

SESSION 1

18th Meeting of Meat Research Workers
University of Guelph
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CANADA'S MEAT INDUSTRY
F.W. Chalmers

Mr. Chairman, distinguished scientists, ladies and gentlemen :
I would like to add my words of greeting to you, and
particularly to extend to those of you from outside Canada
a warm welcome to our country.

After reading the program for this week's meeting, I am sure
you have a good deal of work ahead of you but I hope at the
same time you will find many opportunities to enjoy yourselves
not only as scientists working with your colleagues, but
simply as friends and visitors.

In accepting the privilege of speaking to you this morning,
I have clearly been instructed by Dr. Rubin, your Chairman,
not to talk science to scientists but to address you from
a business point of view.

I will be talking about Canada's Meat Industry, but before doing so I thought you might be a little interested in the geography of Canada and the people who live here.

Almost invariably when I visit another country, I am asked not only about business but also about the size of Canada, the climate, our standards of living and problems of serving a small population spread over a large area.

We have prepared slides of several maps of Canada, the first of which is a map of our total country. (Slide I)

Size of Canada

The total land area of Canada is 3,560,000 square miles consisting of :

Occupied agricultural land			
Improved	169,000	sq. miles	
Unimproved	<u>103,000</u>	"	"
	272,000	"	"
Forest and other lands	<u>3,288,000</u>	"	"
	<u>3,560,000</u>	"	"

On the next map, Slide II, we have cut off the top of Canada, not because we think it no longer belongs to us but merely for convenience of illustration.

Although Canada is divided politically into 10 Provinces and 2 Territories, you will note we have divided our country into 5 main segments :

1. Yukon and Northwest Territories; sparsely settled with no occupied agricultural land.
2. British Columbia; in which is located the Rocky Mountain range and where little grain or livestock is produced.
3. Alberta, Saskatchewan and Manitoba; great grain and livestock production areas.
4. Ontario and Quebec; important livestock areas and the most heavily populated section of our country.
5. The Maritimes (Nova Scotia, New Brunswick, Prince Edward Island, and Newfoundland); an area of relatively small livestock production.

Slide III shows the "total land area" and also (in brackets) the "occupied agricultural land area" for each segment, as follows :

<u>Area</u>	<u>Total Land Area</u>	<u>Occupied Agricultural Land</u>
1 Yukon and Northwest Territories	1,459,000 sq.mi.	9 sq. miles
2 British Columbia	359,000 " "	8,269 " "
3 Alberta, Saskatchewan and Manitoba	681,000 " "	208,556 " "
4 Ontario and Quebec	868,000 " "	47,987 " "
5 Maritimes	<u>193,000 " "</u>	<u>7,249 " "</u>
	<u>3,560,000 sq.mi.</u>	<u>272,070 sq. miles</u>

As an indication of the breadth of our country, you will notice the distance between the City of Vancouver on the West Coast and the City of Halifax on the East Coast is 2,788 miles as the crow flies. However, since not many of our cattle or hogs, or much of our beef and pork, is travelling Air Canada yet, I have shown the distance by rail - 3,754 miles.

I am not really trying to impress you with the size of our country, but rather to suggest it does present problems in serving a few people over a wide area.

Population

Slide IV shows the "distribution" of our population as follows :

<u>Area</u>		<u>Human</u> <u>Population</u>	<u>% By</u> <u>Areas</u>
1	Yukon and N.W.T.	55,000	.3%
2	British Columbia	2,227,000	10.7%
3	Alta. - Sask. - Man.	3,552,000	16.4%
4	Ontario - Quebec	13,824,000	63.1%
5	Maritimes	<u>2,073,000</u>	<u>9.5%</u>
		<u>21,731,000</u>	<u>100.0%</u>

Later in this paper I will show that the three prairie provinces in Western Canada (Alberta, Saskatchewan and Manitoba) where 16.4% of Canada's population is located produces the bulk of our grains and 51% of our livestock.

Climate

First, however, I should like to show you another outline map of Canada related to our climate (Slide V).

The figures on this map show the mean temperature ($^{\circ}$ Centigrade) for January and July in various locations across Canada (starting from the City of Vancouver on the West Coast) and in addition, the highest and lowest recorded temperatures.

You will note we have some areas where the temperature is quite cold in the winter (particularly in the Prairie

Provinces; Alberta (-14.1), Saskatchewan (-16.9),
Manitoba (-17.1).

The details by areas are shown in a chart in my paper
but I will not take up your time by reading them.

	Temperatures			
	Mean	Mean	Record	Record
	<u>Jan.</u>	<u>July</u>	<u>High</u>	<u>Low</u>
Vancouver, British Columbia	2.9°	17.7°	33.3°	-17.8°
Edmonton, Alberta	-14.1°	17.3°	37.2°	-49.4°
Regina, Saskatchewan	-16.9°	19.3°	43.8°	-48.9°
Winnipeg, Manitoba	-17.7°	20.2°	42.2°	-47.8°
Toronto, Ontario	- 3.9°	21.9°	40.6°	-32.8°
Montreal, Quebec	- 8.7°	21.6°	36.1°	-34.9°
Halifax, Nova Scotia	- 3.3°	18.5°	37.2°	-29.4°

I am not sure of the significance of these figures.

(You might draw one conclusion: in Winnipeg, with a
January mean temperature of -17.7° and a record low of
-47.8° you are unlikely to find many girls wearing mini-
skirts or bikinis in January.)

You might also suspect that with the low winter temperatures
in the Western provinces, livestock production could be
limited; but as we shall see in a few moments, this is
certainly not the case.

Grain Production

The next map, Slide VI, shows grain production (1969) in our major grain producing areas.

Further detail is shown in my paper. I will not read it all but merely mention the figures for the Prairies and for the provinces of Ontario and Quebec.

Grain Production (000's Metric tons)	<u>Area 3</u>	<u>Area 4</u>	<u>Areas 2 & 5</u>	<u>Total</u>
	Alberta Saskatchewan Manitoba	Ontario Quebec	B.C. Maritimes	
Wheat	18,103	417	108	18,628
Oats	4,289	1,252	188	5,729
Barley	7,731	362	147	8,240
Mixed Grains	534	1,000	91	1,625
Shelled Corn	2	1,863	-	1,865
Fodder Corn	161	7,324	191	7,676

You will note that the three Prairie provinces, Alberta, Saskatchewan and Manitoba (Area 3), produced in 1969 :

97% of our wheat
75% of our oats
94% of our barley

All of our shelled corn and practically all of our fodder corn is produced in the Eastern Provinces of Ontario and Quebec (Area 4).

In the foregoing, I have endeavoured to show that :

- (a) Only a small portion of our land area consists of occupied agricultural land, a large percentage of which is located in Western Canada.
- (b) Almost three-quarters of our population resides in Eastern Canada. (Areas 4 and 5)
- (c) The Western provinces produce very large quantities of grain and a high percentage of Canada's total grain production.

Livestock Production

The next, and last, map (Slide VII) shows the percentage of our livestock production in each area, compared to the percentage of our population residing in each area. Again, I will not read the figures but have listed the detail.

	%	%
	Livestock Production	Population
	<u>By Areas</u>	<u>By Areas</u>
1. Yukon & N.W.T.	-	.3%
2. British Columbia	1%	10.7%
3. Alta., Sask., Man.	51%	16.4%
4. Ontario, Quebec	46%	63.1%
5. Maritimes	<u>2%</u>	<u>9.5%</u>
	100%	100.0%
	—	—

More than one-half of our livestock is produced in the three Western Provinces where less than one-fifth of our consuming population is located.

The size of our country presents transportation problems of considerable magnitude.

We do move livestock from the areas of production to where it is processed and later to where it is consumed. However, economics dictate that processing should be done as close to the source of supply and should be as complete as possible to minimize transportation costs.

Consequently, in recent years there has been a marked trend to the construction of processing plants in the West.

Development of Canada's Meat Industry

Canada is a relatively young country. We celebrated the 100th Anniversary of Canada's Confederation in 1967.

The first recorded permanent settlement in the country which is now Canada was established at Port Royal (now Annapolis), Nova Scotia, in 1605.

The first real farmer in Canada is said to have been Louis Hebert, who started farming in 1617 on the site of what is now Quebec City and where a monument is erected to him.

With abundant land, suitable climate, and year round demand for meat, it was inevitable that Canada would become a large scale meat producing and consuming country.

One of my associates, Mr. W.W. Lasby, in addressing the 47th Annual Meeting of the Meat Packers Council of Canada in 1967 pointed out that in the early years, cattle, sheep, hogs and poultry were imported by the settlers, principally from France and Great Britain. As the country grew and expanded to Western Canada, in the 1870's, Canadian explorers met up with the Texas Longhorns that had been driven up from the Southern United States. He also pointed out that the whole growth of our commercial meat packing and processing industry actively began at about the time of Canada's Confederation in 1867. It is interesting that two mechanical inventions made possible the development of meat packing plants.

These were the invention of mechanical refrigeration and the invention of the refrigerated railway car using natural ice as a refrigerant.

In 1858 Prof. A.C. Twining, an American, developed the first ice making machine. In 1859, Dr. James Harrison of Australia developed refrigeration equipment for vessels.

The application of mechanical refrigeration to the packinghouse started around 1885 but got the big impetus in 1890 when there was a tremendous shortage of natural ice in the Chicago area and the packinghouses in the United States became convinced that it was necessary to make a large outlay of capital for mechanical refrigeration.

These developments reversed the principles that had been used previously in fresh meat supplies. Formerly, the animals had to be transported close to the point of consumption. With these new developments, the packing plants moved back near the source of production, and dressed meat, held by refrigeration in good condition, was transported in refrigerator cars and ships and transferred into refrigerated storage at points where it was required for consumption.

With the development of mechanical refrigeration, it was also possible to prevent the rapid deterioration of meats and meat by-products and this gave the new industry a

tremendous opportunity to seek out better utilization of all the by-products from the animals.

A third early and important invention in the late 19th century that allowed large scale operations to develop, was the continuous chain operation for hog slaughter. This technique was later used by the motor car industry on their assembly lines. For hogs the process involves disassembly - for automobiles, assembly.

Primarily, the Canadian meat industry represents native enterprise developed and operated by Canadians. There are a few exceptions.

Many of the prominent Canadian meat packing businesses today had their origins with a self-motivating individual who started as an "entrepreneur", a butcher, sausage maker, or wholesaler, and by his own ability accumulated capital for expansion into a more complete operation.

In my address to you this morning, I have quoted and will be quoting statistics which have been prepared by the Meat Packers Council of Canada. I understand that each of you will receive two pamphlets prepared by the Meat Packers Council entitled "Meat - Canada's Largest Food

Industry" and "Canada's Meat Industry".

You will find in one of these pamphlets a description of the functions of the Council and you will note that this national trade association serves as a co-ordinating link between producer, processor, and consumer in order to foster a better meat industry.

Meat - Canada's Largest Food Industry

MEAT is Canada's largest food industry. Meat slaughtering and processing ranks third in volume of sales among 40 odd leading manufacturing groups, being only exceeded by Motor Vehicle Manufacturing and the Pulp and Paper industries.

I have frequently been asked what kind of meat slaughtering and processing plants we have in Canada. Do they operate under inspection? Are they integrated with the producers, wholesalers, and retailers?

Meat inspection of a type began in Canada many years ago. It is recorded that in 1707 the first public health laws were enacted in our country (160 years before we became a nation). At that early date in our industry, it was recognized that animal protein is not only a nutritious

food, but also an excellent media for micro-organisms. Under the law in that year, no butcher could slaughter an animal without first informing the King's Officer who was responsible for carrying out inspection at time of slaughter.

Federal meat inspection, however, as such was established in 1907 and is mandatory for all plants shipping across provincial boundaries and engaging in foreign trade.

We have in Canada almost 1,000 plants handling meat :

Federally inspected plants slaughtering livestock and/or processing meat	300
Registered tenants (Processing under Inspection)	66
Plants under Provincial Inspection (mainly slaughtering)	330
Other plants, with no resident Inspector, but with varying degrees of oversight	<u>300</u>
	996
	—

The core of Canada's slaughtering and meat processing industry consists of plants operating under Federal inspection.

The following table shows the estimated percentages of the total Canadian slaughter carried out in the 300 Federally Inspected plants (1971) :

Cattle	84%
Hogs	84%
Calves	61%
Sheep & Lambs	46%

Of the balance of the commercial slaughter, a substantial portion is now covered by Provincial Inspection systems operated by the provinces or under contract with the Federal Inspection Service.

I am not going to dwell on the obvious importance of meat inspection. You as scientists, probably more than any other group, recognize the vital service inspection provides as a safeguard for the consuming public.

What about the types of meat processing plants in Canada? These range from -

single slaughter plants handling one species of animal, to

multiple plants which slaughter livestock, sell fresh and frozen meats, cured, smoked

cooked and canned meats; which operate lard, shortening and oil refineries, and which process part or all of the by-products.

In between the above two types are specialized plants processing a wide range of cured, smoked and cooked meats and plants which produce portion controlled and special cuts for the rapidly growing Hotel, Restaurant and Institution business. Other specialized plants produce such items as fine chemicals, pharmaceuticals and leather.

The degree to which we have specialized processing plants in Canada is somewhat less than across the border in the United States. We are serving an area as wide as the United States, but they have approximately ten times Canada's population.

The full-line packing plants in Canada still comprise a key segment of our industry as it relates to pork products. However, as cattle feeding has grown and become concentrated in certain areas straight beef plants of a substantial size are being put into operation.

I have already said that meat slaughtering and processing is Canada's largest Food Industry and stands only behind Auto Production and the Pulp and Paper Industry in dollar volume among our leading manufacturing groups.

We are not the heaviest meat eaters in the world. Per capita consumption of meat in various countries for the calendar year 1970 was :

	Calendar Year 1970 (lb. per capita)			<u>Total</u>
	<u>Beef & Veal</u>	<u>Pork</u>	<u>Mutton & Lamb</u>	
New Zealand	114	28	88	230
Argentina	176	18	10	204
Australia	89	30	82	201
United States	117	66	3	186
Uruguay	133	17	46	196
Canada	90	57	4	151
United Kingdom	55	61	22	138
West Germany	55	85	1	141
Denmark	46	88	1	135

In the past two decades our commercial production of cattle, hogs, sheep and lambs has been processed and sold principally to Canadian customers - but not entirely.

Figures for 1971 show Canada's meat production and consumption as follows : (in millions of pounds)

	<u>Produced</u>	<u>Eaten</u>
Beef	1,837	1,884
Veal	93	94
Pork	1,511	1,428
Mutton & Lamb	19	72

What these figures do not reveal is that Canada is both an exporter and an importer of beef and pork.

Last year we exported about 5% of our beef production and about 11% of our pork production.

Since the early days of our packinghouse industry, export markets have been an important outlet for Canadian products. It is recorded that when Mr. William Davies set up what amounted to Canada's first meat packing plant in 1861 in Toronto and equipped it with facilities for slaughtering hogs, curing pork, and processing pork products, he had his eye on the British market, and it was largely through his efforts that Canadian bacon and pork products became widely known in Great Britain.

From 1932 until the end of 1950 the major Canadian export market was the United Kingdom. Canadian hog products,

largely in the form of Wilshire sides, had a preferred position in the British bacon trade. This trade was based on a series of agreements which were terminated in 1950.

Since the end of the British trade, the United States because of its proximity to us, with its enormous population and ability to consume meats, has been the major foreign market for Canadian pork.

However, if we are to develop a livestock and meat industry that will produce beyond our own requirements, we recognize we will have to work diligently to develop our export markets not only in the United States, but elsewhere.

A great deal of work is already underway in this regard.

Representatives of Canada's meat team including producer groups, processors, and government are currently engaged in developing business in many countries around the world, such as Japan, Taiwan, Hong Kong, Singapore, China, the United Kingdom, France, Germany, the Scandinavian Countries, Poland, Italy, Spain, U.S., the Central and South American countries, the West Indies, Australia and New Zealand, on meat products and/or by-products of the meat industry.

Within the past couple of years, considerable activity has developed particularly on exports of pork from Canada to Japan.

Competition In The Industry

Now, returning to our Domestic Meat Industry, I would like to talk about Canada's total meat team; to explain how we operate in a highly competitive atmosphere and how this affects various segments of the industry as well as consumers.

I am including among the meat team :

Livestock Producers

Livestock Feeders

Marketing Agencies

Meat Slaughterers and Processors

Wholesalers and Retailers

Government

At the outset, I should say that the meat industry is not an integrated industry. For example, livestock feeders produce the livestock but, with the odd exception, do not process it.

Processors are not engaged to any substantial extent in producing livestock, nor in retailing meat.

Retailers (except to a very limited degree) do not process the meat they sell.

The meat industry in Canada has often been described as very competitive. I think this is an understatement.

In Canada, all segments of the industry do subscribe in practice to the principle of competition. This includes not only those directly involved in handling livestock and meat right through to the retailers who supply the consumers, but also includes our various governments who have a substantial effect through their legislative policies.

Competition in the industry starts right with the cattle feeder. The Eastern cattle feeder is located in an area where the climate and soil conditions are particularly suitable for raising corn fodder, corn grain and mixed grains. The Western cattle feeders on the prairies are located in an area where nature has favoured enormous production of wheat, oats and barley. These feeders located respectively in the

East and the West compete with each other (and with feeders in the United States) in bidding for cattle to go into their feedlots. This competition has forced the Western feeder to seek more efficient ways of converting feed wheat, oats and barley into meat on the hoof. Grains are handled with bulk loaders and conveyors in the feedlots; protein, mineral and vitamin supplements are added to improve feed conversion.

In the East, the discovery of feeding techniques using high moisture corn in air tight silos along with silage and supplements has been credited with keeping the Eastern feeder competitive with his counterpart in the West. Thousands of grain elevators have always been the skyscrapers of the prairies, but now the silos in the East with mechanized conveyor equipment have become the skyscrapers of rural Ontario.

The next competitive stage in the beef industry is on the public markets and in the feedlots. The cattle feeders sell their cattle to the highest bidder. This bidding takes various forms. Some feeders sell a portion or all of their cattle through public auction markets located at

central points. These market places perform an important function in establishing the market value of cattle. Other feeders sell their cattle by the process of receiving sealed bids with their livestock going to the highest bidder. Still other feeders sell their cattle by inviting buyers to come out and place a bid.

A moment ago I said that even the government subscribes to the principle of competition. Government marketing legislation has been established in several provinces of Canada which provides for hog producers to join together in their own marketing agencies where all the hogs produced in a province may be sold through their agency to the highest bidders. May I give you an example of the technique used in the province of Ontario for this process.

Hogs are shipped by producers to a number of collection points operated by the Ontario Hog Producers' Marketing Board, and are sold through a teletype system to processors in Ontario. A network of teletypes has been set up in the offices of the large pork processors, each with a machine connected to a teletype in the head office of the Ontario Hog Producers' Marketing Board. The Marketing Board starts

the sale by asking, over the teletype, a price it hopes to get for the hogs. If a pork processor wishes to purchase the hogs at that price, he pushes a button in his machine and the sale is completed. If no sale is made at the first asking price, then the price is reduced on a continuing basis until a processor pushes his button and makes a purchase.

The competitive system of selling and buying livestock forces a processor with a plant to operate to bid as much for livestock as he feels he possibly can in order to keep his plant operating and supply his customers. This is one force towards higher prices, but there is a counter-force towards lower prices, namely competition among the retailers for the consumer's business.

We estimate that approximately 65% to 70% of the meat sold in Canada direct to consumers is handled by large corporate and voluntary chains.

In the most heavily populated provinces of Canada, this percentage is perhaps 75 to 80% in Ontario and 55 to 60% in Quebec.

The chain stores have taken credit for contributing substantially to keeping food prices in Canada low. They point out that because of their large volume and efficiency of operation there are many economies which are finally reflected in lower consumer prices.

You may find it interesting to learn that in a publication by the Ontario Ministry of Agriculture and Food -

"The percentage of take-home pay the average Canadian spends on food is declining each year. While the percentage of take-home pay spent on food was 23.4% in 1961, by 1969 this percentage dropped to 18.8%."

This publication makes the point that Canadians spend a smaller share of income on food than most other countries in the world, and provides the following table showing the number of hours of work required to purchase the same food basket in several countries :

Country

Canada	5	hours
United States	5.9	"
United Kingdom	9.5	"
Belgium	12	"
France	18	"
Italy	24	"

The food basket referred to above is a 147 item food basket designed by the Ontario Food Council to represent the kinds of food purchased by the average consumer in Metropolitan Toronto and includes meat, poultry, fish, fruit and vegetables, cereals and miscellaneous items.

The Meat Packers Council reports that in the City of Toronto out of every \$100.00 of disposable income, between \$4.00 and \$5.50 is spent per family to buy meat and poultry products.

There is no doubt in my mind that competition among retailers has had an effect on consumer prices, but it has also provided a downward pressure on prices which packinghouse operators are able to obtain in the domestic market for meat products.

Concurrent with this, the operation of the large retailers has provided the packing plants with some economies. It

costs considerably less to call on one meat buyer who purchases his total company's requirements for all his stores, as contrasted to calling on individual stores to get meat orders.

It also costs less to deliver products in substantial quantities to central warehouses as contrasted with making small deliveries to individual stores.

The pressure of competition to buy livestock to keep plants operating and the pressure of competition to get a share of the large retailer's business does tend to "squeeze" the meat packing plants' margins of profit.

This forces the packing plants to become more efficient in their operations.

In a moment or two, I will mention a few of the steps taken by the Canadian meat industry to improve their operations.

However, before doing so, I should like to very briefly state what I feel are the prime objectives of our business.

1. The production of meat products that will not only provide nutritious food of good value,

well packaged to protect quality, but also to provide a wide variety of products to appeal to consumer tastes.

2. Having said that the meat processors' prime objective must be to fill consumers' requirements, we have in addition a responsibility to find markets for the meat products derived from the producers' livestock - and this includes markets both at home and abroad.
3. In the final analysis, we must operate in a manner which will produce adequate earnings to warrant and attract investment of capital; earnings which will attract to the industry high calibre management and which will provide a good standard of living for all those engaged in its activities.

Earnings in the meat industry in Canada can hardly be considered excessive, and in fact might be somewhat inadequate.

Published reports of Canadian companies involved in the meat processing industry show net profits after tax ranging from 1% to 2% of sales.

Recent published figures show profits for large retailers in the range of 1% of sales to 1-3/4% of sales.

In our meat industry, there is a continuing conflict of interest in meat prices.

Consumers naturally wish to buy food at as low prices as possible. Producers on the other hand, wish to sell livestock for as high prices as possible. In between, the processors and retailers expect a profit.

I do not think that this conflict will easily be resolved, and there is certainly a lot of room for co-operation between all segments of the industry to reach a reasonable balance.

In spite of problems that do exist, I feel there is developing a continually greater recognition among producer groups, processors, retailers, and consumer groups that we are each involved as part of the whole meat team.

Technical Contributions Of the Meat Industry

Before concluding my address to you this morning, I would like to spend a few minutes talking about Canadian technical contributions to the meat industry.

I will only mention a few to support my premise that while it used to be said the Packinghouse Industry preferred to operate along traditional lines and did not change quite as rapidly as others, this is no longer true.

Research in our Canadian industry was started in a serious way in the early days of the last war. The supply of Vitamin D₃ from fish oil had been cut off. Since chicks can utilize only Vitamin D₃ and no other form, our feed business and poultry industry was in danger. This forced us to look for another source and we adapted and developed a synthetic method of making this vitamin, based on cholesterol, a material found in brain and spinal cords of animals.

The production of Vitamin D₃ was a very successful project and it got Canadian research in the meat industry off to a good start.

Another example: I believe the continuous process for wieners developed in Canada in the mid-50's was the first of its kind on the continent. It would take some time to

describe how this, combined with computer formulation, has changed wiener production almost from an art to a science.

It does not take long to describe a major net effect. Using conventional processes of 20 years ago it would take 88 persons on the lines to produce wieners in one of our larger plants which we now produce with 10 persons.

Packaging operations have been revolutionized. One girl used to be able to package 300 pounds per hour by hand whereas now she can turn out 2,500 per hour with machines.

There are other areas in the Packinghouse Industry where substantial advances have been made.

Generally speaking, continuous processing gives important savings in labour and space and by and large can be counted on to produce a uniform product in a more sanitary fashion. This is one way of getting more out of the animal carcass. Highly mechanized hog dressing lines have been known for some time. For beef, the mechanized dressing line was first developed in Canada and has been adopted widely by the Industry, not only in Canada and the United States but around the world.

The first continuous rendering process was installed here about 15 years ago for rendering lard and similar processes have now spread throughout the industry. I am not really quite sure whether this was the first continuous process developed on the continent.

I said at the beginning of my address I was not going to talk science to scientists but allow me one aberration.

In talking about developments in the meat industry, I had an interesting discussion with your Chairman, Dr. Rubin, about one development which originates in New Zealand and which represents a distinct and unique contribution of meat science.

It deals with the phenomenon of cold shortening. When a muscle (beef or lamb) is excised and rapidly chilled before rigor mortis sets in, the muscle fibres shorten drastically and the meat becomes tough, sometimes to the point of inedibility. This can also happen with muscles attached to the carcass since they are not all maintained in the hanging carcass in a stretched configuration. In other words, they can cold shorten on rapid cooling. The toughening thus produced cannot be eliminated by traditional aging. About six years ago, a promising

trade in frozen lamb from New Zealand to the United States was halted because of excessive toughness. This was caused by very rapid cooling of the carcasses and, in fact, by exposing them to blast freezing while still in the pre-rigor position. In other words, this was a clear case of cold shortening, or perhaps thaw shortening. However, the scientists of the Meat Research Institute of New Zealand discovered this phenomenon a few years before, and were ready with a solution. A delay of a few hours before rapid chilling or freezing solved the problem and trade with the United States was resumed shortly thereafter.

Operations Research

Before leaving the subject of Canada's Meat Industry, I can hardly do so without mentioning the development of Operations Research within our industry.

Most decisions in business are based on the evaluation of very complex interacting variables. In addressing a conference of the Canadian Operational Research Society earlier this year, Mr. W.F. McLean, the President of our company, pointed out that judgment and experience,

which is largely used to arrive at these decisions, with inadequate data in hand, and inadequate time for analysis, is imperfect but nevertheless very important and will remain important. He further stated that careful quantitative analysis of the many factors which affect decision-making by Operations Research specialists and sometimes the use of computers to complete this analysis quickly enough, must logically improve the analysis of data or facts on which decisions are based, and thereby must logically improve the average quality of decisions.

Some years ago we started to explore whether we could give our front line managers some assistance in the analysis of their market environment, using computers and operations research techniques in order to give them a better basis for decisions. We have developed and implemented several model systems which now have become part of the managers' ordinary decision-making input.

For instance, we have models of the following sorts :

- formulation and blending for use in certain meat products such as wieners and other cooked meats
- inventory control
- short term operating planning systems, for example models of parts of our pork business which assist in optimising pricing, sales and production decisions in a very complex, multiple choice operation
- similar models of some of our beef business
- forecasting systems which attempt to improve forecasts of future livestock supplies
- some special studies of sales information systems, manufacturing yield control systems, and livestock grading systems.

. . .

. . .

I have attempted in the foregoing to tell you a little bit about the environment in which we live, about the scale of our largest food industry - Canada's Meat Industry; about where our meat is produced, how much we eat and how we operate in a competitive climate.

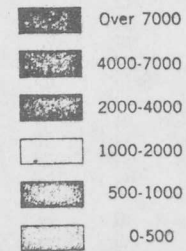
I understand that during the week you will have an opportunity to visit two packing plants and no doubt on these visits you will be able to see first hand much more than I have been able to tell you this morning.

Over the years, your contributions as meat research workers have not always been widely publicized but if here in Canada we feel the meat industry is making a substantial contribution to the welfare of our people, you can be sure that our performance has been immeasurably affected by your contributions to us.

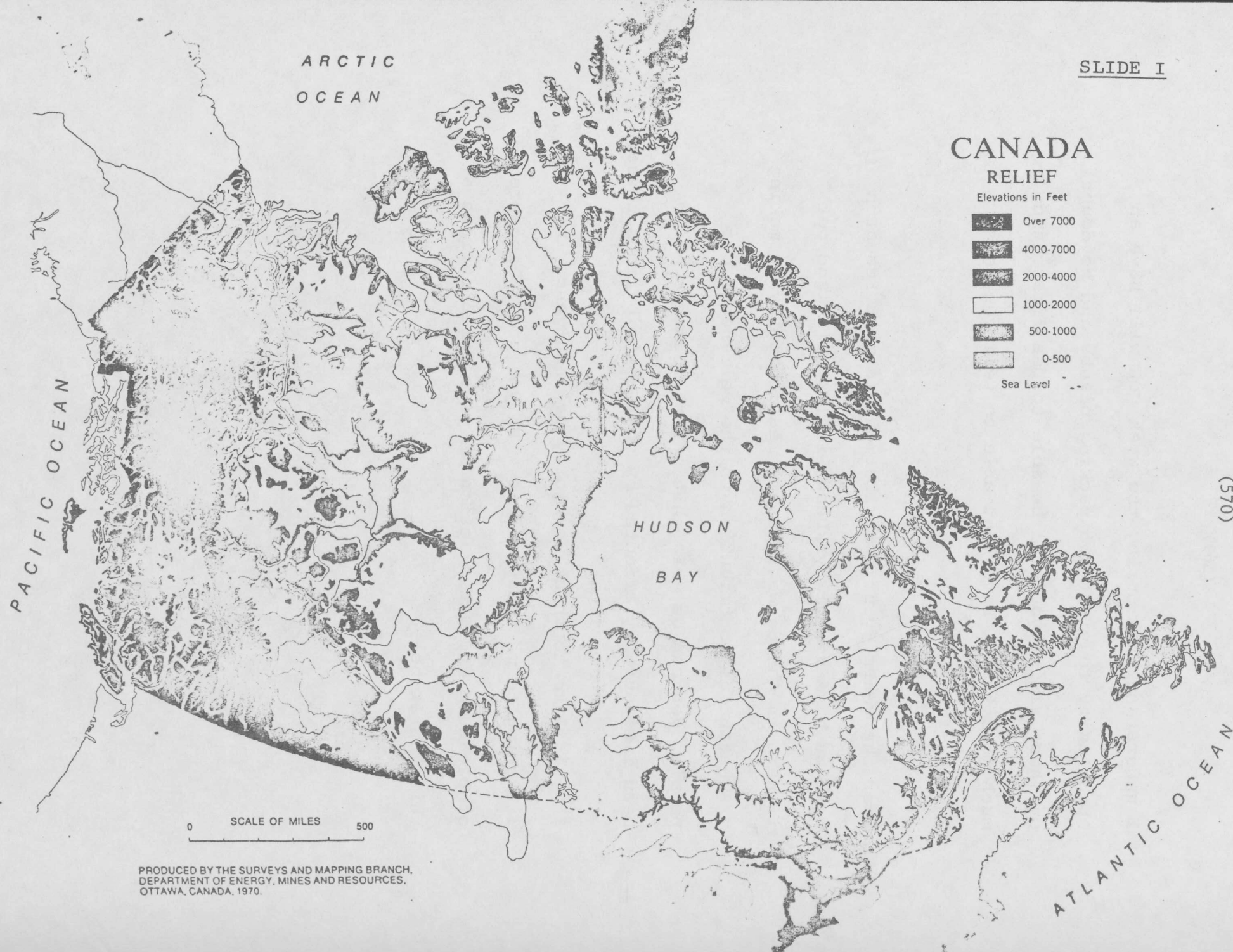
I would like to thank you for your indulgence in listening to me today and to wish you a full measure of pleasure and satisfaction in your deliberations at this Conference.

CANADA RELIEF

Elevations in Feet



Sea Level

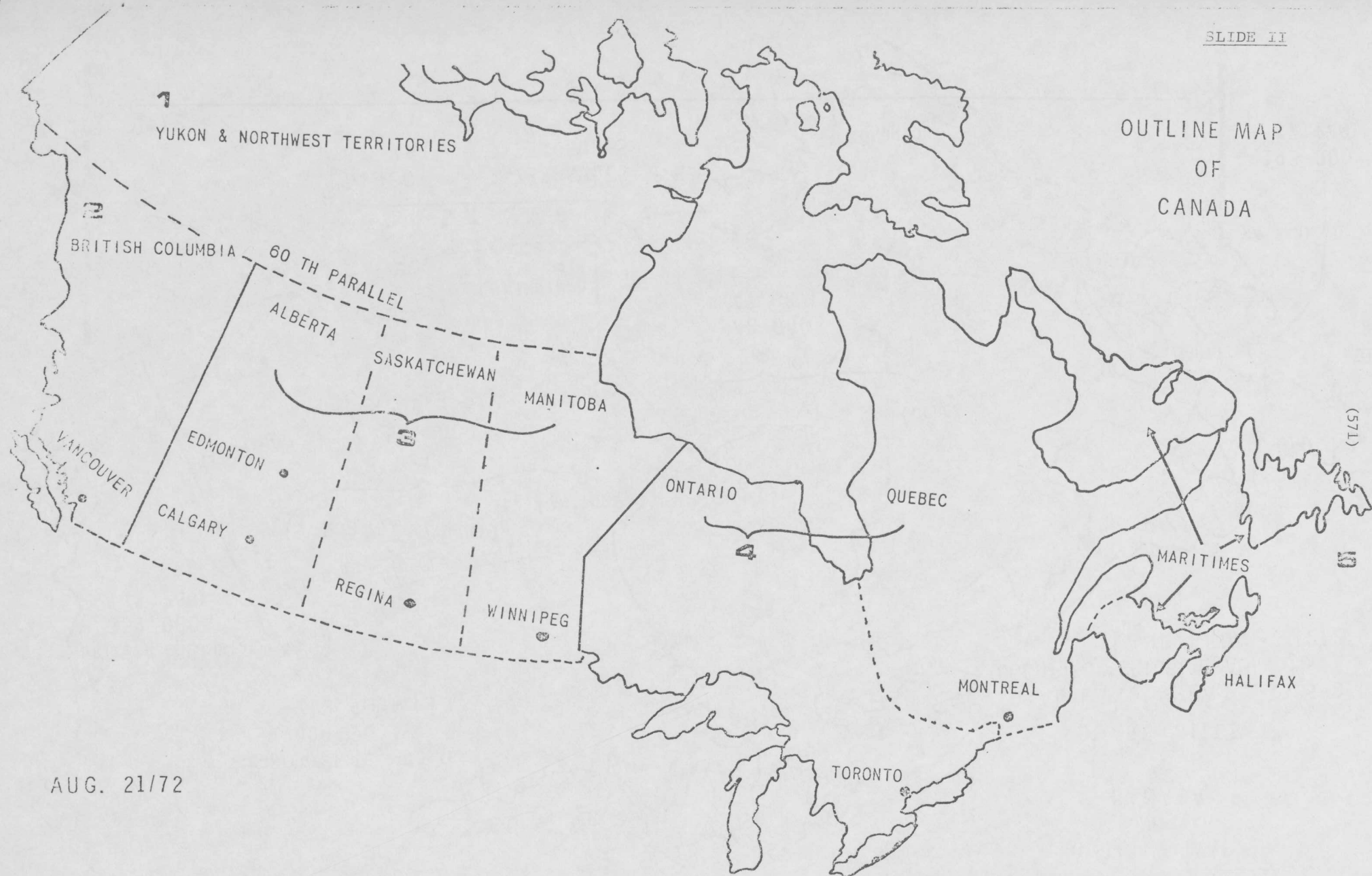


0 SCALE OF MILES 500

PRODUCED BY THE SURVEYS AND MAPPING BRANCH,
DEPARTMENT OF ENERGY, MINES AND RESOURCES,
OTTAWA, CANADA, 1970.

(570)

OUTLINE MAP
OF
CANADA

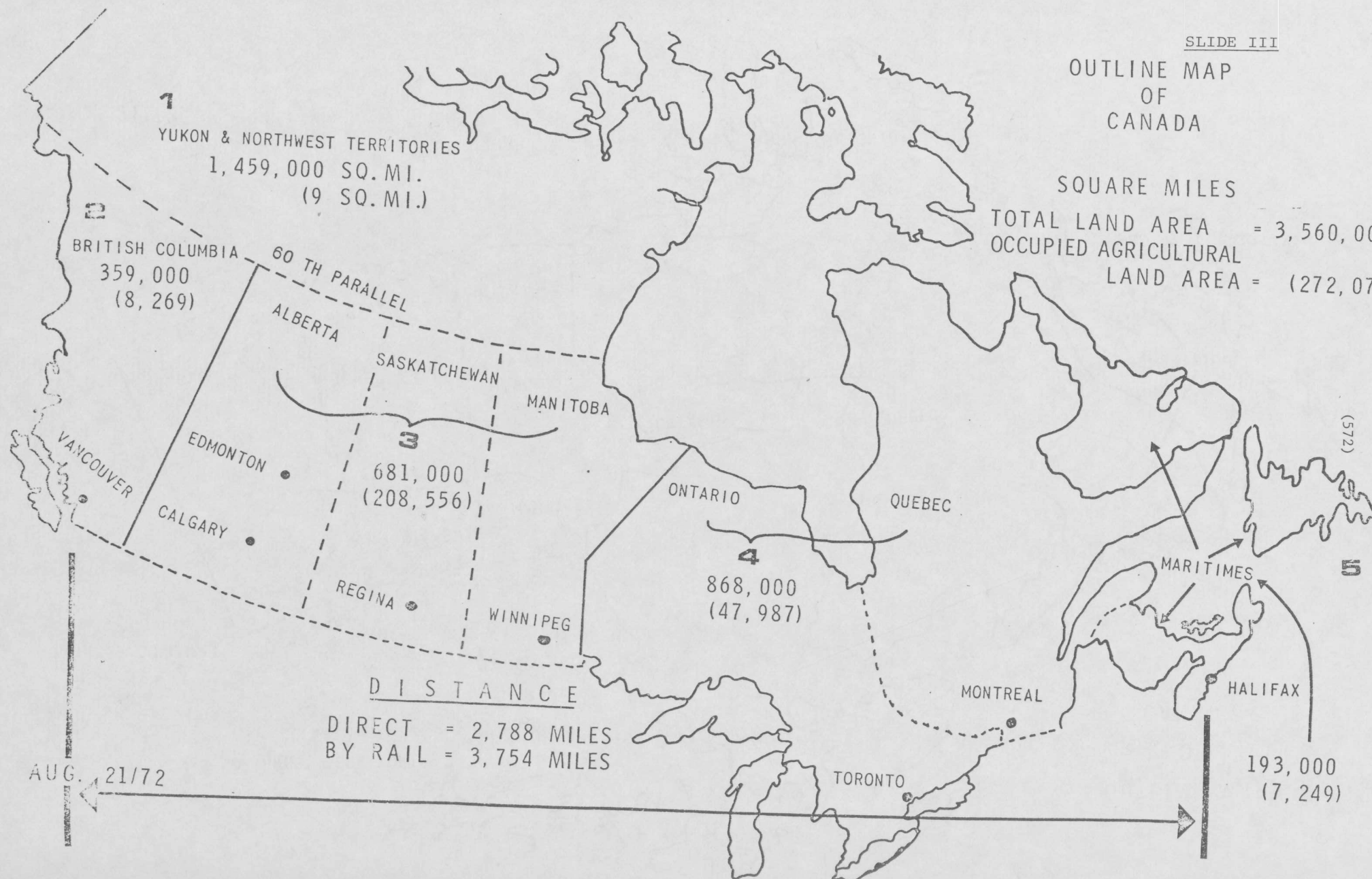


AUG. 21/72

SLIDE III

OUTLINE MAP
OF
CANADA

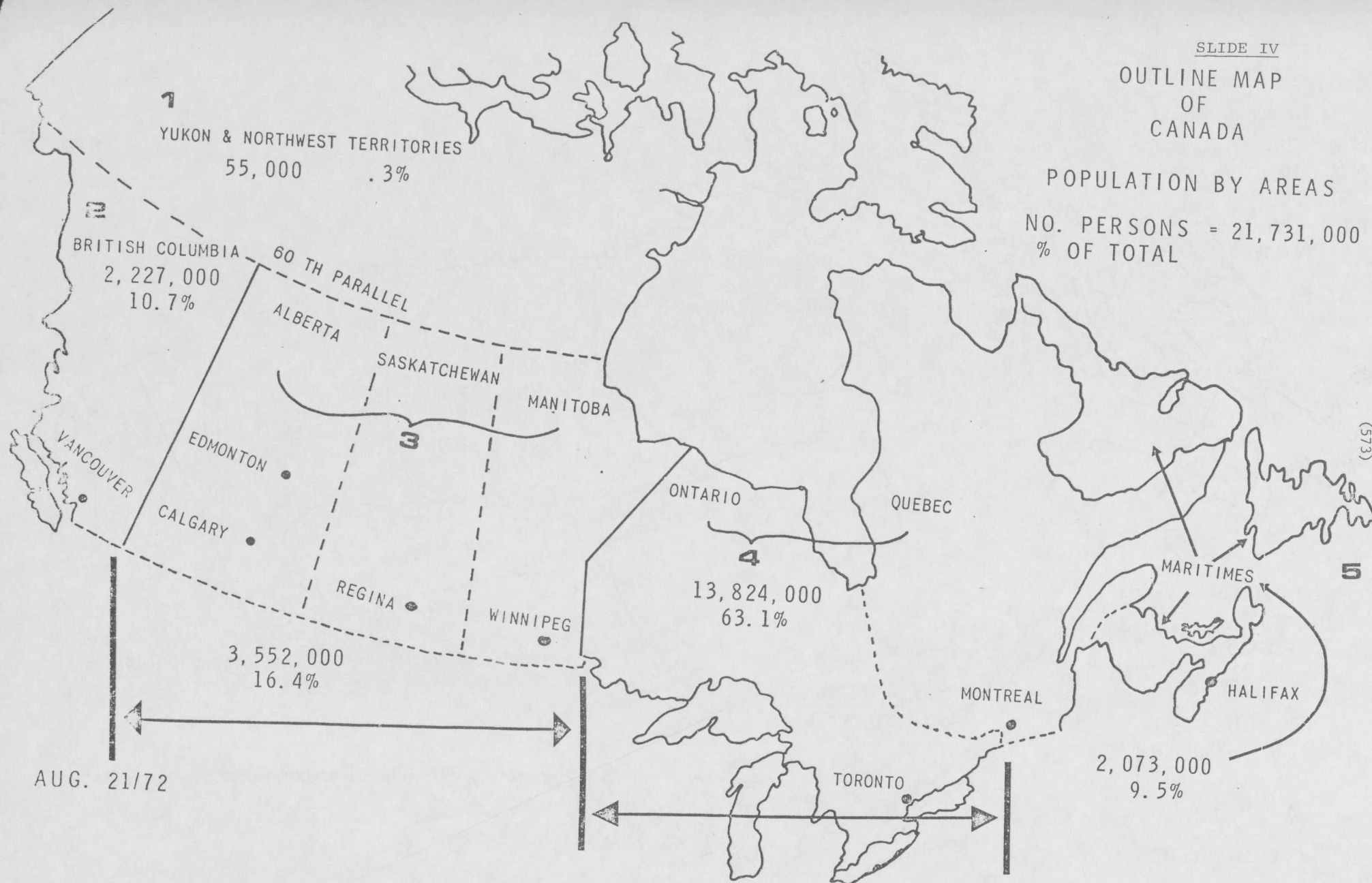
SQUARE MILES
TOTAL LAND AREA = 3,560,000
OCCUPIED AGRICULTURAL
LAND AREA = (272,070)



OUTLINE MAP
OF
CANADA

POPULATION BY AREAS

NO. PERSONS = 21,731,000
% OF TOTAL

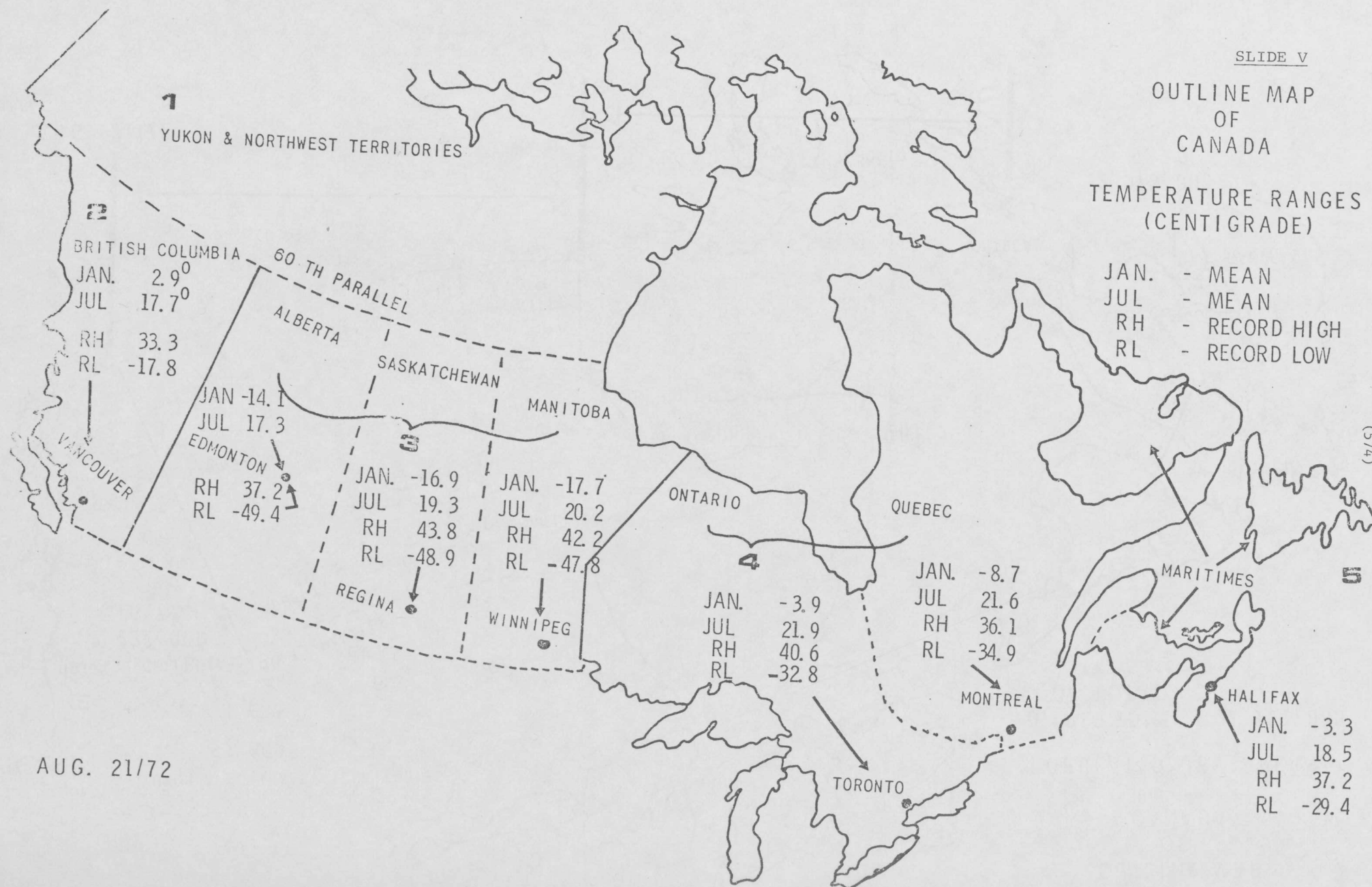


SLIDE V

OUTLINE MAP OF CANADA

TEMPERATURE RANGES
(CENTIGRADE)

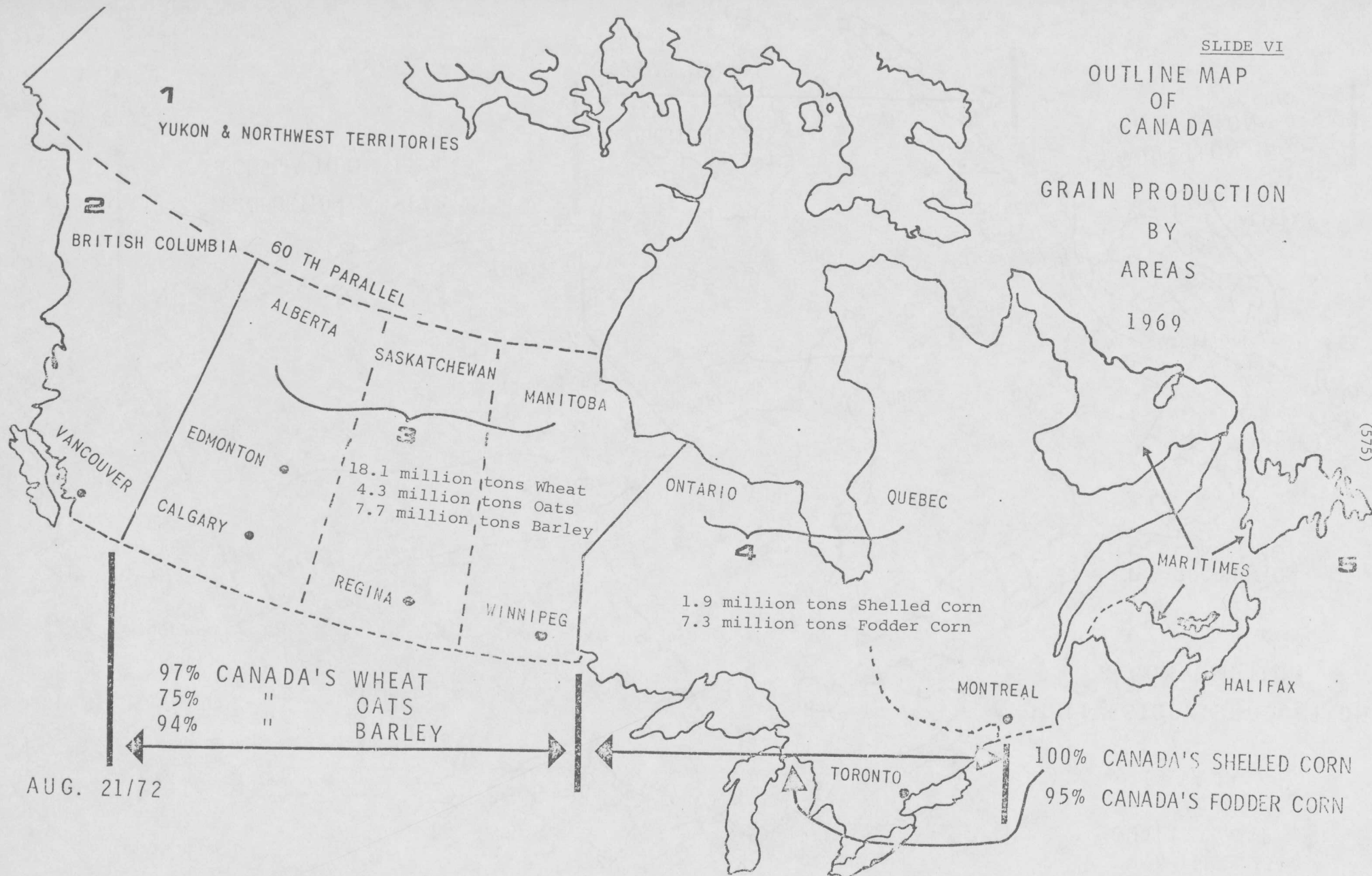
JAN. - MEAN
JUL - MEAN
RH - RECORD HIGH
RL - RECORD LOW



AUG. 21/72

OUTLINE MAP
OF
CANADA

GRAIN PRODUCTION
BY
AREAS
1969



SLIDE VII

OUTLINE MAP OF CANADA

% OF LIVESTOCK PRODUCTION
& CONSUMPTION

BY AREAS

P - PRODUCTION
C - CONSUMPTION

