

speed of a 60 foot torpedo craft in a straight line, their twin screws give them important advantages in respect of turning and going astern. With the rudder alone and with both engines going full speed ahead they can turn in from eight to ten times their length; but with one engine going ahead and the other astern they can go round in a distance equal to twice their length.

SEA OTTER, OR KALAN.

The kalan, or sea otter, says "Wood's Natural History," is very much larger than its fresh water relations, being rather more than twice the size of the common otter, and weighing as much as seventy or eighty pounds. During the colder months of the year, the kalan dwells by the sea shores, and can be found upon the icy coasts of the Northern Pacific, where it is extremely active in the capture of marine fish. When the warmer months begin to loosen the icy bonds of winter, the sea otter leaves the coasts, and in company with its mate proceeds up the rivers until it reaches the fresh water lakes of the interior. There it remains until the lessening warmth gives warning for it to make its retreat seawards, before the fierce frosts of those northern regions seal up the lakes and deprive it of its means of subsistence.

It is rather a scarce animal, and is not so prolific as many of its relations. The fur of the kalan is extremely beautiful, shining with a glossy velvet-like sheen, and very warm in character. It is in consequence valued at a very high price. The color of the fur is rather variable, but its general hue is a rich black, slightly tinged with brown on the upper portions of the body, while the under portions of the body and the limbs are of a lighter hue. In some specimens the head is nearly white, and in one or two instances the white tinge extends as far as the neck. Indeed, the proportions of dark and white fur differ in almost every individual. All the otters are long of body and short of limb, but in the kalan this peculiarity is more apparent than in the ordinary otters, on account of the curious setting on of the hinder limbs and the comparative shortness of the tail, which is barely more than seven inches long, while the head and body measure three feet in length. The food of the sea otter is not restricted to fish, but is composed of various animal productions, such as crustacea and mollusks. Some writers assert that, in default of its more legitimate food, it varies its diet by sea weeds and other vegetable substances.

NEMERTES, OR STRIPED POLIA.

The nemertes is somewhat like the leech, but it is not furnished with a sucker. It sometimes attains the extraordinary length of thirty to forty feet, and can extend or contract itself in a surprising manner. A specimen of twenty feet long is capable of suddenly contracting itself to the length of four or five feet. The exact length to which the nemertes can extend itself is not known. It is always writhing and coiling its long body into apparently inextricable knots, but never suffering any real entanglement. It will convert its body into a long and slender screw, and it is assumed that it moves from one place to another when coiled in this way. No accurate and reliable observations of the habits of this animal have yet been made.

Effects of Severe Cold on Insects.

A very general impression prevails that severe winters are prejudicial to insect life. It is, however, a quite erroneous impression, for nothing has struck us so forcibly in our experience with injurious insects, as the fact that in most cases they pass more safely through a steady, even if severe winter, than through a mild or changeable one. We have repeatedly called attention to this fact in our own writings, and Miss E. A. Ormerod, in her "Notes of Observations on Injurious Insects," for 1879, has some quite pointed remarks on this subject, in connection with the severity of the past winter in England.

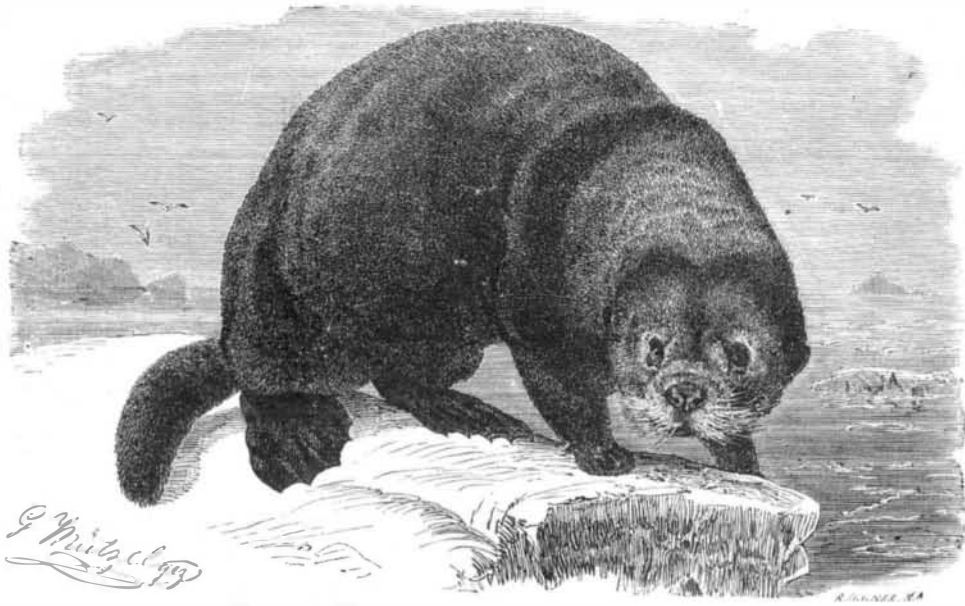
Severe and steady cold is not only favorable to insect hibernation, by causing a continued state of torpor, but indirectly in preserving them from the attacks of birds and other animals, which, during such severe weather, cannot reach them in the frost-bound ground.

Mild winters, on the contrary, generally cause premature activity in insects, often followed by relapses into the torpid state, and such changes are prejudicial to their well being.

Insectivorous animals also fare better during such mild winters.—*American Entomologist.*

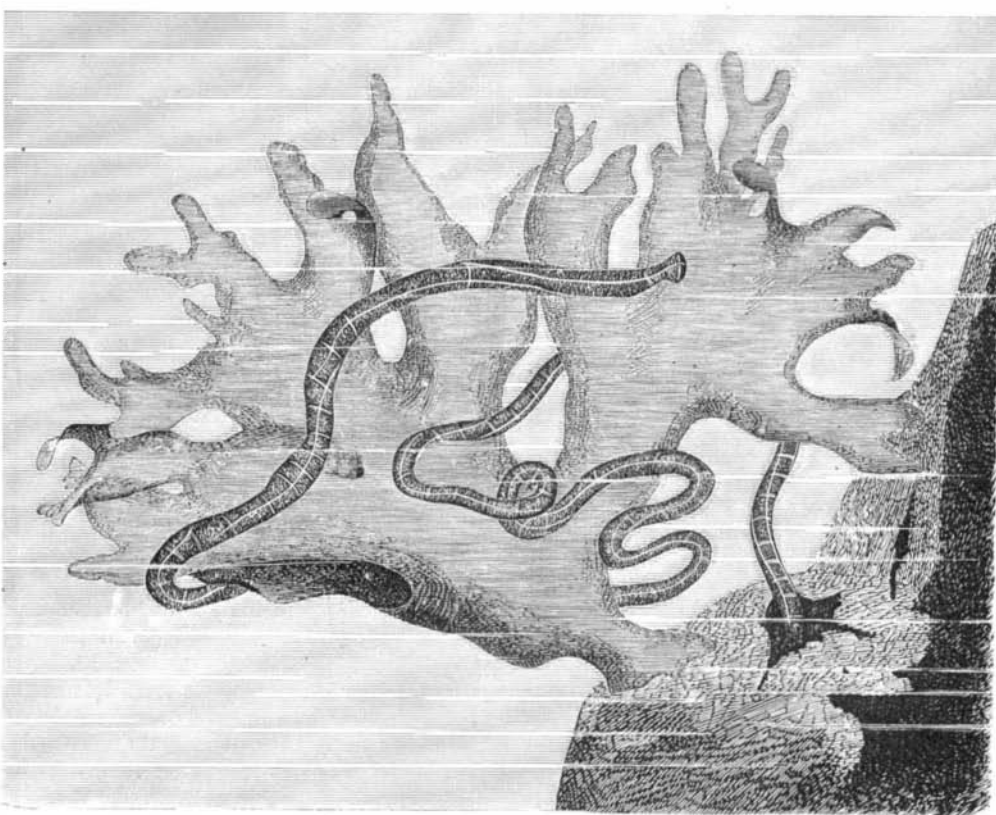
The Centrifugal Creamery.

The estimation of the quantity of cream contained in milk can now be made very accurately and rapidly, by means of centrifugal force. Attach the handle of a can, filled with milk, to a cord; hold the other extremity of the latter in the hand, and whirl as if for a sling; the cream, lighter than the rest of the milk, will accumulate on the surface free from all liquid, and more quickly than if in a state of repose; the time will even be lessened in proportion as the revolutions are rapid. When the milk has a temperature of 59° to 60° Fah., the separation of the cream takes place in fifteen minutes, at the rate of six hundred revolutions per minute. At the same time the quantity of water added to the milk for adulterating purposes can be ascertained. M. Gembloux



SEA OTTER, OR KALAN.—(*Enhydra Lutris*)

having tested that pure milk contains ten per cent of cream, added one, then a second tenth of water, and when whisked the cream represented but nine and eight per cent of the volume of milk. Further, when whirled in the cylindrical churn, the contents formed three distinct layers—cream, water, and skim milk. The same centrifugal test was applied to butter, maintained in the liquid state by means of hot water; the water separated into three states toward the circumference of the churn—fatty butter, caseine, and salt water; it was in the latter all the mineral adulterations lodged. It was at the Exhibition of Vienna that an apparatus for separating cream from milk by centrifugal action was first made known. It is to M. Lefeldt that the honor reverts for applying the system on a vast scale by means of a turbine cylinder making eight hundred rotations per minute, when the cream is formed round the axle of the machine, after which comes the skim milk, and then the impu-



NEMERTES OR STRIPED POLIA.

rities, forming, as it were, three rings or zones. Other skim milk is introduced, which forces up the cream to run over, and thus out of the cylinder. Mr. Lawal's Swedish skimmer is so constructed that, in proportion as the cream and skim milk are separated, they pass off by the entrance of fresh milk. In the co-operative dairy at Kiel, 4,000 quarts of milk, the produce of 550 cows, are centrifugally skimmed per day.

NATURAL HISTORY NOTES.

Effect of Thick Sowing on the Sex of Dioecious Plants.—At the meeting of German naturalists and physicians at Baden-Baden last September, Prof. Hoffmann, of Giessen, as reported in the Berlin *Monatsschrift*, sought to show that seeds of unisexual plants, when thickly sown, result in a preponderance of males. Thus he found that one hundred seeds of spinach, sown in a six-inch pot, yielded two males to every female, whereas the same sample of seed produced an equal number of males and females in the open ground where they had plenty of room. This observation would be important if of general application, and especially with hemp, but Haberland disputes it so far as this plant is concerned. According to Hoffmann, sex does not reside in the seed, but depends on the conditions of germination. Unripe seeds of *Lycnis vespertina*, he found, gave a larger proportion of males than fully ripe seed. Seed of *Mercurialis annua*, artificially impregnated in early summer, gave more males than autumn impregnated seed. Prof. Prault, of Aschaffenburg, remarked that crowded prothallia of ferns produce a larger percentage of antheridia, and scattered ones more archegonia. Prof. Pfeffer, of Tübingen, stated that he had observed a similar phenomena in the case of equisetum.

Interdependence of Animals and Plants.

—The *Gardeners' Chronicle* gives an engraving of a very remarkable pitcher plant, new to cultivation, but described by Dr. Hooker, a few years ago, from dried specimens collected in Borneo by Low and others. The large bag-shaped pitchers are, when fully developed, provided with two sharply toothed wings. The neck of the pitcher is thrown into ridges with intervening furrows, and is prolonged at the back into an erect, or slightly incurved process, terminating in two sharp recurved spurs, the whole reminding one of the head of a snake uplifted and ready to strike with its fangs.

At a recent meeting of the Linnæan Society Mr. Burbridge, an observant naturalist, read a paper on the subject, which throws some light on the curious organization in question, and is of considerable interest as illustrating the solidarity of the organic world. It seems that the stalk of the lower bag or ampulla-shaped pitcher is swollen and hollow, and in their native country most of them are perforated by a species of black ant, which forms its colonies in the old and dry pitcher, and continually visits the fresh ones, so far as can be determined, for the purpose of obtaining food and water, since these fresh pitchers contain a miscellaneous collection of dead and decaying insects of many kinds. As these pitchers are perfect traps to creeping insects of ant-like character by reason of the incurved ridges round the throat of the pitcher, these black ants ingeniously perforate the stalk, and so obtain their supplies, and provide a means of exit in case of need. Now as to the

uses of the formidable spurs which lie concealed under the kidney-shaped lid of the pitchers: There is found in the Bornean forests, where this fine pitcher plant grows, a curious little animal called by the natives "Tamperrillie," and by the few Europeans who have ever seen it alive, the "Spectre Tarsier" (*Tarsierspectrum*). It is a most singular and interesting creature, about the size of a rat. An engraving of it is given on page 247 of the SCIENTIFIC AMERICAN for October 18, 1879. Its head is singularly like that of a small kitten; the eyes are large and full, the body is monkey-like, and the tail slender and as long as the body, but bushy at the tip like that of the lion. Its feet have curiously enlarged disk-like tips, reminding one of the enlarged ends of the climbing tendrils of the Virginia creeper. This little animal is an insect-eater, and knowing that the pitchers contain entrapped insects, visits them pretty regularly. In the case of some of the pitcher plants the insects imprisoned in their unarmed urns are readily removed, but not so in the species under consideration, as the sharp spurs are so placed that the tarsier is sure to be pricked by them, and

quite sharply too, if its head is inserted under the lid for getting at the interior. The main question, and the one yet to be solved, is, of what use are the living ants, and what end is this one species of *Nepenthes* made to serve as the nest of a peculiar species of these insects. To suit its requirements not only is its very structure modified, but especial precautions are taken to ward off the insect-eating tarsier. The use of the entrapped insects we already know, for it has

been demonstrated by Dr. Hooker that the pitchers of *Nepenthes* not only allure insects by a sweet secretion at the rim and upon the lid of the cup, but also that their capture, or the presence of other partly soluble animal matter, produces an increase and an acidulation of the contained watery liquid, which thereupon becomes capable of acting like gastric juice in dissolving flesh, albumen, and the like. In other words these pitchers seem to be stomachs. Borneo is indeed a land of many wonders. Dr. Beccari has found there a curious plant (*Myrmecodia*) which never fully develops until bitten by a large red ant. They make their nest in the swollen stem, and thence rush out to repel all invaders. Dr. Beccari asserts that the presence of these ants is absolutely essential to the plant's existence, for unless the young plants are thus attacked they soon perish.

IMPROVED ELEVATOR.

The frequency of accidents to elevators has suggested a practical field for invention, to which some of our inventors have turned their attention. By some safety is sought in pawls and ratchets, in a multiplicity of ropes, and in the hoisting machinery itself; but the inventor of the device which we illustrate secures safety by automatically opening and closing the hatches as the elevator approaches and recedes from them. This plan not only secures the elevator car from dangerous falls, but it also prevents persons from falling down the hatchway, and in case of fire prevents its spread through the hatchway.

The mechanism by which this very desirable end is accomplished is both novel and ingenious. The hatchway is closed at each floor by two doors, A B, which are connected by links, *a*, with a slide, *b*, moving in guides at the side of the hatchway, so that when one door is moved in one direction the other will be correspondingly moved in the opposite direction. The doors, A B, are each provided with two segmental racks, C D, which are engaged alternately by racks on the vertical rods, E F. These rods extend from the top to the bottom of the hatchway, and are provided with as many short sections of rack as there are segmental racks attached to the doors.

On the driving shaft of the elevator there is a loose spur wheel, G, engaging a rack on the lower end of each of the rods, E F, so that when one of the rods moves upward the other moves downward. Upon the rod, F, in addition to the rack already mentioned, there is another rack which is engaged by a wheel having cogs in a segment of its periphery, H, secured to the driving shaft. The car is hoisted in the usual way, and as the driving shaft revolves an intermittent vertical movement is imparted to the rack on the lower end of the rod, F, by engagement with the mutilated wheel, H. The rod, E, by virtue of its connection with the rod, F, through the spur wheel, G, is also moved vertically, but in the opposite direction.

When the car is ascending the rod, F, with its racks, is moved downward, and its movements are timed relatively with the movement of the car, so that just before the car reaches a pair of doors the rack segment, D, on the door is engaged by one of the racks on the descending rod, F, and the doors are opened, at the same time one of the racks on the rod, E, engages one of the rack segments, C, on the door below, closing the doors immediately after the passage of the elevator through the floor to which the doors belong. When the car descends the reverse of what has just been described occurs.

This invention was recently patented by Mr. James W. Evans, care Geo. F. Betts, Equitable Building, 120 Broadway, New York city, who may be addressed for further information.

A Great Towing Feat.

One of the longest towing feats on record was lately accomplished by the salvage steamer *Recovery*, of Liverpool, in towing from St. Vincent, W. I., to Flushing, Holland, the Italian screw steamer *Centro-America*, which had broken her propeller shaft. The *Recovery* left St. Vincent, with the steamer in tow, April 1, and arrived at Santa Cruz, Teneriffe, April 11, where she was detained one day. The *Lizard Signal* station was passed April 24, the run from Teneriffe, 1,383 miles, having been made at an average of 115 miles a day. Flushing was reached on the 27th, making the whole passage of 2,578 miles in 26 days, deducting the detention at Teneriffe. Two heavy gales were encountered by the way. The best day's work was 144 miles. The *Centro-America* registered 1,384 tons.

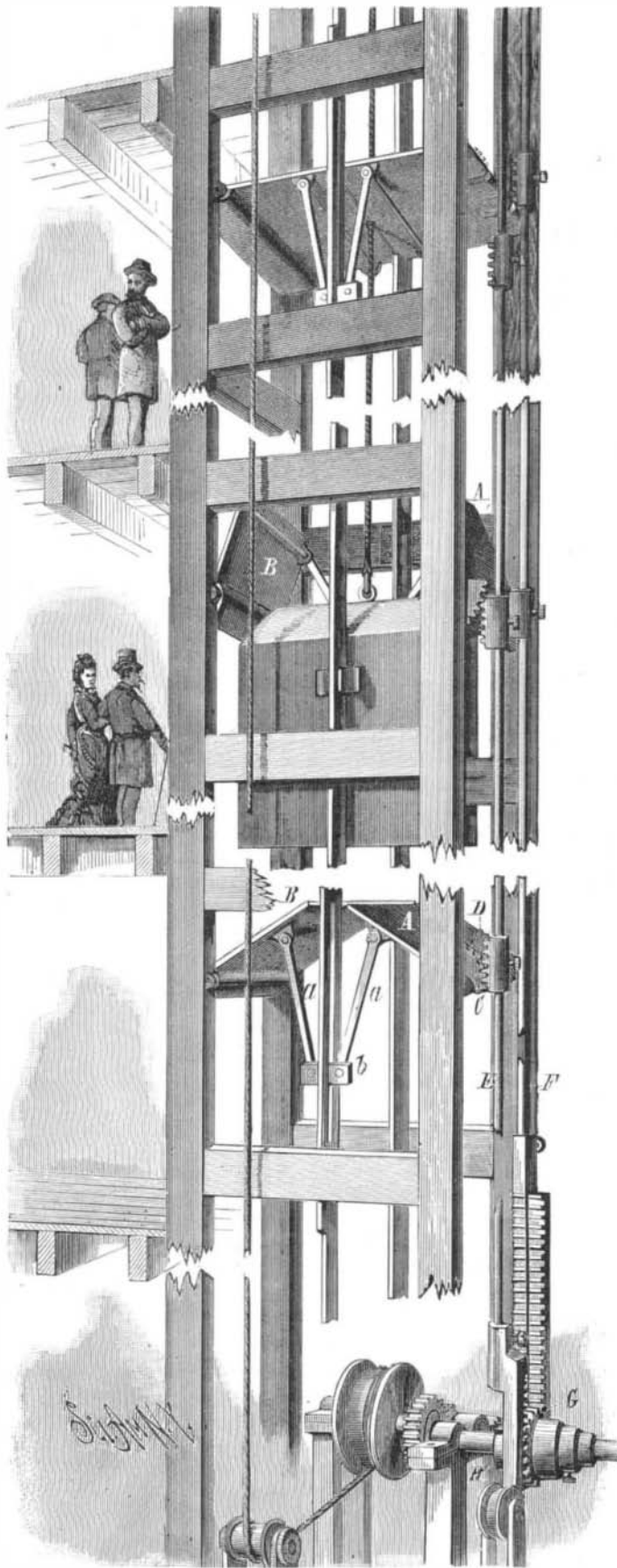
Preservation of Hops.

The principal feature in this new system consists in sprinkling the hops with alcohol prior to packing, and then pressing them tightly into air-tight vessels. In course of time the alcohol combines with some of the constituents of the hop, and certain volatile ethers are thus formed; these possess a strong and peculiar fruity smell, but being very volatile, they are all dissipated during the boiling. Dr. Lintner has experimented on these preserved hops at Weihenstephan, and speaks well of them; he says the fine color

is retained and there is a full development of aroma; the fermentation of worts made with these hops worked well, and the resulting beer possessed a fine bitter flavor. If this method of sprinkling with alcohol will stop the development of valerianic acid, which takes place in hops when stored in the usual manner, it ought to come into general use.

Wind Pressure.

Does the wind, in passing through the open spaces left between the solid members of an articulated structure (such as a bridge), experience no further resistance than that offered by the net area of the solid surfaces of the members? We think it does. Air is a fluid equally with water, and it is well known that when water issues through an orifice in a flat surface, the issuing stream is very sensibly contracted to much less than the area of the orifice. This coefficient of discharge through holes in plates or flat surfaces is as low as 0.62. Or, in other words, only 62 per cent of the opening is truly effective for the passage of the liquid. Without



EVANS' IMPROVEMENT IN ELEVATORS.

doubt, these principles apply equally to all fluids, gases as well as liquids. In the case, then, of air flowing through an articulated structure, we do not think that the full area of the openings, between the solid members, should be considered as effective for the passage of the air, but only to a reduced extent of, perhaps, from 60 per cent to 70 per cent. This would have the effect of adding very largely to the gross resistance offered by any articulated structure to the wind—in fact, it would cause an addition of from 30 per cent to 40 per cent of the openings to be added to the solid members as representing the whole area offering a resistance to the passage of the wind. This additional amount of resistance may be found more than sufficient to occasion overturn, when otherwise it would be far from being anticipated by calculation.—*Iron*.

A Curious Phenomenon.

The *Plaindealer*, of East Kent, Ontario, states that a curious and inexplicable phenomenon was witnessed recently by Mr. David Muckle and Mr. W. R. McKay, two citizens of that town. The gentlemen were in a field on a farm of the former, when they heard a sudden loud report, like that of a cannon. They turned just in time to see a cloud of stones flying upward from a spot in the field. Surprised beyond measure they examined the spot, which was circular and about 16 feet across, but there was no sign of an eruption nor anything to indicate the fall of a heavy body there. The ground was simply swept clean. They are quite certain that it was not caused by a meteorite, an eruption of the earth, or a whirlwind.

The New Brooklyn Elevator.

A brick elevator, with stores, rivaling in capacity the great elevators of the Erie and the Pennsylvania Railroad Companies in Jersey City, has just been erected in Brooklyn by David Dows & Co., of this city. It is intended exclusively for handling and storing grain for the European trade.

The façade on Columbia street is 200 feet, and the sides reached to the Atlantic dock stores, of which it will form a part, are 175 feet on each side and three stories in height. The chimney is situated on Pacific street, about the middle of the building, and is 12 feet square at the base, rising to the height of 180 feet, which is also the height of the elevator. The upper part of the latter will be entirely of framework, extending the full width of the store on which it rests, and will contain five tiers of chutes leading to the wharves on either side, so as to be readily connected with the holds of vessels. A novel feature in connection with these chutes is that they form a continuous circuit with other chutes leading from the new building.

But the essential feature of the structure in which it differs from the other elevators in use is the erection of two elevators on the Columbia street side, corresponding in height and shape to the elevator proper at the wharves. These will be so connected with each other and with the main elevator, that any or all can be used simultaneously in loading from one to four vessels, or in unloading grain from canal boats or lighters at one point, and at the same time loading steamers at another. It is in the facility with which this process can be carried out that the great improvement in the elevator system consists. So great is the capacity of the stores that 20,000 tons of grain can be readily stored on any floor of either building. The machinery will be so adjusted that a double hoisting system can be employed with as little difficulty as the single hoisting system now employed on the railroad elevators. It is calculated that by this method two transatlantic steamers of the greatest capacity can be loaded with grain within eight hours by the simultaneous operation of the double hoisting apparatus.

Explosions of Malt Dust.

One of the Burton-on-Trent breweries has narrowly escaped destruction by fire. A violent explosion occurred in the malt grinding room, and as soon as the workman in charge, who had been thrown on to the ground, could recover himself, he found that the hopper above was in flames, which, fortunately, were soon suppressed. There is but little doubt that this explosion was caused by a sudden combustion of malt dust, and it is well that brewers should be warned against this danger. Finely divided combustible powders, such as flour, malt dust, coal dust, etc., will explode, and there are on record many serious conflagrations which have been traced to this cause; in America several large flour mills have been totally destroyed by fires originating in this way. Some difference of opinion exists as to the way in which these explosions are brought about; it is, however, easy to imagine that a combustible substance like malt, flour, or coal, may be reduced to such a fine state of division as almost to approach the gaseous state, and being thus intimately mixed with the oxygen of the atmosphere, we have all the materials for a sudden and explosive chemical combination. Some persons have argued that these explosions are spontaneous, but we incline to the opinion that either a flame or a spark is required to bring about the combination.

It is a common practice in some breweries to place an unprotected gas jet or lamp close to the malt mill, and in this way the inflammable dust may easily become ignited; or the same result may be produced by a small stone passing between the steel malt rolls, by which a spark is produced, and thus the dust is exploded. Precautions against these two sources of danger should be observed in every brewery.—*Brewers' Guardian*.

A BEEFSTEAK chopped up fine and baked with flour and yeast in the form of a "meat-bread" loaf is the latest dietetic sensation. It is asserted that meat thus treated entirely disappears during the process of purification, the nutritive principles becoming incorporated with the bread. M. Scheurer Kestner has just been explaining the process.