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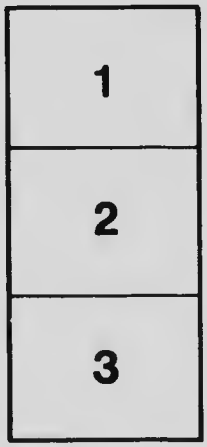

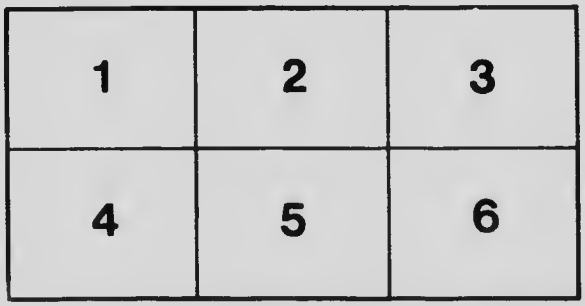

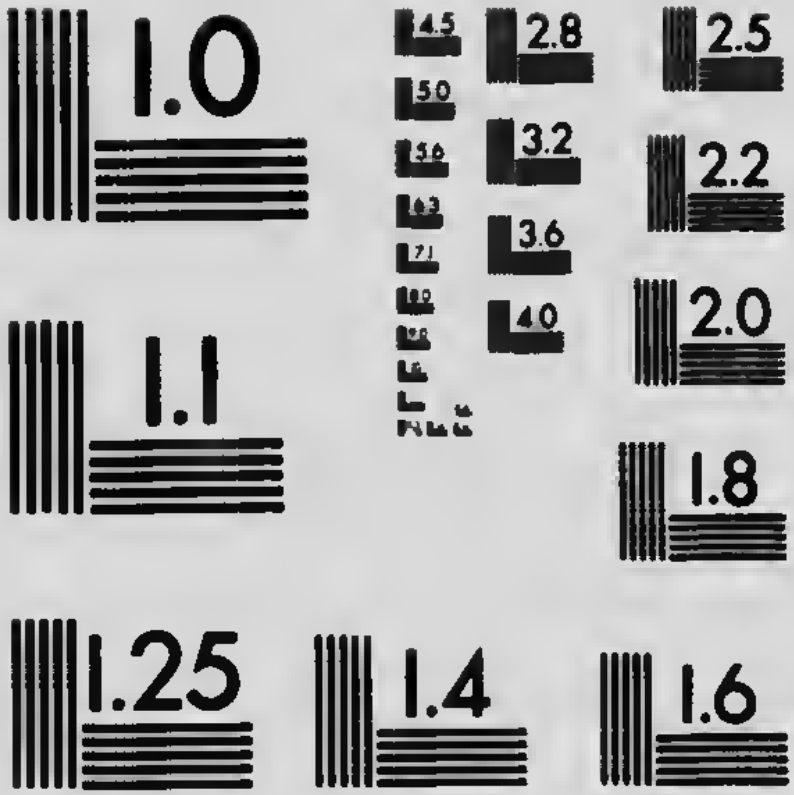

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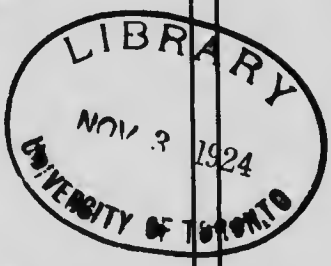
FLAX

Canada imports over $4,000,000 annually of Binder Twine, Linen Fabrics, Yarns, Etc., while millions go to waste in the west through the burning of Flax Straw



POSSIBILITIES FOR INVESTMENT IN THE MANUFACTURE OF CANADIAN FLAX FIBRE

—BY—

CHAS. F. ROLAND
Commissioner
Winnipeg Industrial Bureau
WINNIPEG, CANADA

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CANADIAN FLAX

HOW long will Canada continue to pay to other countries annually the enormous sum of over $4,000,000 for binder twine, linen fabrics, yarns, threads, etc.—on which we pay an import duty of over $700,000—while the flax fields of Manitoba, Saskatchewan and Alberta are producing this year (1913) over 2,000,000 tons of flax straw, which represents 400,000 tons of commercial spinnable fibre, all of which is now burned.

If this present waste product which is making a flaming flax field of 1,000,000 acres in the Canadian West were utilized, it would furnish raw material for an industry that would represent an annual output of over $80,000,000, with only 16,500,000 acres under cultivation, of the 200,000,000 acres available the possibilities in the Flax industry in Western Canada are simply incalculable.

The object of this pamphlet is to enumerate within its limited space as briefly as possible some of the important facts concerning the flax industry, with a view of interesting capital into the great possibilities for the utilization of flax straw that is now a waste product in Western Canada.

The flax industry of this period is commanding marked attention throughout the world and especially in the Dominion of Canada owing largely to the fact that agriculturists have learned by experience that where the same efforts and care are bestowed as are given wheat, oats, corn and other grains, the results probably are more remunerative. From investigation it is found that the whole area, nearly, of Canada is well adapted to the cultivation of flax and that as fine a grade can be produced within its borders as that imported from Russia, Belgium, Great Britain, and other countries. The marked increase in crops in Canada is strongly confirmed by statistics, which show that formerly the production was largely confined to Eastern Canada, while at the present time the Provinces of Manitoba, Saskatchewan and Alberta records about nine-tenths of the entire crop of the Dominion. Its early history we quote from Wm. Saunders, C.M.G.,L. L.D.,F.R.S.C., Director of Experimental Farms, Ottawa, Canada: "The cultivation of flax and the manufacture of its fibre date back to a very remote period. The great value of this plant has been known and appreciated for probably five thousand years past. The fact that the Egyptian mummies

were wrapped in linen shows that the use of the fibre of flax is very ancient and that it was an old and well established industry in Egypt at the dawn of the Christian era. . ne three thousand years ago the Phoenicians devoted much attentioi to the cultivation of this plant, and subsequently the Greeks and Romans made the working of flax fibre a part of the household duties. This fibre, next to cotton, is the most valuable and universally employed textile in the whole range of vegetable fibres, and the plant can be grown in nearly every part of the world where the climate is temperate. Flax was brought to America by the early colonists, and the working of flax fibre was one of the earliest colonial industries which was encouraged on every hand. The cultivation of flax mainly for its fibre has been carried on in some parts of Western Ontario for many years, the yield of seed under such circumstances being a secondary consideration."

Much of the binder twine which is at present used in Canada is imported and all that is manufactured in Canada is made from imported raw material. The same is true of all the linen yarns used in Canada in the manufacture of huckabacks, carpets, etc., etc., which are used in large quantities, and all of which it would appear can now be made from home-grown material. Taking these facts into consideration together with the large acreage of 1,106,000 acres devoted to the Canadian flax crop this year and the almost total loss of straw of which some 2,000,000 tons will be destroyed this year, it is at once seen how vitally important is the application to the industry of efficient and economical machinery, how enormous a stimulant to the industry and how valuable to all Canada such application would be, and what an exceptionally advantageous investment opportunity lies open to this very enterprise. Taking it for granted that the value of the cultivation of flax for its seed alone is universally recognized, while the vast waste, which amounts to over $80,000,000 this year to Canada alone, is apparently unnoticed, it is my purpose to devote as much space as possible to the wisdom of cultivating flax for its straw as well as for its seed. We find that the old process for removing the fibre from the stalk, as well as cleaning it after being removed, entailed so much time and labor that it was simply impractical for Canada and the United States to compete with foreign countries on account of their cheap labor. It seems strange also that this old process which has been in use thousands of years has been allowed to crawl along in this manner

when all other industries that have stood in need of inventive talent have been pushed to the highest state of perfection, and we are not surprised to learn that finally some master mind has met and solved the problem. This should awaken much greater interest in Canada when we have had time after time proofs convincing that Canadian flax fibre is equal in many ways to the best produced in countries celebrated for its culture. Therefore it is a source to be greatly regretted when we are apprised of the fact that 2,000,000 tons of flax straw are burned or wasted this year in the three Prairie Provinces of Western Canada, amounting to over $80,000,000 if manufactured into fibre, which could be handled with but little labor under advanced methods. The old way of converting flax into linen fabric required sixteen to thirty weeks, while the new process machines make all of this work possible within twelve to twenty-four hours. "Instead of expending $4,325,000 a year to get linen from Europe, Canada might make this linen at home and give employment to thousands of hands, thereby also giving the farmers the benefit of the money spent abroad."

PERSONAL INVESTIGATION ON THE UTILIZATION OF FLAX STRAW

"On February 6th, the writer, in company with Ex-Mayor R. D. Waugh, went to Duluth, Minn., where is located the experimental plants of the Western Linen Mills, a company formed for the purpose of working out patented processes for producing linen yarns, threads and fabrics from flax straw, particularly straw grown in the Northwest.

"The manager of the Western Linen Mills, showed us through the plant, a factory that, with the machinery in use, has cost the men who engaged in this enterprize about $50,000. The manager went into the matters of material, processes and production with us very thoroughly, and gave us every opportunity to see this experimental plant in actual operation. We were thus able to see the flax straw as it was taken from the threshing machine, treated and worked upon wholly by machinery, until it was turned out in finished products of yarn, twine and linen fabric. Stated briefly the processes of the Western Linen Mills comprise mechanical operations which take the place of the slow, tedious work that is done by hand in the flax fields and mills of the old

country. We saw these processes actually worked out and brought back samples of the products, which are on file for inspection. The manager also gave us figures which enable us to report that the processes in use by the Western Linen Mills take seventy per cent. from the flax straw in the first operation, fifty per cent. of the remaining product in the second, or degumming process, and a further reduction of forty per cent. in the third process, finally producing 128 pounds of yarn from a ton of flax straw, which has a market value of 22 cents a pound, or $28.16 for each ton of straw that is put through the machines. Besides this, there are by-products of tow and mattress and paper material which are worth $15.00 more, or a total of $43.00 derived from every ton of flax straw treated. The cost of this flax straw laid down at the factory in Duluth is $12.00 per ton."

The bearing of all this upon our own agricultural and industrial life is very important. Bear in mind that the processes of the plant which we saw at Duluth take the flax straw just as it comes from the field—cut by machines, threshed by machine and in all the disorder into which it has been thrown; no pulling nor any costly hand-work whatever. Half a million tons of such flax are burned every year on our Western farms. There is a splendid market at our very doors for every sort of the finished article produced. The new processes we investigated at Duluth prove that our flax straw that is now wasted in such enormous quantities is a good, merchantable product and one capable of being converted into goods for which we have an unlimited market at hand.

At Minneapolis, we called upon the Ware Binder Attachment Company. The Company's product is right in line with the utilization of flax straw because the Ware binder attachment is one that is made for the express purpose of using binder twine made from flax straw. As you are aware that all of the binder twine now used in the West is imported into Canada and any factory here producing this twine from flax straw would give splendid results in industrial growth and the profitable employment of what is now a sheer waste.

Chambers' Encyclopedia says: "The great fault with flax is that the steeping (retting) process does not remove all the gum in the fibre. It has been stated by experts of high standing that if the gum could be completely taken out by some inexpensive process there is no reason why flax should not be spun as easily as cotton."

H. T. Vulte, Ph.D., F.C.D. Teachers' College, Columbia University, N.J., witnessed the new process of converting flax from its natural state into linen at Brookfield, Mass. He was not only greatly pleased with the results but testifies that he was familiar with the majority of the composition of the liquids used and considered them harmless. He also adds: "It seems to me that this new and valuable process has a great future and I hope to see it in operation on a large scale at an early date."

An extract from the U.S. agricultural reports says: "If the American farmers of fifty years ago were able to produce a quality of flax suitable for linen manufacture, there is no reason as far as cultivation is concerned, that farmers of today cannot do the same thing though not by the old methods of cultivation." Again, Charles Richard Dodge, Special Agent in charge of U.S. Fibre Investigations, said in a report to the Hon. James Wilson, Secretary of Agriculture, submitted April 11th, 1898: "The great success of the Department experiments on the Pacific Coast has awakened a widespread interest in the culture of flax for fibre. The fact that the raw flax from one lot of experimentally retted Puget Sound straw gave 47 per cent. of spinning fibre worth $500.00 per ton is conclusive evidence that this country can produce fine flax in quantities." All of which applies to Canada with the same force.

It is reported that at a demonstration of a new process of transforming flax straw into linen fibre which was given in New York in 1907 before a number of experts interested in textile industries, "a dark raw flax was degummed, cleansed and bleached into a white, glossy and exceedingly tough fibre ready for spinning in the space of thirty-five minutes." The further treatment by which the linen fibre is rendered absorbent required only twelve additional minutes. The sample of towels, crash and absorbent linen shown seemed to possess very unusual qualities and the experts present considered that they were very much better value than any similar goods on the market, and as a result of this invention linen fabric can be manufactured at a cost considerably below that of foreign linens. It is partly a mechanical and partly a chemical process and the inventor has demonstrated that he can by this process make linen fibre out of flax straw in half a day.

There are similar references from the Agricultural Department Washington, D.C., as well as from other reliable sources on this subject, but space forbids their publication.

Inspector J. J. Haycock, at request of Department of Agriculture of the Dominion of Canada, submits this interesting Report on this industry:

FIBRE NOW IN USE IMPORTED

"Binder twine to the amount of about 30,000,000 lbs. was used in Canada during the season of 1908, all of which was made from fibre that Canada was obliged to import. At present, twine for the Canadian harvest is manufactured from manilla fibre from the Philippine Islands, sisal from Yucatan and New Zealand fibre from New Zealand.

"The value of the fibre used in the Canadian industry would even at present prices, which are the lowest for eleven years, represent an outlay of over $2,000,000. And with the continued development of the Canadian Northwest the amount required annually will not only be more than doubled in the next ten years, but will increase for many years to come. A large amount of time and money has been expended in Canada, United States and elsewhere in trying to obtain a native fibre that would answer the same purpose. The plant which seems to give the greatest promise of success and the one that has received the most experimental attention in this line is flax. But the great difficulty has been to invent some process by which the fibre could be separated from the woody matter or 'shive' in the plant.

FLAX FIBRE EXTRACTED BY ROTTING

"Of course, the value of flax fibre for the manufacture of various fabrics, yarns, threads and twine has been long recognized and utilized for numerous purposes for hundreds of years, but the systems adopted in the past for extracting the fibre from the plant has been crude, slow and expensive. Under these systems it was necessary to put the plant through a process of rotting, or as it is commonly called, 'retting,' in order to get it into a condition whereby the fibre could be separated from the plant.

"The first of these systems was known as 'dew retting' and consisted in spreading the flax straw thinly on the ground, turning it frequently, and continuing the process until the action of the dew and rain on the plant had rotted it sufficiently to separate readily. The second, 'river retting,' consisted in placing the flax in large crates, sinking the filled crates in water and weighting them

with heavy stones to keep them submerged until sufficiently rotted. The third system is known as 'tank retting,' and consists of building large tanks in which the flax straw is placed, pumping water in and leaving until ready to separate. With these two latter systems the straw had to be taken out and dried before any further operation.

SUCCESSFUL SEPARATION BY MACHINERY

"In order to overcome the difficulties in connection with these processes various machines have been invented for the purpose of separating the fibre without the 'retting' process. So successful have been some of these inventions that in Canada at the present time machinery is in use extracting the fibre from the unretted flax quite satisfactorily. In fact, the separation of the fibre from the unretted flax and the manufacture of it in various grades of shop, counter and other commercial twine, has passed the experimental stage and is now being carried on profitably.

"There has also been a small quantity of binder twine made from this fibre, which it is contended has done good work in the field, although it is thought that some slight improvements are still necessary before it will be perfectly satisfactory. These improvements will undoubtedly be made in a short time and the result will be materially beneficial to Canada.

YIELD WOULD BE 600 lbs. TWINE PER ACRE

"Under this process the yield of fibre is about 300 lbs. per ton of flax, and as the average yield of flax is about two tons per acre it would mean about 600 lbs. of fibre per acre. The area of flax grown in the Provinces of Manitoba, Saskatchewan and Alberta for the year 1908 was about 200,000 acres, which at 600 lbs. per acre represents a yield of 120,000,000 lbs. of fibre. If manufactured into binder twine the quantity would be four times as much as was required to tie the Canadian grain crop of 1908. At present all this flax after separating the seed is burned. There is annually paid out in Canada $2,000,000 for 30,000,000 lbs. of fibre, while at the same time 120,000,000 lbs. of fibre are burned."

Flax, like anything else, in order to gain the best results demands thought, care and skill in the selection of the seed and its cultivation. It is the universal law of Nature which applied to the animal as

well as the plant world, that "Like begets like," and that too much care cannot be taken in selecting the best methods to start with. A farmer who selects the choicest seeds from the best wheat, corn or oats that he produces cannot fail in grading his grain up to a high state of perfection, and this applies just as strongly to flax. The farmer who selects good soil and takes pains in preparing it before sowing the seed generally reaps an abundant harvest. The farmer who does not exhaust the strength of his land but by a rotation of crops strengthens its vitality will always be found in the class of the prosperous. The farmer who studies the utilization of what he produces will rejoice that he has used his mind as well as his hands.

The following tables taken from Census Bulletin of the Dominion, 1911, gives particulars to the production of dressed flax in Canada. The number of establishments in operation in 1906 was twenty-three and in 1911, thirty.

	1906	1911
Value of land, buildings and plant, Working capital	$220,750	$421,389
Total wages paid	144,396	148,701
Value of Product	241,932	548,559

THE GROWING OF FLAX FOR SEED

The growing of flax for its seed is a larger industry in this country. The Census of Canada for 1913 shows the increase in area under cultivation of flax and the yields of seed in Canada for 1890, 1900 and 1913, as follows:

Total Acreage and Yield for all Canada

Year	Acres	Bushels
1890	16,236	138,844
1900	23,086	172,242
1913	1,106,000	14,600,000

True it is the case in all young countries that the by-products of even very important industries are in a great measure wasted. This is perhaps partly due at first to their importance being overlooked in view of the greater purposes of the business, and later to a lack of the special machinery and equipment necessary to treat the wasted substances profitably. It has chiefly been the second of these conditions which has hitherto hampered the Western Canadian flax industry. Up to the present time we have been growing

flax entirely for its seed, which product is used in the manufacture of linseed oil. The actual straw of the plant, which in all other countries is of the greatest value in the manufacture of all kinds of cordage and twine, has been entirely wasted owing to lack of efficient means for its practical and economical treatment.

If linen were as cheap as cotton who would want cotton?

Cotton is an inferior substitute for linen. Hardly anybody used cotton a hundred years ago. But as the population grew and the market for "white goods" increased, the demand for linen outran the supply. It took so long (sixteen to thirty weeks) to prepare linen for use that it could not be made fast enough for the wants of the people. There was not enough of it to go round. Prices went up. Soon the majority of people could not afford linen for common use, and yet "white goods" were necessary to their health, comfort and happiness. As they could not get linen they had to put up with the next best thing.

If our raw flax as it comes from the field can be converted into binder twine, bagging and beautiful bleached linen fibre ready for spinning, or paper, by the new process, the capital invested will make enormous fortunes for those who engage in the business.

I have in my investigations during the past three years received excellent samples of the products of Western flax straw. These samples range from the raw flax fibre slightly crushed, the fibre after it has been decorticated by the mechanical process, and also after degumming. The finished products of yarns, crashes and other useful commercial materials are splendid specimens. If brains, capital and machinery can separate and extract our Western flax fibre from the straw by these purely mechanical means, and without having to resort to what is commonly known as "Pit retting" and "dew retting," a great industry will surely result.

This would seem possible, as seen from the following extracts taken from a recent preliminary prospectus issued after experiments from Western Canadian flax had been carried on in Great Britain.

"The ordinary processes for treating and recovering flax fibre are costly and almost prohibitive in Canada, on account of the high level of wages, and the restricted period for labor involved between the harvesting and the coming of winter. The result being that

as the flax crop is chiefly grown for seed for oil, cattle cakes, etc., large quantities in millions of tons of fibre are allowed to go to waste, while that loss in fibre is of equal if not greater value than the seed.

"The chief points of this new process are, (1) The lower cost of treatment and recovery of the fibre; (2) The saving in time in that process, etc., and (3) The increased percentage of fibre recovered over that yielded by the steeping and retting process.

"The present process of retting and scutching recovers only about 16 per cent. of the 33 per cent. of fibre in the straw, costing from £8 to £10 per ton of clean fibre recovered, while by this process the work can be done for £5 per ton of fibre with an extraction of fully 25 per cent. of fibre equal to fair Russian Colilla Tow.

This process does not aim at producing the highest class fibre but is specially adapted to meet the conditions in Canada by saving the fibre the seeded straw contains in a form available for a great many useful purposes, freely admitted by manufacturers who have seen the results obtained from waste seeded flax straw by this process.

"Where flax is grown for fibre and not for seed a simple process of recovering the fibre is of intrinsic value. The rich and unexhausted soil of the Northwest of Canada lies in the same latitude as the best flax districts of Russia, and yields straw of as good if not better quality, both for fibre and seed, so that the burning of millions of tons of flax straw should no longer prevail.

"This process will lead to an extension of flax planting in the Dominion with most gratifying results to all interested and it is pleasing to know that this year's crop already exceeds last year's flax crop by 300,000 acres.

"As to market for the fibre, it may only be mentioned what there is required in Canada yearly for the raw material of binder twine alone about 150,000 tons of fibre, this being for the most part imported from abroad, and costing from £15 to £25 and upwards per ton, amounting to the almost incredulous sum of from $12,000,000 to $20,000,000. The whole of the raw material for this trade should and can be provided in Canada with this process.

"A quantity of Canadian flax straw was taken lately to Scotland by a party who visited Canada to inquire into the possibilities of this industry. This straw was treated by this process and was found

to yield over twenty-six per cent. of the weight of straw recovered in fibre. The Directors are satisfied both with the cost incurred in the process and the market value of the fibre so obtained.

"It is the object to establish collecting centres at selected points, at which growers within a certain radius will deliver their product, contracts extending over agreed-on periods being entered into with the farmers, securing their whole output during such periods. From these centres the straw will be sent in bales to a central station for reductions to fibre and marketing. In this way the installation of plant will be effected with the greatest economy and running costs minimised.

"It is gratifying to be assured, as we now are, that certain much-needed improvements in the reaper and threshing machines have been effected for securing the seed without the destruction of the straw, and it is likewise doubly assuring now to know that the Flax Pulling Machine has come to stay as a practical factor, whereby the sickening of the soil by flax wilt will cease."

The Canadian West offers many opportunities for capitalists and manufacturers and men with push and pluck.

Twenty-eight business bodies of the City of Winnipeg conduct a Bureau of Information upon Winnipeg and the West's wonderful opportunities. This Winnipeg Industrial Bureau compiles statistics in every line of business and industry, which are supplied free to interested parties.

The remarkable development of this great central market—the greatest growing market in the world—is creating an unprecedented demand for home industries. Winnipeg wants these Manufacturers and offers greater combined advantages than any city in Canada. The City is supplying Electric Power and Light at Cost and any one who is interested can communicate with the writer for illustrated literature and special reports on the manufacturing possibilities in any line of industry.