it will be seen that the residue of this putrefaction is ammonia. Putrefaction is only the common name for the chemical fermentation. It is all nonsense to say that shade is a fertilizer, as has been set forth. Soil may be shaded for twenty years, and not become any more fertile, if there is not some means provided for the production of ammonia, and its absorption in the soil. The summer fallowing of land tends to the production of this food for plants, by the soil absorption of nitrogen, and the decomposition of vegetable or animal products.

War about Geometry.

Mr. Seba Smith, of this city, has recently written a new work on Geometry, termed "New Elements in Geometry." The nature of what is held forth to be new is, that all measurements in geometry are made of cubes. Here is some of it:—

"She never attempts to measure something with nothing, whatever vain imaginations have been indulged hitherto by her votaries. Her magic wand, by which she performs so many wonderful works, is not an ideal line without breadth, but a positive magnitude; by which I mean a magnitude having extension in every direction from its centre. That magnitude is always a simple cube, and nothing else. The cube is her unit, and she uses but one unit in all her measurements. If you ask her to measure simply a line or length, say the length of your parlor, she will inquire by what standard it shall be measured, or what shall be the unit? If you tell her a foot, she takes her cubic foot in her hand, and applies its length, or linear edge, along the distance required, and tells you how many times the length of her unit must be repeated to make the length of your parlor. Again; if you ask her to measure extension in two directions, length and breadth, say the area of your parlor floor, and to return the account in feet, she takes her unit, the cubic foot, and applies its length and breadth, or one face, a sufficient number of times to cover the floor, and tells you how many square feet it contains. If you ask her how much space or extension there is in the whole room, she then applies the whole unit, and fills up the room with cubic feet, and tells you how many it holds. And thus she measures everything, always with that simple square block."

This book has caused a flare up among some old mathematicians, who have an idea that something can be measured from nothing, and found their premises upon geometrical nomenclature, not the true idea they have of their nature—such as "a point is said to have posi-

tion without magnitude, and a line has length without breadth or thickness—or is a succession of points; but Mr. Smith is backed up by somewhat old authority, and if the subject be correctly understood, his "new element" is not altogether new. In Davison's Repository, as we learn by the London Mechanics' Magazine, Nov. 9, Question 62, Mr. Lowery observes, "that an infinitely small quantity, taken an infinite number of times, is equal to a finite quantity, and it is upon this principle that the whole science of Geometry rests; for a line is made up of an infinite number of points, infinitely small; a plane is made up of an infinite number of lines, infinitely narrow, and a solid is made up of an infinite number of planes, infinitely thin—consequently, an infinite small quantity, taken an infinite number of times, is equal to a finite quantity." There now, let our fighting geometricians, sheath their swords; Mr. Smith's idea about a unit is the same as that taught by Prof. Davies, in his Logic of Mathematics.

Nature of a Patent Right.

The true nature of a patent right is best understood, and, indeed, can only be truly understood, by attentively considering the claimants of inventions which are indisputably patentable. Examine, for instance, the invention of Kneller, for an improvement in the manufacture of sugar, by introducing air-pipes into vessels containing syrup, and thus quickening the process, upon the principle that evaporation is promoted by a current of air. If we analyze this invention, of what do we find that it consists?

The process of evaporating syrup was the subject matter upon which the inventive power of Kneller was employed. The process which he undertook to improve, had long previously been the property of the public. This old process, therefore, was no part of Kneller's invention. But further, the natural law that a current of air promotes evaporation, was applied by Kneller to the process in question, by means of introducing pipes into vessels containing syrups. Suppose I should have employed some other mode of introducing air-currents to the syrup, without effecting thereby any material improvement. In so doing I should have infringed upon Kneller's patent—for merely formal changes of an apparatus, do not constitute a distinct invention; hence, it follows, that the peculiar mode in which Kneller introduced his pipes into the syrup, was not a material part of his invention,—and in order to ascertain in what the invention of Kneller intrinsically consisted, we must exclude from consideration the feature alluded to,—that a current of air promotes evaporation was a well-known law. The question recurs,—what was the essence, the spirit, of this invention of Kneller? It was this: the application of a natural law, by practical means, to effect a certain result.

Kneller's patent protected both his own mode of applying the natural law in question, and also all merely equivalent means of applying such laws.

But, it may be asked "if Kneller's invention be irrespective of form, and founded on a natural law, does he not monopolise an abstract principle, which is, and forever ought to be, the property of all mankind?"

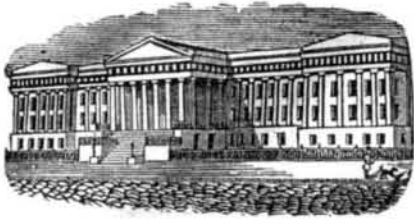
By no means; Kneller only monopolized the application of a natural law to the production of a certain result, by a certain class of means. In other words, his invention was a principle embodied in practice. And such is the distinctive character of the great mass of patent rights.

WATT.

Another Steamboat Explosion.

The steamboat A. Douglass exploded her boiler, at Tate's Shoals, on the Mississippi River, on the night of the 26th ult. It is supposed that 40 or 50 persons have lost their lives, as all the passengers were asleep at the time. When will such crimes be punished, as they deserve, in our country?

Within the last ten years, says the London Chronicle, 150,000 Mormons have emigrated from Great Britain to the United States, most of them men of some means, from Wales and the Northern and Eastern parts of England.



Reported expressly for the Scientific American, from the Patent Office Records.

LIST OF PATENT CLAIMS

Issued from the United States Patent Office.

FOR THE WEEK ENDING NOVEMBER 27, 1850.
To Smith Beers, of Naugatuck, Conn., for improvements in machines for turning irregular forms.

I claim the mode herein described, of changing the position of the ratchet, by means of the arrangement of the sliding rod, knee, lever, lifting plate, and pawl.

To H. J. Betjemann of Cincinnati, Ohio, for improvement in machines for boring dovetailed mortises.

I claim, first, the rotating cutters, (five) formed and arranged substantially as described, with conical heads and cylindrical necks, in combination with a rest or movable table, for the reception and attachment of the bed-post, the said table, while being advanced towards the cutters, being conducted by suitable guides (three) as described, either upon the moving table or the stationary bench, in a course which is at first at right-angles to the face of the post, and thence, as soon as the cylindrical cutter has begun to act in a longitudinal course, receding sufficiently from the face of the post to form a mortise which shall bind the dovetailed tenons of the rail, as they are pressed down in their sockets.

Second, I claim, in combination with the aforesaid guides, the stops, substantially as here arranged and applied, or their equivalents, whereby the table is limited in its course to the particular range of cutting action required for the time being.

To Joseph Dilks, of Philadelphia, Pa., for improvement in the Alarm and Indicator for Steam Boilers.

I claim the peculiar method of moving the indicator by its attachment to the side valve of the whistles, by which the connection is continued through the head of the boiler, as herein described, dispensing with the stuffing-box and packing.

To W. H. Horton, of Newburyport, Mass., for improved arrangement of the bending rollers in tin cutting and bending machines.

I claim to so combine and arrange the rollers, with respect to the jaws, as specified, so as to enable the said roller to be operated in the manner substantially as set forth; that is to say, to be moved in a plane parallel to the common axes of the shafts, the said roller being arranged in a turning frame and supported by a movable and adjusting frame; and the object of my improvement being to enable a person to move the roller against the tin in the manner and for the purpose of binding it down, substantially as hereinbefore explained.

To Wm. Kelly, of Eddyville, for improvement in the Metallic Flask for casting large Kettles.

I claim the elastic iron core, supporter, or inner part of the flask, constructed of wings attached to the crown, and provided with covering strips, substantially as described.

To Orville Mather, of Cincinnati, Ohio, for improvement in machines for Dressing Spokes.

I claim, first, constructing a cylindrically rotating cutter head, with a separating joint athwart its middle, and in the plane of its rotation, so arranged as that, by the mutual advance or recession (in the direction of their axis of rotation) of the respective sections of the cutter heads, as they traverse the length of the stuff, the cutting edges are adapted to impart the varying outline and form required for the work.

Second, the shafts and weighted levers, in combination with other levers, and the links, or their equivalents, for sustaining in position the tongues upon the spoke, and the rollers upon the guides, and rendering them self-adjustable under all the circumstances which can affect them.

To Melville Otis, of East Bridgewater, Mass., for improved Nail Plate Feeder and Turner.

I claim, first, giving the alternating motion

to the nipper rod, by means of a pair of jaws actuated by the opposite ends of a vibrating beam, one of the jaws being provided with a spring and toggle, which causes it to grasp and release the nipper rod, the whole operating substantially as described.

Second, I claim giving to the said rod its progressive advancing and slightly retrograde motions, by means of a pair of jaws actuated by a cam and an eccentric, and two springs, substantially as specified.

Third, I claim operating the follower, so that it is raised from the nail plate, and the nail plate from the lower cutting jaw of the machine, by means of a cam, a rock shaft, and a radius bar connected to one end of the follower, substantially as described.

Lastly, I claim transmitting the motion from the nail machine, by means of a lever beam and connecting rods, when the lever beam is hung upon a cranked centre, and the actuating connecting rod is provided with a knob acting upon a flat crank pin, substantially as described, whereby I am enabled, with facility, to throw my feeding machinery in and out of gear.

But I do not intend, hereby, to confine myself to the particular forms and proportions herein described, provided I construct a machine substantially the same.

To Harvey W. Sabin, of Canandaigua, N. Y., for improvement in Horse Rakes.

I claim, in my improved horse-rake, the device for raising the teeth, substantially to clear them of the hay, and dropping them again, by means of the apparatus, substantially as described, being worked by the draught of the team, when thrown into gear, at the will of the operator.

To Elisha Steele, of Waterbury, Conn., for improvement in Suspender Buckles.

I claim the construction of the buckle frame and attaching the tongue or points thereto, so that the tongue or points slide out or into the buckle, instead of acting upon a hinge or roller, as above described.

To Augustus Thayer, of Melden Bridge, N. Y., for improved Auger Handle.

I claim the construction of auger handles, substantially as set forth, that is, by making the principal part of the same, from end to end, of one piece of wood, or other material, securing the central portion through which the auger shank passes, with a metal band, and arranging a detent for holding the shank with machinery to operate it; the said handles being for use with augers, or any other tools to which it may be adapted.

To J. T. Trotter, of New York, N. Y., for improvement in Vulcanizing India Rubber.

I claim the use and employment of zinc prepared by the process described, whereby a hyposulphite, or similar preparation of zinc, is obtained, in combining with india rubber, for the purpose of curing or vulcanizing it, substantially as hereinbefore set forth, without the use of free sulphur in any way, in combination with the rubber.

RE-ISSUES.

To Charles Davenport & Albert Bridges, of Cambridgeport, Mass., for improvement in the manner of constructing Railroad Carriages, so as to ease the lateral motion of the bodies thereof. First patented May 4th, 1841.

We claim connecting the said turning bearing to the truck frame of the above described kind, resting on four wheels or more, by a mechanism, substantially such as described, that shall not only allow such turning bearing independently of the wheels and axles a lateral play movement or movements, in directions transversely of the carriage, but bring or move it back to its central position after the lateral deflective force has ceased to act.

DESIGNS.

To Samuel Pierce of Troy, N. Y., (assignor to Johnson Cox & Fuller,) design for Stoves.

Cotton Spindles of the World.

The London Examiner gives the following tables as an estimate of the number of spindles engaged in the cotton manufactory throughout the world:—Great Britain, 17,500,000; France, 4,300,000; United States, 2,500,000; Zollverein States, 815,000; Russia, 700,000; Switzerland, 650,000; Belgium, 420,000; Spain, 300,000; Italy, 300,000. Total, 28,585,000.

Gravitation—What it is.

Under this heading, a writer (W. K.) in last week's Scientific American, puts forth some ideas, which are incorrect and contradictory. He says—

"Gravitation is that property of matter by which it resists a change of state, with respect to motion or rest. This will, no doubt, be considered a sweeping declaration." &c. It is a sweeping declaration, but only a declaration. If he had used the word *inertia* instead of "gravitation," he would have given us, word for word, the very proposition of Newton, as relating to *vis insita*; the only difference between the two is, that Newton is nearly right, while W. K. is the very opposite. If gravitation is that law which resists a change of state, as set forth above, it is very easy to prove it. It is just this—every body once in motion, must forever continue in motion; a ball, shot from a rifle, will forever continue fleeting through space. It is in motion, you see, therefore it will resist a change of state to rest. Now, how is it that a ball, shot from a rifle, is brought to a state of rest? We can easily understand how it gets motion, or, in other words, has changed its state of rest, viz., by the *impact* of a superior force; but, then, no powder, no human hand touches it while fleeting through the heavens; and how does it come to a state of rest? Take away the known law of gravitation—that principle of attraction in all bodies—and we cannot explain it; but with it we can explain the phenomenon. By the laws of Inertia and Gravitation, we can explain all the deflections, all the motions, and the forms of moving bodies, but not by the declaration above. The whole of the reasoning, to prove his proposition, is inappropriate. I cannot see how it applies to, or dovetails with, his text. Instead of proving his proposition, his exposition relates wholly to the composition of forces, an entirely different subject. One of the most singular ideas set forth by him is this—

"If this is the true philosophy of gravitation, then we are at once introduced to the true reason why its force is always in proportion to the quantity of matter. When we lift a stone from the earth, we separate two bodies, containing a vast amount of matter, for which reason we experience a great opposition. When the stone is small, it leaves the earth to move only a small distance, it is true, but as all motion is mutual, and proportional to the two bodies themselves, the earth must, upon the lifting of the stone, recede her proportion. When we double the volume of the stone to be raised, then, although the quantity of matter contained in both is the same, yet because the earth, the greater of the two, is obliged to recede twice the distance, we experience twice the difficulty in raising it; we therefore say, the stone has twice the weight of the former."

Now, sir, this is not correct: force is not always in proportion to the quantity of matter. Laboring force embraces weight, or gravity, and velocity. One body having just half the quantity of matter as another, may have the same amount of force, yea, ten times the amount. A ball, weighing one ounce, has as much force as one weighing a pound, if the same quantity of powder is used to propel each. What he says about lifting the stone is droll.

He forgets that there are properties belonging to matter which are named magnitude and density, and these properties must be considered apart from distance or space. One pound moved through 100 feet of space, in one second, has as much force as 60 lbs. moved through space at a velocity of 100 feet per minute. About lifting the stone, and the receding of the earth, is very amusing, as it seems that, doubling the volume of stone, the quantity of matter is not increased; that is, there is just the same quantity of matter in one pound of sugar that there is in two:—W. K.'s wife, if he has one, could never become a believer in this doctrine. A pair of scales could easily convince him that he is in error. The most singular announcement which he makes, is as follows:

"We can move a weight, not only about three times greater in a horizontal than in a

perpendicular direction, but even ten, fifty, or a hundred times as great. The reason is plain, there being no separation of bodies, there can be no re-action in a direction towards each other,—the force, therefore, thrown upon the body is constant, and although we can scarcely see the effect at first, yet, as the force is every instant accumulating, therefore, by continued pressure, we can move a much greater body in a horizontal than in a perpendicular direction."

There, engineers, don't you see that a horizontal is a hundred times more powerful than a vertical engine. This, however, is not the meaning of W. K., but it shows how he confuses subjects—he has not a clear understanding of them. The fact is, direction of motion has nothing to do with the subject; there is no difference in the force of one body from another, if both have the same momentum—let them be moving in any direction, horizontal or perpendicular. I was sorry to see such an idea advanced as the following:—"The elements of matter are unoriginated, hence they have already passed through an infinite number of modifications, in which every particle of matter has been associated with every other particle, from which it has since been projected." He deduces the above from the laws of action and re-action. He might just as well have said, that he himself was not originated, because there is an inherent principle of self-preservation within his breast. How he accounts for matter passing through various modifications, the association of particles, and then their separation, is a problem; such events could never happen, if his theory was true; never.

It is not long since that a writer in the Scientific American discovered the same law as W. K., giving it another name, but he was going to make vessels cross the Atlantic in a few days by it.

The laws of Mechanics are not generally nor well understood. With your permission, gentlemen, I will pursue the subject in some subsequent articles. MACLAURIN.

The Cotton Worm.

MESSERS. EDITORS—In No. 4, page 27, of the present volume of the Scientific American, is an article under the head of "Cotton Worm," which speaks of a destructive insect, a fly, resembling the "Candle Fly." In my researchs in entomology I never came across an animal of such a denomination; no doubt the misnamed insect is a *Papilio, Noctua Gossypii*, a native of South America, blown to our Southern States when in the winged state, and becomes destructive when, on its arrival, the cotton is in full bloom; if later, it is a welcome customer. So I found it in 1812, in South Carolina, where the cotton had ripened into pods, and nothing left for it but the leaves, on which it fed, by which means the planters reaped a cleaner crop, free from the small particles of the leaves. Fortunately, this insect cannot endure our climate, or else it would become naturalized. The manner of destroying the fly, as stated by the writer, would rather be inefficient—examining the blossoms; what a labor! The quicker way would be to set the whole crop on fire, and is more sure than inviting these guests to a dish of molasses—a luxury to bees, wasps, and hornets, but not to papilios, who only suck nectar from flowers. The only method our planters have tried, was to light fires near by, in calm nights, around the cotton fields, which attracts moths.

Savannah, Oct. 20, 1860. A. G. O.

[The article referred to, in the above letter, was an extract from another paper, and credited to that paper. We did not endorse, nor make any comments on it.—ED.]

Freshets.

It is our opinion that there have been more freshets in our country, this season, than any other within our recollection. Last week the village of Cleveland, Oswego Co., was visited with a destructive freshet in the rising of Black Creek, which carried away five dams and two bridges.

The Toronto papers estimate the surplus wheat of Upper Canada this season at 7,000,000 bushels more than last, which was 4,000,000—making 11,000,000 bushels.