

engine was stated to have lasted during a service of 14,070 miles. This was a coiled packing, and, at the end of the service named, the gland had been screwed so nearly home as to require the addition of another coil.

These facts, in connection with what we personally know of this packing, lead us to believe that a much more extensive use of asbestos packing might profitably be made. But there are other substances that might, we think, prove adapted to this purpose.

Common hard soap forms an impervious durable packing for stems and spindles in gas meters, gaslight machines employing light hydrocarbon, etc. It is possible that some of the insoluble soaps, the bases of which are the oxides of lead, calcium, magnesium, aluminum, etc., might be found sufficiently indestructible under the action of lead to afford a good packing, at least for low pressure engines. Some or all of these soaps might easily be made the subject of experiment for this purpose, and we think there is at least a probability that one or more of them would prove available either singly or as the basis of a mixture or compound. Neither steam nor oil would dissolve some of these soaps, and the only destructive action that could take place would be their possible fusion or decomposition at high temperatures.

THE ADVANCE IN THE PRICE OF IRON.

An advance of ten dollars per ton on manufactured iron, and fifteen dollars per ton on pigs, during the short space of three months, at a time when no special event has occurred to which such a rise can be directly attributed, is a noteworthy fact calculated to cause the manufacturing and commercial public to do for themselves a little hard thinking. In such an emergency, when large enterprises are retarded through the increased cost of an indispensable material, the elaborate essays of theorists and the harangues of partisan speech makers will do little to allay the anxiety caused by the check, in many kinds of business, this advance has made and is yet likely to make. The old wordy warfare between protectionists and free traders will rage with renewed vigor, but the people are at present in want of something besides words; they want cheap iron.

It has been the avowed purpose of protectionists to keep American labor from being reduced, in the respect of wages, to the level of European labor. A large share of those called protectionists have, like ourselves, conceded the justice and wisdom of this policy, limiting its action to those industries in which our natural advantages are equal to those possessed by other countries. No legislation can place coal and iron closely in proximity, so as to render possible cheap iron. Legislation may, however, place American manufactures on a par with foreign producers so far as the item of labor is concerned. To step beyond this limit is to create monopolies and to enrich manufacturers at the expense of the public.

It would seem, through the combined effect of their own efforts and the logic of events, that foreign labor is fast appreciating in value. This, together with the increased general demand for iron in Europe, has affected the iron market throughout the world. Importations have fallen off, and home manufacturers, doubtless in anticipation of further advance, are refusing to make contracts at fixed prices for further fulfillment. It is stated that most manufacturers are running their establishments chiefly on orders as received.

Another equalizing effect upon labor is produced by the unusually high price of pig iron as compared with that of manufactured iron; the skilled labor requisite to produce the latter is therefore correspondingly at a discount.

It has been truly said the great want of the age is cheap iron. This being the case, the general reader will at once comprehend how disastrously this upward tendency of the iron market affects most manufacturing interests, how it specially retards the progress of railroad building, and thus affects the entire business of the country, to a greater or less extent according to the relation various industries bear to the development of the new resources which the roads now in progress and those projected are intended to open up.

Happily, this state of things cannot long continue. With our inexhaustible stores of ore and coal, we can produce our own iron in any quantity required to meet the home demand; and capitalists will not be slow to see the opportunities, for profitable investment, the iron manufacture is likely to offer. We may therefore expect active competition, and a final return to former prices, with a large and permanent increase of home manufacture.

STEAM ON THE ERIE CANAL.

The reward of one hundred thousand dollars offered last year by the State of New York for the best plan for a motor for canal boats still remains open, no person having as yet brought forward a boat that satisfies the Commissioners. In a recent report to the Legislature, these officials state that the almost universal impression among inventors is that the important point to be overcome is the prevention of the wash of the banks of the canal. But this impression is wrong. There is no danger to the canal banks, as the boats are only required to run three miles an hour. What is wanted is a plan by which the boats may be towed or propelled more cheaply than by animal power.

In order to set the matter straight, the Commissioners have adopted the following resolution:—

Resolved, That the experiments, heretofore made in navigating the canals by freight boats propelled by steam, have not been failures by reason of injury done the banks of the canals by the swell caused either by the motion of the boat or the wheels through the water; and that, in the judgment of this Commission, there is no practical difficulty, in navigating the canals by boats carrying 200 tons of cargo at the

rate of three miles per hour, that arises from "injury to the canals or their structures." The main difficulty to be overcome is to establish the economy of steam or other motor as compared with animal power.

The Commissioners state that inventors in nearly all the States of the Union, in the Canadas, in England, Scotland, Wales, Holland, South America, southern Africa, and in short nearly every part of the world, have written letters of inquiry to various members of the Commission and to its engineer and secretary. About 700 communications in all have been received and been replied to, giving, as far as practicable, the information sought. Various models and drawings have been sent to the Commission, and among them several the productions of women.

Among the plans presented are many ingenious and elaborate devices accompanied with carefully prepared drawings, while very many of them are evidently the result of immature or inexperienced study, and in some instances the propositions are, to all but the inventors, absurd. A vast number of methods of applying motive power have been presented, from plans that were decided useless years ago, to the introduction of the modern narrow gauge railway on the banks of the canals.

As evincing the general character of a large proportion of the plans presented, the following may be mentioned: Plans to propel the boats by large screws or wheels, placed on deck and designed to act upon the air. The use of automatic poles attached to the sides or stern of the boat, or a wheel with long arms placed in a well in the center of the boat, to act on the bottom of the canal. A variety of tracks laid on the bottom of the canal, on which the boats are to be moved. Elevated and submerged cables and cables attached to the banks. A plan called by the inventor the "Siphonic system." The power to be derived from water supplied by a trough to be elevated above the canal and to extend its entire length, which is passed through a syphon, the short leg of which to be inserted in the trough, and the long leg to pass through the stern of the boat. A fly wheel passed over the stern of the boat and designed to receive and store up power, to be exerted by the crew during their leisure from other duties, and to deliver it again through the medium of a screw propeller connected with it by proper gears, and many others of a like character.

The anxiety of the inventors to secure the money offered by the State is such that a large number of devices, we are informed, are now in the course of construction, and there is every reason to expect that, during the coming season, many more boats will attempt the trial trips required by the Commission. Some of the inventors express great confidence in success, while others insist that the law should be amended in such a way as to be more favorable to their particular schemes.

The Commission does not advise any change in the law of the kind desired by such persons as think its objects cannot be secured as it now stands and is construed by the Attorney General; on the contrary, they think all the things now required by the law should be insisted upon being complied with before the money should be awarded.

All the time allowed by the law will be given to the competitors, but the Commission will adhere to the determination, expressed at its first meeting, that boats in actual service, and not drawings or models, will be considered as competing for the money offered by the State.

We last week published illustrations of Goodwin's method of canal propulsion, which we understand is to be tried practically during the present season. It is one of the most promising of any of the plans that have been devised.

BEET SUGAR IN THE UNITED STATES.

Believing as we do that the production of beet sugar is destined to become one of the important industries of this continent, we regard any facts which tend to hasten this result as of importance. Through much ignorance, timidity, and consequent failure, we are, by the efforts of persevering and hopeful men, gradually groping to the light in this matter. The conditions, for the successful growth of good beet crops on the different varieties of soil contained within our borders, are gradually becoming understood; and, after all, this is perhaps the greatest essential of success. Given good crops of beets rich in sugar, and the profitable extraction of the sugar will certainly follow in time.

We have perused, with much interest, the report of Professor Charles A. Goessman, Ph.D., on sugar beets raised upon the farm of the Massachusetts Agricultural College, published in the ninth general report, of the trustees of that institution, to the Governor and Council of Massachusetts, in January of the present year, which contains facts which we propose to make the basis of a few remarks.

An experiment was made on the college farm with 47 acres of land, prepared in the best manner possible for the reception of beet seed. Owing to the want of a suitable drill for sowing the seed, the rows were made two and one half feet apart, instead of from eighteen to twenty inches apart, as should have been the case, thus leaving considerable waste land. The seed drill also worked imperfectly, leaving blank spaces in some of the rows. Still, under these unfavorable circumstances, the root crop averaged 22,300 pounds to the acre.

Seeds of the following varieties of beets were planted, namely: Vilmorin of 1869, Imperial of 1869, ditto of 1870, Electoral of 1870, Vienna Globe of 1869, varieties of mangold of 1870. The Imperial sugar beet crop—seed of 1870—gave 12.59 per cent of sugar; Vilmorin, 12.95 per cent; Electoral, 12.30 per cent; Vienna red, white, and yellow globe beets, 8.004 per cent; ordinary mangolds, 5.035. These re-

sults were obtained by analysis, and not in the regular process of manufacture.

A computation, made with these results as a basis, shows a handsome margin of clear profit obtainable on the assumption that the extracting process would be economically and skillfully conducted.

In concluding his report, Professor Goessman touches upon a vital point relative to the profitable extension of the beet sugar manufacture in the United States. It has been argued, against the introduction of this manufacture, that the difference in the price of American and European labor forbids the hope of our competing with foreign producers. This argument is so ably met by Professor Goessman, that we quote a portion of his remarks upon it:

"Although duly recognizing the great weight of this point for with the farmer rests the success of the enterprise in the end, I believe that its influence as an obstacle is frequently overrated and based on somewhat obsolete assumptions. The government tax of from \$40 to \$50 per acre of sugar beets, in Germany and France, as well as our higher prices of sugar, will go far towards covering our most expensive labor. The interests of the Louisiana sugar planters and the sugar beet cultivators of more northern sections of the country are the same, as far as a proper protection of their industry is concerned; and the public opinion, in view of the requirements of the government, is apparently prepared to accord to them, for some time at least, this advantage. Great improvements in agricultural implements and in modes of securing the juice have reduced labor by hand to a considerable extent. A short enumeration of the most conspicuous instances may place this statement in its proper light. Various seeding machines, improvements more or less on Garrett's famous seed drill, are used in planting the seed, in four or more rows at once, and at any desired distances from twelve to twenty inches apart. According to the size of the machine, one or two men, with one or two horses or oxen, may seed from eight to sixteen acres per day; the same implement can also be modified by replacing the seed boxes with suitable knives to be used as cultivators, to clean the space between the rows of plants, and to cover the roots. Ploughs with two knives are used to break up the soil on both sides of the rows of beets, to loosen the latter in such a manner, without lacerating them, that children may do the harvesting of the roots. In fact, the whole work in the field, after the soil is once properly broken up, calls for extraordinary labor. A good deal of the work can be done by boys. Machines do the washing, the grinding or cutting, and general handling of the roots to the centrifugal apparatus. The task of handling the pulp of beet roots for the press requires, comparatively speaking, a large supply of hands to do the business connected with that process, but Roberts' diffusion method dispenses with a large number of the hands formerly required in the press room—nearly one half."

In further support of his position, the author cites the introduction of the Roberts diffusion process, which though it reduced the expenses for labor in the press room one half; but this reduction only made one sixth of the extra earnings of the manufacturer. It is thus seen to what an extent the success of this industry depends upon the skillful culture of the roots; and though skill is undoubtedly requisite in all the subsequent processes of extraction and manufacture of the sugar, it appears plain that, with increasing knowledge, we shall be able ultimately to establish this department of agriculture and manufacture on a sound and permanent basis.

Death of Erastus Corning.

Mr. Erastus Corning, who for more than sixty years has been one of the most active business men of New York State, died on the evening of Monday, April 8th, at his house in Albany. He was born at Norwich, Conn., on December 14, 1794, and was therefore in the seventy-eighth year of his age. His commercial life commenced in a hardware store, and being shrewd and persevering, he soon became the proprietor of the concern. After some years of continued prosperity, he bought 250 acres of land near Albany, and became one of the most advanced agriculturists of his day. He was, moreover, an active politician, and was rewarded therefor by the confidence of his fellow citizens, he having held several important offices. The railroads of New York State owe much to his enterprise and ability, he having been a director of many of them, and, for some time, president of the leading one, the New York Central.

Of late years, Mr. Corning was chiefly known in connection with the iron and steel works at Albany and Troy. He lived to see the growth from the beginning of this important industry in America, and had the satisfaction of knowing that he contributed much to its development. He leaves for his heirs a fortune of some five million dollars of his own acquiring.

Don't Use Galvanized Iron Pipes.

We have, on several occasions, called the attention of our readers to the danger which arises from the use of galvanized or zinc covered iron pipes for conducting water for household purposes. Such pipes render the water poisonous, sickness and death being the result. In a recent case at Portsmouth, N. H., where a family of four persons were made ill by the drinking of water supplied through galvanized iron pipes, Dr. Jackson examined the water, and found it to contain six grains of oxide of zinc to the gallon.

THE Goodyear hard rubber patent expires May 6, 1872. The Goodyear soft rubber patent expired sometime ago.