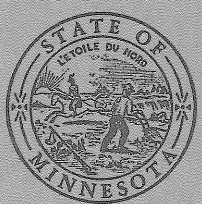
Developing Natural and Human Resources in Minnesota

A report on the work of the Iron Range Resources and Rehabilitation Commission
1950-1952



State of Minnesota

Iron Range Resources and Rehabilitation

St. Paul, Minnesota

To the Honorable C. Elmer Anderson, Governor, and the Legislature of the State of Minnesota:

I am herewith submitting to you the biennial report of the Iron Range Resources and Rehabilitation Commission.

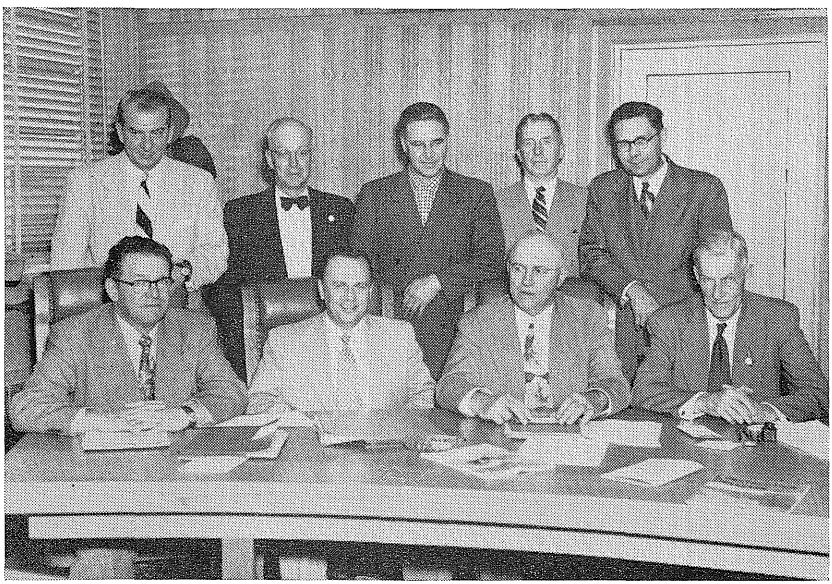
This is the report for the twenty-third biennium, covering the period beginning July 1, 1950, and ending June 30, 1952.

Respectfully submitted,

Edward G. Bayuk
Commissioner
St. Paul, Minnesota

CONTENTS

Working as a Team . . .



MEMBERS of the Iron Range Resources and Rehabilitation Commission meet to discuss new and old projects. Left to right, front row, are Rep. Fred W. Schwanke, Deerwood; Commissioner Edward G. Bayuk; Sen. George O'Brien, Grand Rapids, chairman; Roy E. Gordon, court reporter; back row, Ralph Lilly of the attorney general's office; Sen. Herbert Rogers, Duluth; Sen. Elmer Peterson, Hibbing; Rep. Warren S. Moore, Duluth; and Rep. Emil Ernst, Lester Prairie. This particular session was held in Grand Rapids. Chester S. Wilson, commissioner of conservation, also a member of the IRRRC, was absent at the time.

Program Demands Vision

Minnesota is a state of vast natural resources, rich soil, mineral deposits, forests, water and wildlife. Man continues to use them every day, year after year. Some resources are replaced as they are used by nature's own forces.

Some resources, such as forests, are used so rapidly or unwisely, that nature falls behind in the process of reproduction. Resources, such as iron ore, are removed from the ground and can never be replaced — no matter what help man offers.

Heavy unemployment and continued depletion of the state's best ores were among the key motivating factors which led to the creation in 1941 of the office of Commissioner of Iron Range Resources and Rehabilitation by legislative action.

It was noted at that time that St. Louis and Itasca counties, top mining areas, had 10,000 persons unemployed; that 12 per cent of the people in St. Louis county were receiving public assistance or relief of some kind; that employment in the iron mines had dropped in 20 years from 12,000 to 4,500 men. Increased use of labor-saving machinery — that is, technological advances — was cited among the reasons for the diminishing job rolls.

Job Field Limited

Job troubles were multiplied by lack of other fields or vocations to turn to. There was little timber left, and the heavily cut-over land in many cases was not suitable for successful farming. For that reason, along with unwise farming methods, the agricultural economy in many cases tended to be sub-standard.

The onset of World War II, with the heavy demand for iron ore, followed by a production boom across the nation after the war, has lifted the unemployment problem in those areas for the present.

But the work of the Iron Range Resources and Rehabilitation Commission has gone on — with an eye to the future. The emphasis by the mining companies of finding ways for using the state's lean ores has changed the picture somewhat. However, the drain on the ore reserves continues.

And the work must go on to give those areas a better balanced economy as a cushion for the future as well as to meet the immediate needs of opening new vocational fields.

Law Defines Duties

The law permits wide latitude in the work of the commissioner and does not necessarily restrict him to the iron ranges. The law states:

"When the commissioner shall determine that distress and unemployment exists or may exist in the future in any county by reason of the removal of natural resources or a possibly limited use thereof in the future and the decrease in employment resulting therefrom, now or hereafter, he may use such amounts of the appropriation made to him in this section as he may determine to be necessary and proper in the development of the remaining resources of said county and in the vocational training and rehabilitation of its residents."

Your commissioner feels the office was created to help stricken areas of the state by promoting vocational training, encouraging low grade ore development, encouraging wise farm programs, promoting a long range forestry program in the 16 "cutover" northern Minnesota counties, promoting processing of wood products and finding new uses for available trees, such as aspen; developing the use of other abundant resources, such as peat; and encouraging development of programs for rehabilitating the people in the stricken areas.

Fund Source Noted

Funds for the operation of the Iron Range Resources and Rehabilitation Commission are derived from a portion of the state occupation tax on iron ore, that is, a tax based on iron ore mined. The tax is allocated to the various state funds as follows:

45 per cent to the state general revenue fund; 40 per cent to the permanent school trust fund; 10 per cent to the permanent university trust fund; and five per cent to the Iron Range Resources and Rehabilitation Commission.

Two years after the creation of the office of the Iron Range Resources and Rehabilitation Commissioner the legislature set up an advisory body to guide the work of the commissioner. That commission is composed of three senators, three representatives

and the commissioner of conservation. The senate members are appointed by the senate committee on committees, and the representatives by the speaker of the house.

Chief Gets Advice

Projects or programs covered in this report, and the expenditures for them, have all been approved by the commission as required by law. However, it should be noted that the governor is the appointing power and that the commissioner is primarily responsible to him.

So with the advice and counsel of the commission, and with the duties and the aims of the office in mind, the commissioner has continued certain programs under way when he took office and initiated some new ones detailed in this report.

The administrative office of the commissioner is located in the State Office Building, St. Paul. Administrative costs reflected in this report cover the salary of the commissioner, and salaries of all other employes directly responsible to the St. Paul office as well as expenses for maintenance of the office and for purchases of supplies, materials and other miscellaneous expenses, such as workman's compensation.

Members of the Iron Range Resources and Rehabilitation Commission

Senator George O'Brien, Chairman
Grand Rapids, Minnesota

Senator Elmer Peterson, Secretary
Hibbing, Minnesota

Senator Herbert Rogers
Duluth, Minnesota

Representative Fred W. Schwanke, Vice Chairman
Deerwood, Minnesota

Representative Warren S. Moore
Duluth, Minnesota

Representative Emil C. Ernst
Lester Prairie, Minnesota

Chester S. Wilson
Commissioner of the Department of Conservation

Expanding a Market

Duluth now has a firmly established $4,000,000 business that benefits a wide area thanks to the helping hand of the state through the Iron Range Resources and Rehabilitation Commission. The business is Chun King Sales, Inc., producer of oriental foods. It was already well established when Jeno F. Paulucci, the president, came to the commission for a helping hand. He needed money to expand.

The commission studied the proposal. The possibilities were there. A vast potential use for items grown in the area. Chun King uses tons and tons of poultry, celery and onions. Here was a chance to expand farming along those lines. The mucklands of the Duluth and Iron Range hinterlands were considered particularly suitable for an expanded celery industry.

So when Paulucci, who processes and distributes more than a dozen varieties of oriental foods, came to the commission two years ago its members listened. He was even considering leaving the state. He needed more space and one state already had offered him the sort of plant he wanted.

Farm Blow Averted

Removal of the plant would be bad enough, but it also would deal a heavy blow to the farm potentials. So the commission decided to allocate $200,000 to the project, the sum including the purchase of the abandoned Universal Match Co. building in Duluth for the expanded Chun King plant. The remainder of the funds was to be used for remodeling and setting up production to meet necessary health requirements.

The investment appears to be one of the happier experiences of the Iron Range Resources and Rehabilitation Commission. Returns began to show up early and the effect on the farms was almost immediate. Celery farming, in particular, got a shot in the arm. Paulucci served notice to produce and poultry raisers in the area that he would be in the market for about two million pounds of onions, 250,000 pounds of poultry, as well as large supplies of eggs, meat and mushrooms.

Chun King was organized by Paulucci, a native of Aurora, who went to school in Hibbing. Business was first started in a quonset hut in Grand Rapids. By late 1947 it had outgrown the hut and in 1948 the company moved to larger quarters on Lake avenue in Duluth.

Source Called Best

Why did Paulucci pick Duluth? He considers the city the center of one of the best source areas for the company's main raw ingredients — celery and onions. The new plant on Fiftieth Avenue West has one cooler alone which holds one million pounds of celery.

A year ago much of the celery used, about eight million pounds annually, was shipped in from Michigan, but with the development of the fertile mucklands of the Sax - Zim - Meadowlands area, northern Minnesota farmers will grow a good portion of the celery needed in the Chun King plant.

The area contains 10,000 acres of muckland capable of producing the world's finest celery, but only a few hundred acres were actually under this crop cultivation. Last spring Paulucci himself went into the area to help increase the acreage under celery cultivation.

Hopes Borne Out

One year ago Chun King bought about two million pounds of celery annually from growers near Zim. Forecast then was that the company eventually would use as much as six million pounds of Minnesota grown celery every year.

That forecast has almost been borne out in just 12 months. This year, with its own celery farm in production for the first time, Chun King harvested and used more than five million pounds of celery grown within an hour's drive of its plant. The company's own farm is on land that was covered with small trees, shrubs and weeds in 1951.

When the land was planted, against the predictions of some, last spring, optimistic forecasts were for a crop of one million pounds. When harvesting began, in mid-September, the original estimate was quickly revised upward to a crop of at least three million pounds. From other farms in the same area Chun King purchased another two million-plus pounds.

New Life Injected

New life was given to an area where truck garden attempts flourished and faded some 25 years ago. In addition, Chun King is buying increasing amounts of onions, mushrooms, chickens, meats and eggs from other Minnesota growers and producers. Value of these purchases annually runs into the hundreds of thousands of dollars.

The annual payroll of Chun King exceeds $700,000, a considerable sum for Duluth and northern Minnesota.

Another significant benefit of the overall-project: Land which had been tax delinquent for years has now been restored to state tax rolls and there will be additional returns as more of the muckland acreage is put under celery cultivation (Chun King alone expects to more than double its acreage in 1953); expansion and revived interest in truck gardening and celery growing by other farmers, to meet the company's continuing demands, has brought new income to small growers.

There are other obvious potentials. For instance, Chun King buys onions by carloads that are shipped in from elsewhere.

Chun King is making regular repayments to the state to cover the investment. Under the agreement in which Chun King leased the Duluth building from the state, the company agreed to pay the sum of $7,000 from Jan. 1, 1952, in monthly installments of $500.

Project Pays Off

Commencing Sept. 1, 1952, and for the remainder of the terms of the 20-year lease the company agreed to pay at the rate of one-half of one per cent of net sales or finished food products produced at the plant — but not less than $10,000 a year. The company was ready to make first payment under these terms as this report was written.

The project appeared to offer an excellent situation for promoting and developing latent resources in an area where the full potentials had lain dormant for years. The business itself seemed to offer strong insurance toward stability of employment in that area. It can very well be one of the keystones in the business future of northern Minnesota.

At this point, at any rate, the helping hand given Chun King appears to be paying off handsomely.

Stacked High!

CELERY GROWING has hit new strides in Sax - Zim - Meadowlands area. Above is one of the neatly cultivated fields. And it's good celery, too, Chun King President Paulucci (left) and Commissioner Bayuk agree. Newly-harvested celery (below) goes to market and is stacked high in the company's own cold-storage plant in Duluth.

Checking Water Supplies

An investigation of the surface-water supplies of the Mesabi Iron Range area was begun in 1942. This investigation has been continued as a cooperative project, with the Iron Range Resources and Rehabilitation Commission and the U. S. Geological Survey participating on an equal basis.

The object of the investigation is to provide records of water resources needed for wise and orderly development of the other resources of the area.

Water, the experts note, is a renewable source, being more or less continuously replenished by rainfall. Because it is only "more or less" replenished, it is a resource that cannot be inventoried by "taking stock" once or even at intervals.

Records Necessary

Continuous records over relatively long periods of time are necessary to determine surface-water supplies.

Modern industry uses large quantities of water, and in the Iron Range area the beneficiation of taconite ores appears to be the largest potential use. Development of these ores has been given much greater attention during the past biennium. Pilot plants have demonstrated the feasibility of the beneficiation processes now in use, and large capacity installations now are under construction.

Beneficiation processes found practical use large quantities of water. So it is apparent that the growth of the industry may be limited if adequate water supplies are not available. Improvement in processing may lessen the quantities required, but it is probable that increasing use of these ores will demand great quantities of water.

Demands to Rise

There is also this other significant point in the water-flow investigations: Successful utilization of taconite ores on a large scale will result in new concentrations of population, which will increase the demand for domestic water supplies.

Prior to 1942, little was known regarding the potential water supplies of the Iron Range, and it was realized that no large investment would be made without definite knowledge regarding the amount available. That resulted in the start of the investigation of the surface-water resources of the Range, and since then has been continued.

At the beginning of this biennium (July 1, 1950), five gauging or water measuring stations were being operated under this cooperative program. The five are:

Dark river near Chisholm.
Embarrass river near Embarrass.
Partridge river near Aurora.
St. Louis river near Aurora.
Sturgeon river near Chisholm.

These stations have been continued in operation at a cost of $7,300 for the biennium, which costs were shared equally by the Commission and the U. S. Geological Survey.

Increasing activity in the development of taconite ores in the vicinity of Babbitt indicated an additional need for water-supply information in that area. In recognition of this growing need, two additional gauging stations were established in the fall of 1951.

One of the two stations is on South Kawishiwi river near Ely, and the other is on the Dunka river near Babbitt. The cost of constructing and operating these stations was $6,100. Again, these costs were shared equally between the Commission and the U. S. Geological Survey.

The gauging stations operated under this program provide a foundation of factual data upon which wise and orderly developments may be based. The firmness of this foundation depends on the length and continuity of the records because only long-term continuous records will show definitely the water supply available.

Additional records may be needed as developments are made and water supply needs can be accurately foreseen.

Water is Carefully Measured

EQUIPMENT for checking surface water fluctuations include the recording well and shelter at the right and the outside return gage at the left. This scene is on the Sturgeon river near Chisholm.

Farm Rehabilitation

An expanded agricultural development program is contemplated. This program requires detailed study to meet changing conditions. Full-time farming is being replaced by part-time farming because of high industrial activity in the cut-over area. So, some projects considered must be of a part-time nature.

Because of the small average crop acreage in the cut-over area, land clearing work is still of great importance and there is a growing demand on the part of the farmers for more cleared acres.

Consideration also is being given to expansion of truck crop farming in the cut-over area, which now imports most of its vegetables.

Pushing Forest Development

Conserving forest lands and restoring those lost by unwise cutting offers one of the best hopes for stabilizing the economy of the ore mining areas and the entire section of northeastern Minnesota. With those points in mind the Iron Range Resources and Rehabilitation Commission is cooperating wholeheartedly in forestry programs.

A significant point: The forest industry using wood as a raw material is the third largest industry in the state of Minnesota. Over 150 million dollars worth of forest products were harvested in 1951.

Projects and programs designed to provide information and assistance necessary to stabilize and promote the development of Minnesota forest industries have been supported by the Iron Range Resources and Rehabilitation Commission.

Funds derived from a diminishing exhaustible resource (iron ore) are being expended to promote the continued development of timber, a renewable resource. In selecting these projects the Commission has not duplicated the efforts of any other agency or group but is fulfilling an urgent need in the development of our state, particularly the cut-over areas which are potential heavy timber producing regions.

Survey Comes First

As in any business, an inventory is the starting point for logically evaluating a resource — in this case timber. In other words, what have we got on hand? What kind is it? Is it marketable?

If not, how can we make it so? How fast is it growing? Who owns it? Where is the timber located? How fast is it being used? Is growth keeping up with cutting?

Detailed information is being collected for all classes of forest ownership in 16 northeastern Minnesota counties, including Aitkin, Becker, Beltrami, Carlton, Cass, Clearwater, Cook, Crow Wing, Hubbard, Itasca, Koochiching, Lake, Pine, Lake of the Woods, St. Louis, and Wadena. More general information will be assembled in other counties of the state.

Since the start of this project, complete reports have been published for seven northeastern counties, including Crow Wing, Aitkin, Clearwater, Carlton, Cass, Itasca and Beltrami. Four more were scheduled to be published before the end of the current fiscal year.

Field work is under way or has been completed in areas comprising 70 per cent of the state. The remainder will be covered as rapidly as possible.

Idle Lands Put to Work

Sometimes only a bit of encouragement and guidance is needed to put idle lands to work. So, with that idea in mind, technical assistance in the management of tax-forfeited lands is provided to northeastern Minnesota counties (including the Iron Ranges) under a county land-use planning program.

The counties control and administer between four and five million acres of land in our northeastern section. These lands, abandoned for taxes, are capable of producing large quantities of timber. It is essential that county officials are properly advised so their management will result in maximum benefit to their people.

The men assigned to this project prepare forest management plans for the county lands and assist in administration of these plans. They also provide expert assistance in land zoning, appraisal, and classification, as well as inspect, promote and assist in land development programs.

Land Development

The 1951 legislature passed laws permitting the counties to levy for the purposes of re-establishing section corners and also for developing tax-forfeited lands.

To encourage county use of this enabling legislation, the commissioner has provided assistance to the counties that they might better realize the value of such development work.

The land development work undertaken by the counties through the assistance and guidance of this program includes:

Resurrecting lost and obliterated section corners.

Ground preparation through discing to encourage natural regeneration of cut-over forest lands.

Encourage forest tree planting.

Encourage timber stand improvement work such as thinning and pruning to promote quality growth in choice timber stands.

Start 'Em Young

Most forestry programs are designed for and directed at the land owner. The Commission, believes, however, more widespread and lasting results can be obtained if forestry and conservation programs are carried out in our schools.

To evaluate this belief, farm forestry has been taught by a trained specialist in a number of rural high schools in the Iron Range area.

The result: Boys in the agricultural classes have proved very receptive to this training and have applied many good forestry practices to the woodlots on their fathers' farms. There has been a heavy demand for the services of this instructor for special assistance after school hours and during school vacation periods.

Pointing the Way

The surveys point up more than ever that while good timber land is sorely depleted there is, nevertheless, a great abundance of aspen (poplar). That happy situation suggests stepped up efforts to find more uses for this fast growing tree.

Valuable hardwoods have been found in preliminary studies made in Goodhue, Wabasha, Winona, Olmsted, Fillmore and Houston counties in the southeast tip of the state. Cooperating in that study are the Lake States Forest Experiment Station, U. S. Forest Service, State Division of Forestry, county lands departments and private industry.

In the 16 northeastern Minnesota counties there are about 200,000 acres of tax-forfeited land that should be planted to conifers. Four million trees planted annually would do the job in 50 years.

About 250 acres of 12-year-old plantations on tax-forfeited land need thinning and pruning of crop trees. Much of that material can be sold for Christmas trees and boughs. Counties should be encouraged to promote these programs to develop their timber stands.

Mapping the Contours

The U. S. Geological Survey has been making topographic maps of the states of the nation for more than 60 years. By and large the work has been financed by the states and the federal government on a 50-50 basis.

In other words, the joint projects have been confined to states which made appropriations for participation. About 52 per cent of the nation has been mapped under this program.

Minnesota lagged far behind in this work, with less than 19 per cent of its area covered up to 1949.

Prior to 1949 when the legislature appropriated $100,000 for topographic mapping for the biennium no funds had been provided since 1917. So for 32 years topographic mapping had been virtually at a standstill.

State Back in Step

Now the program is under way again and it is hoped that it will continue until Minnesota steps from the rank of the lowest of the 48 states in area mapped and takes a position near the top of the list.

The Iron Range Resources and Rehabilitation Commission is cooperating in the program by allotting $30,000 a year for mapping the Mesabi Range where taconite (low grade ore) development made adequate maps a practical necessity.

The U. S. Geological Survey, encouraged by the evidence of interest in topographic mapping by state agencies, appropriated in 1949 additional exclusive federal funds of $40,000 for work on the Mesabi Range.

Topographic maps are considered essential in the study of problems bearing on all phases of conservation activity.

Industry Needs Data

Viewed from the standpoint of commercial development, much time and money can be saved by being able to make preliminary studies of problems from an over-all map showing the topography. Many worthwhile projects may well have been abandoned in the past because of the lack of basic topographic maps.

On the other hand, projects which have been undertaken and have proved a disappointment or failure might not have been attempted had this basic data been available.

Already, much field work has been completed and many maps printed so that the resources and other physical features of the Iron Range can be presented to prospective commercial interests. These maps provide the basic data for preliminary planning, reconnaissance and examination of industrial, engineering and scientific projects.

The topographic maps are one of the most direct and substantial aids to the development of the Mesabi Range for planning the extensive developments that are taking place with the establishment of taconite concentration plants.

Range Maps Drawn

Field work has been completed and maps made for good portions of the Iron Range, including such areas as Allen, Aurora, Embarrass, Isaac Lake, Biwabik, McKinley, Virginia, Chisholm, Eveleth, Hibbing, Mountain Iron and Babbitt.

The published maps are printed in three and four colors. Water is shown in blue, contours (lines of elevation above sea level) are in brown. All works of man are in black, including such features as roads, buildings and section, township, county and other boundaries of political subdivisions. The fourth color shows wooded areas in green.

The federal government plans eventually to complete a topographic map of the entire United States on a scale of one inch to the mile, and the Minnesota work is a part of this overall plan.

The maps, important as they are in all types of construction and state development, also are of value in conservation, recreation, defense, and in fact almost any activity of man.

Close of an Experiment

Hopes of transforming Minnesota's low grade ore into iron powder were given a setback in October, 1951, when the Iron Range Resources and Rehabilitation Commission decided to sell an experimental plant at Aurora. The plant was sold to the highest bidder, the Duluth Iron and Metal Company, for $114,101.23.

The Commissioner found all possibilities had been exhausted of ever using the plant again for what it was originally built and intended to produce. The state spent $783,763.28 on the five-year experiment.

The project was promoted by Iron Range legislators, the northeastern Minnesota junior chambers of commerce, representatives of mining companies and the University of Minnesota Mines Experiment Station. Funds were provided by the Iron Range Resources and Rehabilitation Commission.

New Process Tested

The state entered into an agreement with Continental Machines, Inc., in 1946 to construct and operate the Aurora plant to make powdered iron from low-grade ore by a process developed by the late Charles V. Firth of the University's Mines Experiment Station.

The Firth process was successful in the laboratory at the University of Minnesota and the plant was built at Aurora to prove the success of the process on a commercial basis.

In August, 1950, the company notified the state that the Firth process for making powdered iron was not commercially feasible, and that it had stopped further experimental work.

The Firth process had been advanced by the northern Minnesota groups and research and engineering men as a way of producing a high quality of powdered iron from carbonate slate, a highly siliceous ore found on the Mesabi Range in great abundance.

Held Out High Hopes

Unhappy as the experiment proved, the project had held out strong possibilities. Iron powder can be used for such parts as bearings, pinions, cams and many other machine parts used in

the construction of automobiles, farm equipment and household appliances. The powder is compacted into shape and the item requires no machining to finish.

The death of the inventor of the iron powder process was one of the handicaps early in the project. Mr. Firth died shortly after the site of the plant was selected and before the furnace he was especially designing was completely blueprinted. So others had to visualize the plans Mr. Firth had in mind.

A New Name, New Goals

Repayments are being made each month to the Commission by the Arrowhead Canning Company, Grand Rapids, which had its start back in 1945. The idea was to can rutabagas, a vegetable mainly eaten in its fresh or somewhat preserved state.

The project was encouraged by the Iron Range Resources and Rehabilitation Commission because of the great possibilities of expanding the use of lands well suited for rutabagas.

The canning plant was expanded and the firm arranged to obtain rutabagas from about 30 farmers in Itasca county area.

Call 'Em Turnips

In the past year the whole community of Grand Rapids joined in a promotion project designed to boost the sale of canned rutabagas. The idea was to popularize the name of them as turnips. So government permission was obtained to label the projects yellow turnips instead of rutabagas.

The switch in name to yellow turnips is expected to overcome a slow market in the east where the vegetable is known by that name. Easterners, in many cases, never have heard of rutabagas.

One of the selling points for rutabaga canning is the fact that for home use rutabagas are harvested when small and then waxed with a preservative. If canned, they can be grown to any size — and the longer they grow the sweeter and better they get.

Bringing a Crop Back

Minnesota was once one of the best legume producing states in the country. Its alfalfa and clover used to be ranked among the best, and it had a flourishing legume seed industry.

At various times the state has held first place in the production of alfalfa, alsike clover and sweet clover. Today it is outranked by many states in the production of alfalfa and red clover, and total seed production is way down. The legume production average for this important crop dropped from 55,000 acres in 1940 to 16,000 acres in 1948.

So the state is out to find why legume output has dwindled so much in the last decade. Most of the land involved is in the northern part of the state. Loss to the northern counties runs into millions of dollars because of the crop reductions. If the vast acres of the cut-over lands were put to suitable and profitable use it would help to stabilize the farm and job picture.

Scientists Called In

Therefore, the Commission in July, 1951, provided $35,000 for expanded legume research, the work to be done by University of Minnesota scientists. Farm experts recognize the value of legumes as soil builders and soil conservers. It is a crop that will utilize the acres and produce good income.

There are two main reasons for Minnesota's present reduced standing as a legume seed producer:

First, other states are producing an increasing amount of alfalfa seed.

Second, Minnesota's yields have decreased and the acreage devoted to seed production has declined because of the unsatisfactory seed yields.

Main objectives of the research program are to find the causes for the reduced yields and then determine how to boost the crop output and lessen the hazard of production.

Most legume seed production has been in the northern portion of the state. Therefore, much of the observational and field experiment aspects of the work have been in the northwest coun-

ties. Some experiments were undertaken in University greenhouses and laboratories. A few plots for additional observations and experiments have been located in other parts of the state.

An advisory committee made up of prominent seed growers and county agents from the 13 northwest counties meets with the research staff to advise and assist. An executive committee of the advisory body is located at Roseau.

Soil Checked for Clue

Soils were checked to determine the types most suitable for legume production. The work in 1952 was on alfalfa and alsike clover. Six fields located in Clearwater, Beltrami, Roseau, Polk and Lake of the Woods counties were in alfalfa. Two fields in Roseau county were in alsike clover. The eight experimental fields were selected on the basis of field observations, soil tests, and soil texture and structure.

Phosphate fertilizer was found to be most essential on all eight fields. Potash with the phosphate gave an added response. The fertilized plots showed two to three times more growth and two to three times more blossoms and flowers, indicating a potentially greater seed producing capacity over the unfertilized plots.

Preliminary observations on the alsike clover plots indicated that there was a higher number of pollinating insects in the fertilized plots as compared with those in the unfertilized. All preliminary observations indicate the fertilized plots would potentially produce a much higher seed yield than the unfertilized.

Seedings of alfalfa were made in 1950 at eight locations selected for good or poor seed production. Factors studied at the 252 plots included row versus broadcast seeding, different dates for clipping, and differences in the varieties.

Possible Key Found

Yield of seed differed markedly at the different locations, and the differences apparently were due in the main to differences in abundance of pollinating insects. In 1951, the varieties did not differ significantly in yield of seed. Seed yields were increased approximately 20 per cent when injurious insects were controlled.

Weeds in fields of legume crops being grown for seed are a menace to seed production in three main ways. They compete for soil nutrients and moisture that should be available to the

crop plants, the weed flowers compete with the crop flowers for attention of nature's pollinators, the bees, and weeds in the harvest prevent the producer from obtaining certification of his seed.

So cultural and chemical methods of weed control are being studied on 200 plots on five farms, two in Roseau, two in Lake of the Woods and one in Beltrami county.

Discoveries Noted

Studies on the control of injurious insects by insecticides revealed some startling possibilities. A single application of DDT to alfalfa resulted in increases in seed yields of 46 per cent to 158 per cent. Unsprayed plots of alsike clover averaged 81 pounds of seed per acre, while plots sprayed with DDT averaged 194 pounds per acre, an increase of 139 per cent.

Part of the research project was aimed at increasing the amount of cross-pollination by bees. Experts consider bees the most effective agents for the cross-pollination necessary for a seed crop.

Studies are directed in such possibilities as increasing the attractiveness of the flowers to lure the bees, increasing the number of pollinating bees and increasing the probability of pollination by eliminating competitive weeds and crops.

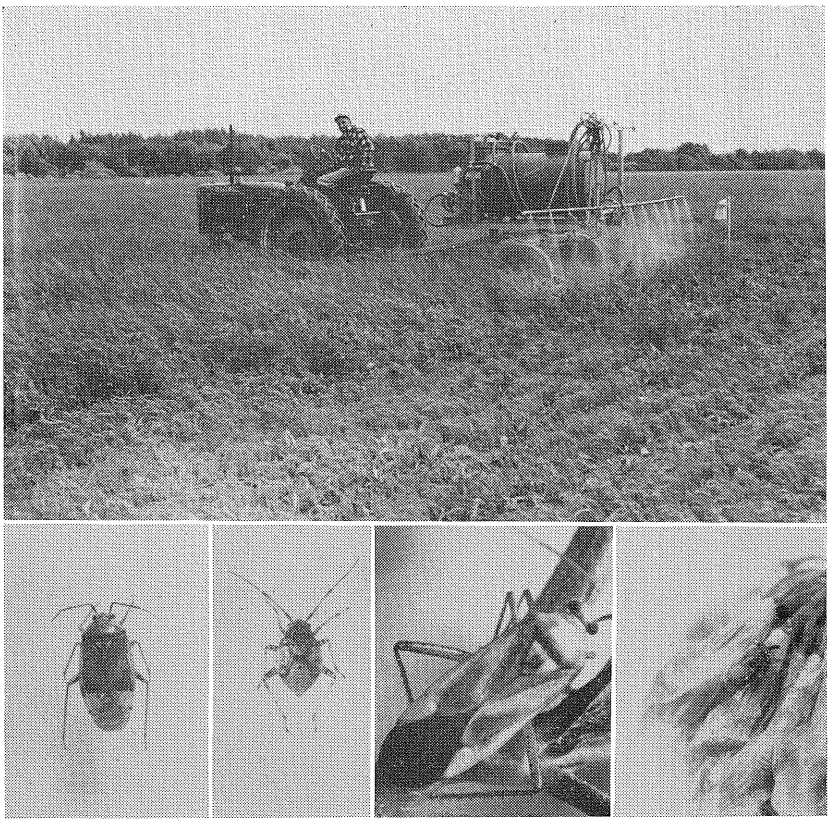
Observations in northern Minnesota suggest that soil nutrients, particularly phosphate, may affect the attractiveness of the flowers to the bees.

Diseases Found

Research showed black stem to be one of the worst diseases of alfalfa in Minnesota. It is caused by a fungus and can infect any part of the plant. Infected seeds are shrivelled, light, chaffy and dark brown, compared to round, plump, greenish-yellow normal seeds. Much of the loss goes unnoticed because infected seeds are blown out of a thresher with the chaff and do not appear in commercial seed.

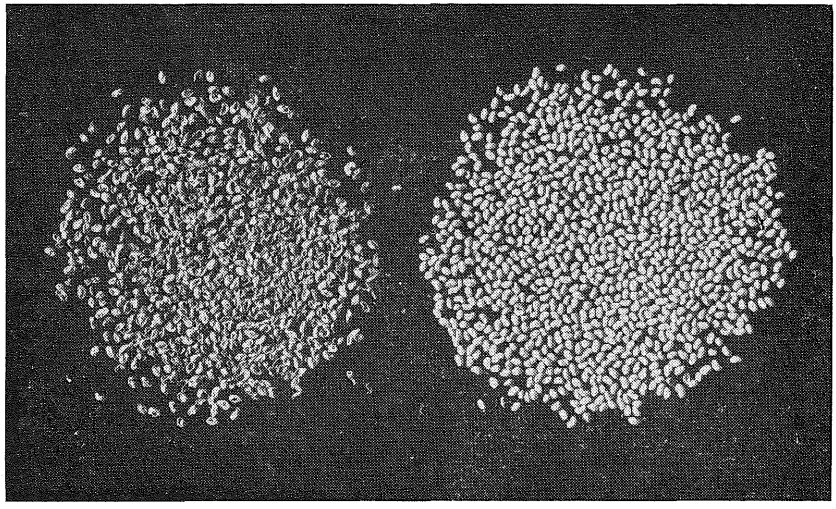
Investigations are being made to devise control methods. Cultural practices such as burning fields in the spring, clean cultivation, and row planting may give some control. The most practical means of control is the development of resistant varieties. Intensive search is being made for such material, and certain strains of alfalfa show promise in that respect.

Insects Cut Legume Crops



SPRAYING experimental plots of alfalfa for control of injurious insects in Lake of the Woods county. Below, the most important injurious insects of alfalfa and alsike clover; left to right, adult Lygus bug, young Lygus bug, adult alfalfa plant bug, adult Alsike clover seed weevil on flower head of alsike clover.

SHOWING IMPROVEMENT in growth and increase in flowering of alsike clover early in the season with fertilization in one of the soil experiments. Photo taken June 18, 1952, when effects of drought were still evident. On the left 1000 lbs. of superphosphate per acre; on the right no fertilizer. Note that without fertilizer the minimum growth had not reached the 6-inch line while with fertilization the growth was considerably more than 6 inches.



ALFALFA SEEDS: left, from plants infested with black stem disease; right, from non-infested plants.

Scientists Work in Field

TAKING A CENSUS of insects in a field of alfalfa or clover being grown for seed in order to determine the need for spraying.

Hardboard Project Pays Off

With the help of the Iron Range Resources and Rehabilitation Commission, a project was started in 1947 to carry on experiments in the manufacture of hardboard from aspen (poplar), a fast-growing tree which covers vast expanses of the state. Under a contract with the state, Superior Wood Products, Inc., constructed a plant in Duluth.

That project is now far beyond the experimental stage. The plant is operating the year around, utilizing huge quantities of this abundant resource. Hardboard production has been stepped up steadily and the plant has been expanded without state help. Production has been tripled in the past two years.

Regular repayments are being made to the state to cover the investment which helped to find a new use for aspen, created another industry and made more jobs. Since July, 1950, to June 1, 1952, a total of $73,500 had been repaid to the state. And the company has never defaulted.

Here's Market for Aspen

HUGE STOCKS of aspen are brought to Duluth from the north state area to meet the demands for hardboard production. All of which means more income and jobs from this abundant Minnesota resource.

Trade School Survey

During the depths of the Big Depression of the 30's one of the aggravating problems in helping the Iron Range jobless was their lack of suitable vocational training in any field. That indicated an urgent need for a good vocational trade school in the Range area.

Studies were made and the state came out in August, 1946, with a report on a Range area vocational school survey. In 1951 the Chambers of Commerce of Virginia and Eveleth asked the IRRRC to bring up to date the statistics as prepared in the 1946 report.

So, under IRRRC sponsorship and at a cost of a little over $1,000, Walter W. Klausler, a trained expert in vocational education, conducted a survey to evaluate the present vocational education in the Range area to determine the need for a proposed area vocational-technical school.

Findings Show Need

The survey, completed early in 1952, showed vocational training in Range schools was weak, poorly co-ordinated and thinly spread over the entire area. It recommended steps be taken to bring about the formation of two Range area vocational schools, one for the Hibbing area and the other for the Virginia-Eveleth community. Also recommended was the consolidation of the Virginia and Eveleth junior colleges.

The survey report noted that it was necessary for hundreds of World War II veterans to leave the Range and seek vocational training elsewhere; that many youths and adults were denied, and still are being denied, the opportunity for vocational training. Veterans of the Korean war eventually will want vocational training. It is now possible, the report concluded, to start the organization of a sound vocational training program and expand the services as conditions demand.

The report observed that mechanization of the iron mining industry not only requires more skillful help but the repair and maintenance of this equipment calls for a greater number of skilled workers. Continued development of the use of taconite promises to create a growing need for employment of a large number of people with the required skills.

Rehabilitation Help

Under sponsorship of the Iron Range Resources and Rehabilitation Commission a study was made in the Iron Range area of the possible need for a curative workshop for the physically handicapped. Funds in the amount of $1,479.98 were spent on the project and the survey was made by Louis F. Zini, Eveleth, himself a physically handicapped person.

He made an exhaustive study in St. Louis, Itasca and Koochiching counties. Data was collected by Mr. Zini with the aid of a field representative of the Minnesota Society for Crippled Children and Disabled Adults.

All information was obtained by personal contact with medical authorities, clinics, hospital, school, city and county health departments, school and civic organizations.

The survey established an urgent need for a rehabilitation center on the Iron Range where out-patients may receive treatment by physical therapy, occupational therapy, speech therapy, and treatment and training of cerebral palsied youngsters. Other curative and rehabilitating practices and procedures may ensue. The establishment of such a center on the Iron Range would mean rehabilitating the people and will mark a step toward further developing the human resources in that area.

Camp for Future Farmers

For the last two summers hundreds of Minnesota boys and girls have been enjoying outdoor educational camping sessions at Arrowhead lake, 13 miles north of Virginia. The camp was made available to the state Future Farmers of America organization in the fall of 1950.

Future Farmers of America from all over the state and scores of Future Homemakers of America, national organization of pupils studying homemaking in junior and senior high schools, find the camp a place for learning and recreation.

The FFA took over the camp through an arrangement with the Iron Range Resources and Rehabilitation Commission which provided funds totaling a little over $12,000 to enlarge and improve the camp for youth activities.

State Guides Camp

The board of trustees for the state FFA camp is drawn from the vocational division of the state department of education.

Objectives of the camp are to develop wholesome outdoor educational activities.

The camp is skillfully staffed and programmed to develop self reliance, sportsmanship, cooperation, service, thrift, leadership and intelligent use of camp opportunities. It provides group living experiences, opportunities for social adjustment, group activity, useful citizenship, patriotism and cooperative effort and fellowship among boys and girls.

First owned by the Range Auto Club, the camp was operated by the Virginia Fire Department Relief Association for a time, and later by St. Louis county rural schools. The St. Louis county board of education transferred the property to the state in 1950.

The camp is now considered one of the best equipped camps of its kind in the state. It now operates independently of the Iron Range Resources and Rehabilitation Commission, the state having leased the property to the Future Farmers of America. The FFA, under supervision of the state department of education, operates the camp on a self-sustaining basis.

Through the camp, the FFA offers vocational training to some 600 boys and young men during the summer months. The training is related to farm forestry, conservation and leadership. Included are:

Tree identification, tree planting, care and improvement of farm woodlots, wildlife conservation, making timber estimates, scaling of wood products, forest mapping, soil management and soil erosion control.

Forest engineering, practical work with instruments and tools used in farm woodlot management, prevention and control of forest fires, establishing windbreak, establishing farm woodlots.

Keep Minnesota Green activities, game management, fish management, guided field trips, demonstrations and leadership training session. The program is under direction of a camp counselor.

The state department of education uses the camp during the school year for various conferences, such as meetings for agriculture, trade, industrial, homemaking and business teachers.

Hopes Still High for Peat

Minnesota's struggle to make profitable commercial use of its seven million acres of peat has gone on for more than 75 years. Results have been discouraging. For the last two years the Floodwood experimental plant has been idle. The state built the plant in 1945, spending about $203,000. John Whitney operated the plant until December, 1950, when he gave up the project. Later, Whitney's claim of $98,000 against the state was settled for $50,000. He said the money was due him for machinery and land and money invested in the plant.

Efforts were made to find a suitable operator to reopen the plant and interviews were held with several prospective individuals and firms. But they failed to stand the test of thorough investigation and those efforts failed to materialize.

New Ideas Studied

New possibilities, however, are being studied and hopes are still high that the state's peat bogs may yet produce new industry. Foreign nations, particularly Germany and Russia, have long made good use of peat. Progress on peat use in the United States has been practically negligible. One of the big factors is high labor costs.

Up to now Minnesota peat has been processed principally for poultry litter and nursery purposes. That has proved unprofitable because of foreign price competition.

So it appears that peat research and production in Minnesota may very well be aimed in another direction — using peat as a possible source for valuable chemicals.

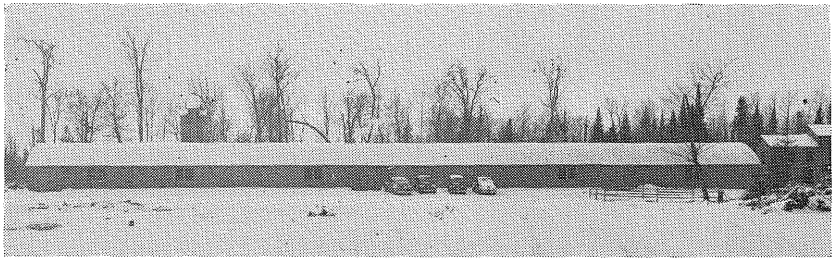
Chemical May Be Key

For instance, some scientists regard peat as an excellent source of cellulose, one of the most important raw materials in the world, in both war and peace. Cellulose is the basic material in rayon, paper, film, celluloid, explosives, plastics and a thousand other products.

Furthermore, experts note that the millions of tons of cellulose required each year in the manufacture of these products are decimating forests to an alarming extent.

Minnesota has about 60 per cent of all the peat lands in the United States. The industrial potentials are staggering. Drawing valuable chemicals from this vast untapped resource may be the key.

Will the Wheels Move Again?



FLOODWOOD PLANT: Under the snow, possible wealth from peat.

Hard Veneer from Aspen

The search goes on to find good uses for aspen, abundant softwood timber. Itasca county has vast stands of aspen (poplar). So, the Iron Range Resources and Rehabilitation Commission decided to help the Wolmac Company, Grand Rapids, experiment with the use of aspen in the making of veneers and plywoods. The company produces furniture-grade plywood and veneers from birch, elm and other hardwoods. It offered to prove the value of developing aspen into a high grade furniture wood.

The company received assistance in installing a $15,000 veneer dryer. Tests were made to determine whether aspen veneer can be properly dried and whether it can be shaped, sanded, turned, bored and mortised. The tests also were to determine its shrinkage qualities and its ability to absorb paint, stains and varnishes.

It was already known that the best aspen is produced in northern Minnesota. But it has never been fully utilized. It was not giving the farmer or the logger the return it should commercially.

Now, the tests have long passed the experimental stage, and the results have proved extremely profitable and encouraging for the area and the state as a whole.

For one thing, it allowed the company to hire some twenty new employees. It proved that aspen can and does make good commercial veneer. It enabled the company to pay the farmer and the logger prices for aspen that are in line with veneer grade prices for the other northern hardwoods, prices that are up to fifty per cent higher than ever before paid for aspen logs.

With the dryer in operation, the firm has found it is now in position to utilize aspen to its full potentiality, a resource that is only now beginning to show its full worth to the people of the area.

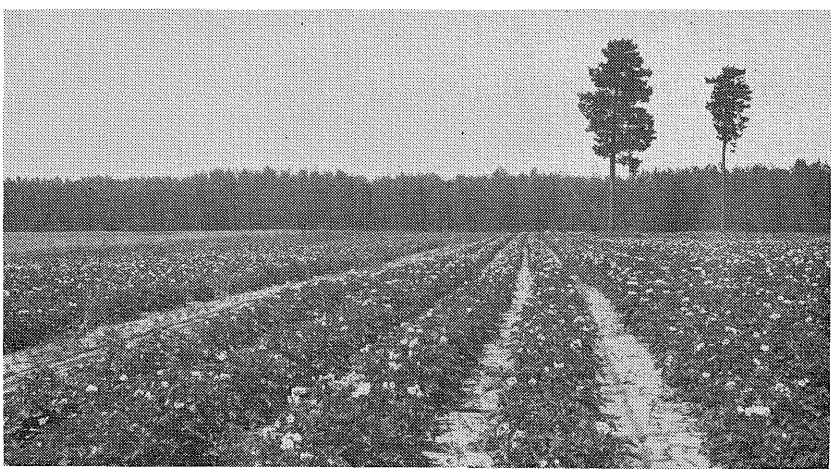
Among the firm's customers are some of the largest and finest furniture manufacturers in the United States. They have unconditionally accepted the use of aspen in their highest grade plywoods. The results of this acceptance will be felt more and more as the information spreads through industry.

Choice Potatoes

Many areas of the cut-over section of northern Minnesota are considered ideal for potato production. This is a part-time phase of farming that can well be expanded. It is now being done on a small scale by a few rural people while they still hold their jobs in the mines.

Seed potatoes from this area have a good reputation and the demand is usually greater than the supply. Efforts are being made to expand the acreage not only of seed but of table stock. Most of the market demand in this area is being supplied by shipments from the outside. As long as this situation exists there is justification for potato expansion.

Experimenting with Potatoes



THOSE HANDSOME blossoms are from a field of Cherokee potatoes. This is a new variety, first tried out in a trial plot on one of the Embarrass farms.

Berry and Fruit Possibilities

Work is progressing on efforts through this office to boost berry and fruit production in northern Minnesota and to further develop marketing methods. Minnesota already is the third largest grower of red raspberries and the Arrowhead region is one of the most promising sections of the state for increased production.

Railroad transportation facilities from Duluth to large terminal markets are good and the quality of the berries grown are unexcelled in competitive markets.

Furthermore, the crop matures very late and at present has little competition in its season from other berry producing regions. Commercial small fruit production was initiated because this industry appears to be particularly promising in this area.

Plants in Demand

Strawberry production is encouraged because tests showed much of the soil is unsuitable for growing raspberries. It was found to be excellent for strawberries.

In 1951 and 1952 the sale of strawberries amounted to more than $8,000 and all of the commercial plantings have been inspected and certified for plant sale.

In 1952 growers sold over 60,000 plants for from $18 to $24 a thousand. More than 200,000 plants should be available for sale in the spring of 1953, in addition to plentiful home berry crop production.

Investigation showed that raspberry production is unsatisfactory in many cases because of unsuitable planting sites, infected plant stock, inadequate winter protection, unsuitable varieties and unwise planting.

Ideal Soil Sought

Tests indicated that raspberry fields with good production records are found only on sites that have no impervious layer of sub-soil in the area normally occupied by the root system, or in soil with good drainage.

In 1945 raspberry production totaled only 500 crates. In 1950 and 1951 this was increased to more than 2,000 crates. In 1952, severe winter damage cut production to 1,000 crates. The price per crate has advanced from $5.25 in 1945 to $8.75 in 1952.

The short season in northern Minnesota limits the growing of tree fruits commercially, but there are early maturing varieties of apples and crab apples that can be grown successfully for home use.

Wood Processing

An experimental plant in Deer River is attempting to show that small lumber producers in northeastern Minnesota can again produce and market fine quality and true grade lumber. The plant was built in 1947 and the Burns Manufacturing Company of Aitkin holds a contract to operate the plant. Results of the experiment have not been fully determined.

Transferred Funds

Certain funds of the Iron Range Resources and Rehabilitation Commission were earmarked for specific projects by direct legislative action. Among them were:

A detailed study of the whole system of taxing iron ore by a legislative interim commission, whose membership was set up on a bi-partisan basis to enable the project to be considered without political implications.

Research by the University of Minnesota and divisions of the conservation department on the possibilities of utilizing enormous deposits of manganiferous and low grade (taconite) iron ores.

IRON RANGE RESOURCES AND REHABILITATION

Expenditures by Projects

PROJECT	1950 - 1951	1951 - 1952
Administration	$ 40,687.37	$ 30,501.42
Agricultural:		
Legume Seed Investigations		35,000.00
Seed Potatoes	21.54	89.25
Small Fruit	4,095.56	4,922.29
Arrowhead Canning Co., Grand Rapids, Minn. (Rutabaga canning)	64,757.95	
Chun King Sales, Inc., Duluth, Minn. (Chinese-American foods)	199,983.30	
Forestry Development	95,714.48	132,813.60
Nursery Project-transfer to Div. of Forestry		35,000.00
Future Farmers of America Camp, Lake Arrowhead	197.33	12,180.46
Iron Powder Plant, Aurora, Minn.	13,275.52	3,134.00
Peat Processing Plant, Floodwood, Minn.		2,073.37
Peat Research Plant, Chisholm, Minn.	8,748.33	
Rehabilitation Center Survey	1,479.98	
U. S. Geological Survey—Topographic Mapping	30,000.00	30,000.00
U. S. Geological Survey—Water Investigations	1,750.00	4,950.00
Vocational Trade School Survey		1,008.10
Wood Processing Plant, Deer River, Minn.	565.59	
Wolmac Company, Grand Rapids, Minn.	15,000.00	
TOTAL EXPENDITURES	$476,276.95	$291,672.49

Transfers Out:

University of Minnesota (Beneficiation of manganiferous and low-grade ores)	$ 75,000.00	$ 80,000.00
Conservation Department:		
Forestry Division		200,000.00
Lands & Minerals:		
Testing low-grade ore	36,400.00	35,861.00
Other		17,689.00
Waters Division		6,060.00
General Revenue Fund:		
Recovery of receipts credited to IRRRC from its inception to 6-30-50	96,015.17	
Legislative Claims	140,335.62	
Interim Committees Commission on Taxation of Iron Ore		150,000.00
TOTAL TRANSFERS OUT	$347,750.79	$489,610.00

IRON RANGE RESOURCES AND REHABILITATION

Receipts

PROJECT	1950 - 1951	1951 - 1952
5% of Occupational Tax on Iron Ore	$855,568.32	$1,199,834.72

Transfers In:

Conservation Department:		
Lands & Minerals (Unobligated balance of appropriation transfer made in year 1949-50 for testing low-grade ore)		6,008.56
Lands & Minerals (Unobligated balance of appropriation transfer made in year 1950-51 for testing low-grade ore)		6,087.37
Legislative Claims (Unobligated balance of transfer out during year 1950-51)		50,250.00
TOTAL RECEIPTS	$855,568.32	$1,262,180.65
Receipts from IRRRC projects credited to the General Revenue Fund	$ 36,881.04	$ 42,561.37

Breakdown of Receipts

Arrowhead Canning Company, Grand Rapids, Minn. (Rutabaga canning)		$ 875.00
Arrowhead Seed Growers Coop., Cook, Minn. (Warehouse)		1,000.00
Burns Manufacturing Co., Deer River, Minn. (Wood processing plant)	$ 33.53	524.64
Chun King Sales, Inc., Duluth, Minn. (Chinese-American foods)		6,000.00
Forestry Development (Rental of tree planting machine)		2.00
Milkhouses	97.51	347.25
Superior Wood Products, Inc., Duluth (Hardboard manufacturers)	36,750.00	33,687.50
Wolmac Company, Grand Rapids, Minn. (Veneer dryer)		124.98
TOTAL RECEIPTS CREDITED TO GENERAL REVENUE FUND	$ 36,881.04	$ 42,561.37