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Conservation

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VOL. III

JANUARY, 1914

NO. 1

GOVERNMENT RESERVES WATER-POWER SITES

Survey of Vermilion Falls on
Peace River—Other Reser-
vations in North-West
Provinces

Consistent with the policy of the Dominion Government to preserve the water powers for the people, the Department of the Interior is placing under reservation all vacant Dominion land that the Superintendent of Water Powers may recommend to be valuable for the development of water power.

Six whole sections of land, in township 108, range 6, west of the 5th meridian, have recently been reserved from disposition of any kind until the engineers of the Water Power Branch have had an opportunity to make a complete survey of the famous power site at Vermilion falls, on the Peace river in northern Alberta.

Similar reservations have been made on the various rivers in the provinces of Manitoba, Saskatchewan, Alberta, and in the Railway Belt of British Columbia. Particular mention might be made of reservations covering land contiguous to Grand rapids on the Athabaska river, the various power sites on the Elbow and the Bow rivers, in the province of Alberta; for land required for the development of power at Grand rapids on the Saskatchewan river, and all unoccupied land along the Winnipeg river, in the province of Manitoba.

Other reservations will be made from time to time upon the receipt of sufficient information to enable the Superintendent of Water Powers to make a definite recommendation covering a description of the land that might be required for power purposes.

May the good work proceed.

EXPERIMENTAL SEWAGE PLANT FOR STAFFORD— WORKINGMEN'S HOMES

The Stafford Town Council plans to expend about \$730 for an experimental bacteriological plant to ascertain the best method of sewage disposal for the town.

The surveyor of Stafford has been instructed to prepare a scheme for the erection of 40 working-class dwellings to re-house occupants of insanitary premises.—U.S. Consular Reports.

TO NEWSPAPERMEN

"Conservation" is a press bulletin for newspapers to clip from, and for that reason is printed on one side of the page only. To further public interest in conservation subjects, our cuts will gladly be loaned to Canadian journals. It is requested that orders be by number, stating the date when the cut is required to be used, and that a copy of the publication in which the illustration appears be sent to our office.

ADVANTAGE OF LIGHT IN BARN



(Cut No. 29)

A convenient, well built barn with the most up-to-date fixtures, shut almost in darkness. Three times the number of windows could quite easily be put in, giving the barn a better appearance, improving the health of the live stock, and increasing the pleasure of those working inside. The value of light is inestimable.



(Cut No. 30)

A well lighted, as well as well built, barn, healthy and well ventilated, comfortable for the live stock, and cheerful for those who have to work in it all winter long.

Articles of clothing from wood fibre are being made in Europe. The material for a suit costs about fifty cents. Clothing made of this material, however, can not be washed.

If the teams are not all busy hauling grain away from the prairie farms, it would be well to haul out some of that manure. Incorporated with the soil it will prevent blowing and drifting.

STERILIZING MILK BY ELECTRICITY

Dr. E. W. Hope, Medical Health Officer, Liverpool, England, states that, for the past two years, careful researches have been carried on at the University of Liverpool by Professor Beattie and others, with the object, if possible, of lessening the cost of sterilizing milk. As a result, it has been demonstrated that all extraneous organisms in milk can be effectually destroyed by electricity without changing the flavour or chemical composition in any way.

The process is said to be very much cheaper than the ordinary pasteurization by heat. Dr. Hope is also authority for the statement that the corporation of Liverpool has authorized the installation of the electrical method at one of their depôts for the supply of milk for infants.—C. A. H.

Gasoline from Natural Gas in Alberta?

A few months ago a "white oil" was struck in an oil well at Black Diamond near Okotoks, Alberta. It consisted largely of gasoline of such purity that it has been successfully used in its raw state for driving an automobile. At a higher horizon in this well, a flow of 2,000,000 cubic feet of gas per day was obtained.

There are two hundred plants in the United States making gasoline from natural gas. The yield is determined largely by the quantity of liquid paraffin vapours in the permanent gases, and is further affected by the temperature conditions in the well, the gasoline content of the oil, and the intimacy of contact between the oil and gas. Such rapid expansion of gas from a casing head has been known to occur as to cause a heavy condensation of vapours at the point of egress.

The above considerations suggest that the possibility of manufacturing gasoline from the natural gas, which occurs in such enormous quantities in Alberta, is a matter well worthy of investigation. There would undoubtedly be a large market for the gasoline produced, and after its extraction the residual gas would be rich in methane and ethane and have a high heating value.—W. J. D.

Manitoba Water Powers

Importance of Hydro-electric Energy in the Province—Development of the Winnipeg River

Owing to the great and ever-increasing cost of good steam coal, the great distance of the province from anthracite coal fields, and the constant growing demand for hydro-electric energy in and around the city of Winnipeg, the development of water powers in Manitoba possesses a peculiar importance.

The main sources of power in commercial quantities are the Winnipeg river, Grand rapids on the Saskatchewan, and the large rivers of the northern hinterland, including the Churchill, Nelson and Berens.

The great strides made in the electrical industry in recent years have brought the present, commercial centres of the province within easy transmission distance of the basins of the Winnipeg and English rivers.

A well-considered and cautious policy of water-power administration has put into force regulations which afford every reasonable protection to the public in the way of limited grants, rentals and controls of rate, subject to periodic revision while at the same time providing sufficiently attractive opportunities for investment to actively interest the capitalist. Moreover the Department of the Interior has issued instructions that all vacant Dominion land contiguous to power sites on rivers shall be reserved and shall be disposed of only under the Water-Power Regulations referred to.

Of the eight possible power sites on the Winnipeg river there are three now under development, representing a total power capacity of 199,000 (twenty-four hour) horse-power. One site is completely developed by the Winnipeg Electric Railway Company on the Pinawa channel, and produces about 26,500 horse-power under favourable conditions. Another site at Point du Bois falls, developed by the city of Winnipeg, produces at the present time about 20,800 horse-power but is capable of extensions to a maximum of 77,000 (twenty-four hour) horse-power. Development at the third power site at Great falls, having a maximum possible development of 95,500 (twenty-four hour) horse-power, is about to be commenced.

There is, therefore, at the present time, about 47,300 horse-power produced on the Winnipeg river, and transmitted for use in and around the city of Winnipeg, which can with the two present plants be increased to 103,500 horse-power.

The five remaining power sites on the Winnipeg river are under the control of the Dominion Government, and can furnish a further amount of twenty-four hour

Improvident Waste of Water in North American Cities

Needless Consumption Equals a Hundred Gallons per Head per Day—Proposed System of Metering and Inspection

That the *per capita* consumption of water in most cities of North America is inordinately high, can be shown by a comparison with centres of population in Europe. The tables below give figures taken from representative cities on both sides of the Atlantic, and furnish a good basis for such a comparison.

	Imp. gal. per head per day
St. John, N.B.	200
Vancouver	160
Montreal	120
Ottawa	190
Toronto	95
Hamilton	98
New York	100
Buffalo	270
Chicago	190
Philadelphia	175
Average	159.8

Vienna, Austria	14
Ascher, Germany	24
Basel, Switzerland	40
Copenhagen, Denmark	26
Hamburg, Germany	40
London, England	36
Liverpool, England	36
Glasgow, Scotland	72
Newcastle-on-Tyne, England	33
Hull, England	38
Nuneaton, England	18
Stirling, Scotland	53
Riga, Russia	21
Manchester, England	42
Devonport, England	40
Average	35.5

It will be seen from the above that the average consumption per head in America is between three and four times what it is in Europe. This tremendous difference can only be accounted for by assuming that the greater portion of the water consumed in New World cities is simply wasted. A consumption of 50 gallons per head per day ought to be ample for all purposes, and would still be about 43 per cent greater than the European average. Taking the American average as 150 gallons, we see that cities on this side of the Atlantic are using 100 gallons per head per day more than is necessary.

This unnecessary waste increases the cities' financial burdens

power to a maximum extent of 210,700 horse-power.

In addition there are several important power sites on the Winnipeg and English rivers within the province of Ontario, which are within easy transmission distance of Winnipeg.

Surely this abundance of dependable and economically feasible

in many ways. The pumping and filtration plants must be of needlessly large capacity; far more power must be employed to force a large quantity of useless water through the mains; and the distribution pipes and also the sewers that carry the water away, must both be bigger than necessary. Mr. R. O. Wynne-Roberts, M. Inst. C.E., estimates that in a city of 250,000 population, the extra cost of water delivered would amount to \$560,000, or \$2.24 per inhabitant. Further, the difference in cost of sewerage and sewage disposal would be \$420,000, or \$1.67 per inhabitant. This means that the city's water rates are increased by \$3.91 for every man, woman and child of the population, without any appreciable benefit being gained for the extra outlay.

Undoubtedly some of this waste could be eliminated by placing meters on all house services, and, indeed, this is a common practice in England, and has already been adopted by some United States cities. To avoid the cost of installing meters on each service and to detect leaks in the mains, Mr. Wynne-Roberts suggests that meters be placed on the mains in different parts of the city, so that the quantity consumed in various districts could be ascertained. This would localize waste, and, if combined with an efficient system of inspection, would materially reduce useless consumption at a less cost than metering all house services. For a city of 250,000, he considers that about twenty district meters would suffice, and estimates the cost as follows:—

15 per cent. interest and depreciation on meters	\$7,500
20 Inspectors at \$1,200	24,000
1 Superintendent	2,400
2 Clerks	1,920
Rent, light, stationery and miscellaneous	2,000
	\$37,820

Say \$40,000 per annum.

Certainly some means should be taken to check the present reckless waste. If some cities would conserve their present water supply, there would be no necessity of new reservoirs and additional water supply for many years to come.

power spells an assured industrial future for the province of Manitoba, and especially for the cities of Winnipeg, Portage la Prairie and Brandon.

Condensed from a letter by J. B. Chalties, Dominion Superintendent of Water-Powers, to His Honour Judge H. A. Robson, of the Public Utilities Commission, Winnipeg.

Conservation of Lobster Fishery

Money Value Increases but Catch Declines—Conclusions of Shell-fish Commission

The wonderful productiveness of the Canadian sea-shores is still carried on on a vast scale, and the total money value of the lobster fishery is greater than ever, but the annual returns are really misleading, because, while the supply of lobsters is declining, the price has so materially advanced that the total value is greater to-day than at any previous period. Thus, in 1880, lobsters brought \$5 a case, whereas last year the price realized was nearly four times that amount.

In the case of the oyster, though the number of barrels annually produced on the Canadian beds is only half what it was ten years ago, the price per barrel has increased in about the same ratio as the price of lobsters, and is now four or five times what it was in 1880.

The following points are worthy of attention in considering the present condition of the lobster industry:—

1. The size of lobsters has materially declined, great catches being of very much smaller average size than in former years, while the fishing operations are carried on over a very much larger area, and with greatly increased number of traps, and in deeper water, and, in most districts, with the assistance of motor boats.

2. The traps used are more effective and destructive than formerly, and the parlour and other forms of trap have replaced the lobster pot used in past years.

3. There is a tendency in some localities to increase the small canneries and, in such canneries, to either pack the fishermen's catches on shore or to pack them for the fishermen, charging a rate agreed upon for the cost of cans and the labour.

4. While the size limit has been ignored, and was practically a dead letter when various size limits were in force in the different lobster districts, the fishermen realize that the taking of small lobsters has been detrimental. In such localities as the shores of Grand Manan island, a large size limit seems to have been observed. It is a widespread opinion that, by returning small lobsters to the water and marketing only the large lobsters, the value of the catch has been increased. But, in general, fishermen do not favour a size limit and some canneries would, for a time, be closed were the eight or nine-inch limit enforced generally. All, however, are convinced that the berried lobster—the female lobster carrying eggs—must be protected.—From *Report of Dominion Shell-fish Fishery Commission, 1912-13.*

Even Light Burning Injures Pine Forests

The effect of light surface fires on pine timber is to kill or damage more than half of the mature trees, according to findings just announced by the U.S. Forest Service.

The studies were made on the Wallowa and Whitman national forests in the Blue Mountains of eastern Oregon. Several typical stands of western yellow pine, where surface fires had recently burned, were selected. The region had been periodically run over by such fires for a long time. The most recently burned areas were carefully surveyed and all the trees individually studied to find the effect of the fire.

As a result of this survey the following facts were verified: a surface fire falls from one to three merchantable trees per acre, by eating out basal fire scars; it makes fire scars at the base of 42 per cent, or nearly one-half, of all the merchantable yellow pines; it actually burns to death more than 3 per cent of the trees—that is, they are killed by the heat of the surface fire at their bases. In short, of the mature trees, more than one-half of the total stand suffer more or less damage.

The stands were selected to insure results representative of the region, according to the Forest Service investigators, who draw the conclusion that deliberate light burning in such localities to remove brush and undergrowth is distinctly uneconomical, particularly since successive surface burnings only heighten the injury to the trees and make it cumulative.

Forestry Progress Depends on Public

Educational Devices Employed by Forest Fire Protective Associations

"Progress in forestry depends more upon what the public permits than upon what foresters and lumbermen perform." This is a conclusion of the Forestry Committee, as expressed at the Conservation Congress held at Washington, D.C., November 17th to 20th.

"As a consequence," the committee goes on to say, "public education is of prime importance, and the best methods of educating the public demand special study. Since no one else has the interest, or the requisite forestry knowledge, foresters and lumbermen must learn this trade or profession in addition to their own. It is not forests, but the use of forests, which we seek to perpetuate and therefore, to be sound and convincing, education must include a knowledge of the lumber business."

In presenting some of the educational devices the committee commended particularly the booklets prepared by various forest fire

Attitude of Railways Towards Forest Fires

Vice-President of Canadian Pacific Expresses His Views on Situation—Policy of Construction, not Destruction, Must be Pursued

"While it is not possible to agree fully with the statement as to the prevailing attitude of railway companies in the past on the forest fire situation, the following extracts from an address by Mr. George Bury, Vice-President of the Canadian Pacific Railway, at the Winnipeg Convention of the Canadian Forestry Association, are of great interest since they bring out very clearly some features of the general situation to which nothing like adequate attention has been given in the past. The extracts are as follows:—

"Taking the transportation of a country as one of the greatest of its assets, it cannot be charged that the setting of fires by locomotives is due to carelessness, for that were burning up one of the greatest sources of revenue. Not so, however, the fires started in unprotected slashings left by road builders, others left by settlers, fires left unquenched by prospectors. A trip over roads built by provincial governments in recent years has shown that no precaution was taken to dispose of the slashings, but that they were simply left where cut and every incident offered to running fires.

"But both Provincial and Federal governments must go further than either has yet done. The open burner of the sawmill must be abolished; prospectors who leave unquenched fires must be followed and punished; government road-building gangs and umbermen must be made to put out their camp fires and effectively dispose of the debris of the camp as well as burn the slashings; sawmills must be made to set closer watch on their camps as well as institute better patrol of the timber limits and in the vicinity of the mills. While great advancement has been made in these lines in the past few years, even greater must be made. The logging railways must also be brought under better supervision. On lines of these railways they seldom clear the right of way; the accumulation in yards adjacent to mills must be disposed of instead of being a direct connection for fire between the burner and the forest. An investigation held by standard lines disclosed that the logging roads, the very ones that should protect forests, are responsible for a much

larger percentage of fires than are the standard roads.

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"A better system of patrolling must also be instituted. At present the way of doing the patrolling is not steady enough nor done by men who are capable of taking the initiative in times of stress. All of these deficiencies are matters that this Association must press still harder upon the governments responsible for such action as will not only stop the spreading of fires, but will get to the root of the evil—carelessness.

"It has been estimated that the revenue derived by a railway from the production of one acre of heavily timbered land is equal to the accumulated traffic of an acre of agricultural land for 80 years. You will thus see what the preservation of forest adjacent to its lines means to a railroad. The opening of timber tracts by a railway is followed by an influx of trappers, prospectors, surveyors and settlers, each intent upon his own interest and without the restraint of organized authority. Prospectors impatient to follow up their discoveries, loggers cutting the virgin timber and homesteaders clearing land for the plow, have all been responsible for the starting of fires. But long before railways, prospectors or surveyors traversed the country, fires were set by natives to drive out the game. Modern thought and a policy of construction instead of destruction has supplanted the native's idea and also the primitive lumberman's that the lumber areas would last as long as people now living demanded it, and that nature would supply an alternative. Man must assist nature in supplying the alternative, and this is being done by forest preservation.

"I would now call your attention to what we are doing for the protection of our own timber lands in British Columbia. In the Cranbrook District we have some 543,486 acres in twelve Fire Reserves. On these reserves, mounted patrols have been established; on three of them trails are being cut out to make them easier of access; and on four of them telephone communication is being established. I might also mention that on the largest of these reserves the operation of burning the logging slash was carried out with great success during the month of May."

box legend which points out that, while a match has a head it cannot think for itself, but is dependent on the thought of the user to keep it from doing harm in the woods.

Fox Farming in Yukon

Animals Dying in Captivity—Shipments to Eastern Dealers

The enthusiasm concerning fox catching and farming in Yukon has materially waned during the past few weeks, owing to the fact that the price of foxes has decreased nearly 50 per cent since last summer and that hundreds of foxes held in captivity have died from some unknown cause. Many of these foxes were black, and, in some cases, as high as \$1,500 to \$2,000 had been paid for them. One dealer who, it is said, could have sold his stock of foxes in July for \$65,000, sold two weeks ago for less than \$35,000, the latter price being, to some extent, due to the decline in prices, but, also, to the fact that many of the animals had died in the meantime. One young black fox, for which \$1,600 had been paid, died five days after being placed in the corral.

Owing to the decline in price, fully 150 young foxes, all of the red variety, held in captivity in southern Yukon, have been turned out to return to their native haunts in the wilds. Previous to sickness developing among foxes in captivity here, upwards of 200 young ones had been shipped from Whitehorse alone, to fox ranches in New Brunswick, Prince Edward Island, and to dealers near Boston, Mass. At present there are not over 50 held in this locality.

A number are experimenting with mink farming, but great difficulty is experienced in keeping them, wire corrals offering little resistance when they seek their freedom.

Owners of black and silver gray foxes are not discouraged over the slump in prices, but contend that they will be more valuable than ever within a few months.—U. S. Consular Reports.

PHYSICAL EXAMINATION FOR WORKING CHILDREN

Upon the recommendation of a special commission in New York State, the legislature has enacted that, before a working certificate is issued, a thorough physical examination of every child shall be made by a medical officer of the Department of Health, and that a duplicate record of the results of such physical examination shall be transmitted to the Department of Labour. During six months, this law in New York city alone, prevented 324 physically unfit children from going to work in factories.

It would be well also that the definition of labour be amplified, as brain work is more exacting upon the physical strength than muscular work, and under present conditions the environment during working hours of the average skilled mechanic is infinitely more sanitary than are most of our offices and stores.—C.A.H.

Thick Seeding of Clover Successful

Fall Sowing Also—Experiments on an Illustration Farm—Gratifying Results

Mr. Will C. Barrie, of Mount Pleasant Farm, Galt, Ont., has forwarded to one of the agricultural experts of the Commission of Conservation, an interesting report showing the magnificent results obtained on an Illustration Farm. The following extracts speak for themselves:

Hay Crops

"In comparing the plots sown with the different thicknesses of timothy, we find that the plot sown with six pounds to the acre has much the best stand, and should, from present appearances, yield a heavy crop of hay. The plot sown with two pounds per acre is much too thin and we notice a considerable number of weeds in that plot, while in the other plots that were sown thicker there are no weeds.

"Regarding the different seedings of clover we were rather doubtful at first as to the advisability of sowing in the fall, as it did not show up very well early in the spring, and we were under the impression that it had been mostly winter-killed. We bought enough clover seed then to resow the whole field with ten pounds per acre, sowing at the same time had two acres of the field that had not been sown in the fall. During the summer we noticed that owing to the very dry weather, there was practically no clover on the two acres that had been sown in the spring only, while on the rest of the field that had been seeded, both in the fall and spring, there was a splendid catch. I believe the reason we did not notice the clover in the spring was because the top dressing of manure had covered it and in that way it was able to pull through the dry weather.

"The alsike, sown in the autumn, ten pounds to the acre, looks the best, although the lighter autumn seeding shows up well, much better indeed than our best catch in another field that was sown in the spring. The only disadvantage with thick seedings of clover and timothy in the fall, is that it might tend to lighten the yield of wheat.* It is quite possible that the extra yield of clover and timothy would more than repay the loss, if any, in the yield of wheat. We will be better able, after next year's hay harvest to judge the different seedings.

*Experience at the "Central" Experimental Farm demonstrates that the thick seedings of clover and timothy do not decrease the yield of wheat or of other grain.

Different Thicknesses of Seeding Grain

"The only tests we made in that line this year were with oats and wheat. The quantities of oats sown were 1½, 2 and 2½ bushels per acre.

"From the appearance of the stools after cutting, the portion sown with 2 bushels seemed to be slightly the best. It was a little thicker on the ground, but was somewhat shorter in the straw than the 1½ bushels per acre. The part sown 2½ bushels per acre, was very short, due no doubt to the dry season, and to part being on a higher portion of land. As this has been an extra good fall for wheat, we are unable to tell any difference so far between the thick and the thin seeding.

Top Dressing with Manure

"We have tried top dressing with barn-yard manure on wheat and meadows and we are convinced that it gives much better results than the old way of ploughing down all the manure for hoed crops. It not only helps to bring the young clover and timothy through the winter, but we get the benefit of the manure the season it is applied, while when ploughed under, it is not in a condition to help the crop to the same extent, and much of it is wasted, especially on the soil that we have in this district."

(To be continued)

POLLUTION OF INTERNATIONAL STREAMS



(Cut No. 31)

Sulphite mill waste from Minnesota and Ontario Company's paper mill at International Falls, Minn., discharging into the Rainy river.

The republic of Colombia is said to have excellent regulations for its national forests. Lumbermen who take cedar and mahogany are required to plant young trees of the same species in the cut-over spaces.

Disposal of Brush in British Columbia

Provincial Forest Branch Pursues Progressive Policy to Reduce Fire Menace

During the past year, much progress has been made in the province of British Columbia in connection with minimizing fire risks through the disposal of slash resulting from lumbering operations. In 1913, according to the Provincial Forest Branch, about 20,000 acres of lumbering slash were burned in that province, and a much larger area would have been burned had it not been for an extremely wet autumn. On the Coast and in the Interior, several experimental areas were burned by the Forest Branch, which, also, in co-operation with the Department of Public Works, burned a great many miles of slash along public roads. Such serious fire menace as long as it is allowed to remain undisposed of.

The Forest Branch, in co-operation with private land owners, secured the burning of quantities of slash created by road and railroad construction through private lands. It was a condition of the charter of the railways now building through the province, aggregating 1,800 miles in length through timbered territory, that where timber is taken from Crown Lands for construction purposes, the slash shall be piled and burned, scattered or burned, or lopped, according to the direction of the forest officers. This was done over an area of nearly a quarter of a million acres.

About one hundred and twenty timber sales are completed or under negotiation with private companies, both lumber and pulp companies, and brush disposal is an important provision of each timber sale contract. Specific information is being collected by the Forest Branch as to the cost of brush disposal, but it is too early as yet to make definite announcement of the results.—C. L.

School Savings Banks

Whatever be the fundamental cause of the "high cost of living," our national tendency to extravagance is certainly a contributory factor. In this connection it is interesting to note the efforts that are being put forth to encourage thrifty habits among school children.

The school savings bank system in Canada had its origin in Toronto and still has its headquarters there. The "Penny Bank," as it is commonly called, is largely a philanthropic institution, as practically all the service in connection with it is voluntary. It is incorporated under the "Penny Bank Act" of 1904, the most important provisions of which are: (1) that 95 per cent of the de-

posits must be placed in a Government or Post Office savings bank; (2) that no depositor may have to his credit an amount exceeding \$300; (4) that there must be a guarantee fund of at least \$10,000, made up of cash or unpaid subscriptions, contributed by a Guarantee Company approved of by the Government; (5) that no director nor voluntary worker shall receive any remuneration for his services, and that no dividends shall be paid to the guarantors. The work of collecting the deposits and keeping the pass-books is performed by the teaching staff, in co-operation with some chartered bank.

Many instances are related by school teachers showing that the savings of boys and girls have been put to splendid use. During the depression in 1907-8, the bank accounts of many children, small though they were, saved the day for almost destitute families and there are not a few cases where the Penny Bank has proved the salvation of families in times of sickness. It has often given boys a start in life, which they otherwise would not have had, and has served to counteract vicious tendencies. It has been the enemy of the cheap candy store, where so many boys and girls acquire the habit of selfishly squandering their money. It has in short been a splendid supplementary force in education.

Waste from Desks Goes into Brushes

Remnants from One Factory Used as Raw Material for Another

Waste wood in the manufacture of school desks is now being used for the backs of cheap brushes. A large manufacturer of school desks in Michigan had a considerable amount of waste material in sizes which were too short to enter into the manufacture of the smallest desks, and could not be utilized further with his machinery or in his line of work. This material was all hard maple in pieces an inch thick, a foot or so long, and about three inches wide; for a long time it had been consigned to the waste pile and sold as firewood. This waste amounted to from 1,000 to 1,500 board feet each day. A nearby manufacturer was using practically this quantity of maple, which he was sawing up into small pieces for making the backs of cheap brushes.

Members of the Forest Service, investigating methods of eliminating factory waste, conceived the idea that the blocks used by the brush factory could be readily secured from the waste of the school desk manufacturer, and on this basis an arrangement of mutual benefit was soon concluded. Arrangements were made so that the brush manufacturer now places orders with the other firm for its raw material and what was formerly waste is now a source of profit.