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At the kind invitation of the Department of Industry, Trade and
Commerce and the Canadian National Millers Association I propose to
describe briefly some aspects of the newly created International
Development Research Centre, the organization which employs me.
In addition I should like to offer to you certain observations and
opinions concerning flour milling and other wheat product utilization
in ^{various} the developing regions of the world. At the outset I wish to record
and emphasize that all observations and opinions which I express are my
own and must not be attributed to the International Development Research
Centre, the Canadian International Development Agency or any other
Canadian or international ~~agency or~~ organization living or dead.

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TALK TO THE CANADIAN NATIONAL MILLERS ASSOCIATION

DEPARTMENT OF INDUSTRY - 11 MARCH 1971

I believe it was Winston Churchill who pointed out that most people use statistics as a drunken man uses a lamp-post: to lean upon rather than for illumination.

I fully realize the danger at this time in the afternoon of leaning heavily upon a statistical lamp-post. Nevertheless, if you will bear patiently with me, a few introductory statistics will provide a helpful introduction to my brief talk.

More than 50% of all the scientists who have ever lived are alive today. In fact, if the present trend line is extrapolated, we can predict that in less than 100 years there will be more scientists on earth than people.

Though the total Canadian expenditure on research and development exceeds 900 million dollars annually, it represents barely 1.5% of our gross national product and only 2% of the total research expenditures of 10 selected OECD countries which include the major western European nations, the USA and Japan. Nevertheless, in the realm of research as in the song "It Ain't What You Do It's The Way That You Do It". It is less significant how much we spend upon research than on what we spend it.

Of all the known scientific research 98%, is funded by costs is undertaken by the Western developed nations and only 2% by the less developed countries of the world. Of this total western world research effort 50% is spent on space, defence and nuclear research,

25% on industrial and economic research,

14% on health and welfare research,

10% on fundamental research and

less than 1% on research related to the problems of the undeveloped nations.

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The World Bank's recent Commission ~~lead~~ by our former Prime Minister, Mr. Pearson, recommended that developed nations such as Canada should devote at least 5% of their total research efforts directly to help the economic and social development of the less developed nations. In accordance with this recommendation the Government of Canada has created the International Development Research Centre. The IDRC was created by an Act of Parliament which received Royal Assent on 13 May 1970.

The IDRC is a Crown Corporation consisting of an International Board of Governors of which Mr. Pearson is the Chairman. 10 of the Governors are Canadians; 10 are from other countries; 1 each from the U.K., the USA, France and Australia; 2 from Africa, 2 from Asia, 1 from Latin America, and 1 from the Caribbean. Thus out of 21 Governors, 11 are Canadians. At the Centre's official opening, the Hon. Mitchell Sharp pointed out that no one knew better than Mr. Pearson the importance of having a majority even if ~~only~~ ^{only} a majority of one.

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The IDRC exists without precedent and parallel. At no time in recorded history has a sovereign government entrusted its affairs in similar manner to such an international Board as governs IDRC.

The objects of the Centre are:

"to initiate, encourage, support and conduct research into the problems of the developing regions of the world and into the means for applying and adapting scientific, technical and other knowledge to the economic and social advancement of those regions, and, in carrying out those objects.

- "(a) to enlist the talents of natural and social scientists and technologists of Canada and other countries;
- (b) to assist the developing regions to build up the research capabilities, the innovative skills and the institutions required to solve their problems;
- (c) to encourage generally the co-ordinations of the international development research; and

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(d) to foster cooperation in research on development problems
between the developed and developing regions for their
mutual benefit."

RENEW BALANCE 90:2

To achieve its objectives

Among ~~other activities~~ the Centre may:

- "(1) initiate and carry out research and technical development,
including the establishment and operation of any pilot plant
or project, to the point where the appropriate results of such
research and development can be applied, for the benefit of the LDC's.
- (2) support or assist research by governments, by international,
public or private organizations and agencies, or by individuals;
- (3) enter into contracts or agreements with governments, with
international, public or private organizations and agencies, or
with individuals;"

MOST FUNDS FROM GOVERNMENT: CAN RECEIVE INCOME FROM
PRIVATE AGENCIES.

The Centre's work force is organized into four programmes:

- ① Population and Health Sciences
- ② Social Resources
- ③ Information Sciences
- ④ Agriculture, Food and Nutrition Sciences

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Because the Centre has been in active existence for only a few
months, it is at present easier to discuss what we hope to do than
what we have already achieved. Our major concern, certainly within
the Agriculture, Food and Nutrition Sciences programme for which I
am responsible, will be for the economic and social welfare of rural
peoples: the small farming and fishing communities and those who
depend upon them. Because the ~~crops~~ Cereals grains and grain legumes provide more than 75% of the
energy and protein of these rural peoples of the less developed world,

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we propose to lay very heavy emphasis upon the cereal grains and grain legumes in our research programs. Our first major project will be to advance the development of the cereal grain Triticale.

Triticale is a unique cross between wheat and rye which was developed at the University of Manitoba. We hope to accelerate the development and utilization of triticale by means of a co-operative research programme between one or more Canadian universities and research organizations and the International Centre for Wheat and Maize Improvement in Mexico (^{SPANISH NAME} Centro Internacional de Mejoramiento de Maiz y Trigo) CIMMYT.

Triticale is proving to be an extraordinary grain. Though some varieties of wheat contain more than 20% protein, wheat protein is nutritionally inferior to animal proteins such as meat, fish, eggs and milk. In contrast the protein of certain species of triticale appears to be nutritionally equivalent to milk protein.

The International Centre CIMMYT in Mexico has gained an international reputation for its remarkable development of new wheat varieties. These short straw varieties are producing yields close to 100 bushels to the acre and are now being widely planted and tested in many countries of Latin America, Asia, and the Near East. ^{Africa} In consequence of their development, Mexico over the past 20 years has evolved from the status of a wheat importer to that of a wheat exporter. Pakistan expects soon to become self-sufficient in wheat production and many other countries in Asia, N. E., Africa and L. A. will unquestionably increase their cereal productivity by adaptation of these new high yielding wheat varieties. The objective of the IDRC-supported triticale project will be to develop a plant which will produce around 100 bushels to the acre and contain protein nutritionally equal to milk powder. The nutritional and economic advantages of blending such a grain with home grown or imported wheat varieties cannot be overemphasised.

cannot be over emphasized.

It is indeed unnecessary to emphasize to this audience the futility of developing new and improved cereal grains if simultaneously we do not give attention to the means by which they will be utilized. Consequently we are ^{supporting.} ~~starting~~ a programme of milling research and development which may ^{dramatically} ~~very well drastically~~ change milling technology throughout the developing world.

which are to be found in many African villages
If we exclude the small primitive rural grinders/ flour mills throughout the developing world are essentially replicas of those which operate ~~one finds~~ in Canada, the United States and most other developed countries. ^{it is fed by} Whether these rely largely upon imported or local wheats, the complex roller mill which is familiar to us is not ideally suited to the long term needs of the less developed world. In many of these countries what is required is a single straight grade flour with the bran, shorts, and germ being utilized locally in animal feeds. Because of the poor roads and transportation facilities which exist in many of the less developed countries one central flour mill cannot satisfactorily utilize all of the locally produced grains nor ^{adequately} ~~satisfactorily~~ supply the whole country with flour and animal feeds. ^{In many countries} it would be more efficient if the flour milling industry were decentralized and a series of smaller mills ^{OPERATED} ~~distributed~~ at strategic points throughout ~~the~~ the rural areas.

Decentralization of grain milling and the establishment of versatile
milling units at strategic points throughout the rural areas is the stated
policy of a number of Governments in Africa and may well become a familiar
practice in a great many developing countries. When I speak of versatility
I mean a mill equipped with machinery which is simple and inexpensive to
operate and capable with minimum engineering modification of milling not
only wheat but other cereals such as corn, millet, sorghum and possibly
oilseeds and grain legumes. The modern roller mill as we know it was not
designed to be versatile. Roller milling was the first fully mechanised
completely continuous food processing system to be devised and commercially
exploited. In common with all those other continuous food processing systems
which have followed it it was designed for maximum output and minimum labour
input. ~~Furthermore, it was designed to process only one kind of raw material.~~

LABOUR-SAVING PROCESSES ARE NOT HIGHEST PRIORITY OF LDC'S

The need for versatility in the less developed countries arises from
a number of factors. In the first place, most of the less developed
countries lie between the Tropic of Cancer and the Tropic of Capricorn
and consequently winter as we know it does not exist. Consequently many
of these countries can produce more than one crop a year but where year
round irrigation is not possible, the crops may vary with the season.
Another important relevant factor is a direct outcome of recent agricultural
research. More progress has been made in the last 25 years to improve
cereal production throughout the world than in the last 6,000 years.
Until 25 years ago cereal production in most parts of the world was
increased simply by extending the acreage under cultivation. During
the last 25 years 70% of all increases have resulted from improved
yields. As I briefly mentioned earlier the high yielding cereal variety
story began in Mexico in 1945 when the Rockefeller Foundation began an
intensive plant breeding programme. Since the Programme began the

Mexican population has increased by 70% but production in Mexico of the three staple crops, corn, wheat and beans, has more than trebled. As I mentioned also, the new Mexican wheats have short stiff straws with longer heads and more grains per head than conventional varieties. These short straw varieties are more responsive to water and chemical fertilizers and produce high yields without lodging. Perhaps more important is that many of the new grain varieties mature very much more quickly than the conventional. For example new varieties of rice will mature in 125 days compared with 180 days for the older conventional varieties. ^{yes,} The new varieties are more adaptable to soil and climate and therefore permit intercropping on the same land. Consequently in several parts of Asia and Africa one now can find corn, ^{or} millet and sorgum grown in the dry season and rice in the wet with three crops being produced in any one calendar year. It is obviously beyond the means of the developing countries to establish separate mills for each of the crops they grow at different seasons hence the need for mills which are versatile.

It is interesting to note that this versatility ^{may be} ~~has been~~ made possible by a new approach to milling technology. In place of the break and reduction roles of conventional systems the new approach is to use a system of abrasive decortication in which the bran layers of the tempered grain are literally rubbed off and removed by air streams. The remaining endosperm is reduced to flour by a process of attrition grinding, the products again being conveyed by currents of air. An added valuable feature can be introduced. In many of the tropical countries the grain is inclined to be of high moisture content but if the air used to convey the flour through and out of the system is heated the flour moisture content is automatically reduced during the milling process and the shelf life of the flour

can in consequence be increased by several months.

~~A further beneficial result of~~ Decentralizing the milling industry
and establishing small versatile mills in the rural areas ^{leads to} ~~in the~~ better
utilization of the total grain. Most of the large mills in Africa have
been built in the major port cities and are fed almost entirely by
imported wheat. Because of poor transportation and the lack of an
organized animal production industry, ^{MANY} ~~most~~ of these mills export the
mill feeds to Europe. An extreme example is to be found in the Sudan
where wheat is imported into Port Sudan, shipped ^{> 500} ~~several~~ hundred miles
to the mills in Khartoum where after milling, the mill feeds are packed
into coarse ^{HESSIAN} ~~hessian~~ bags, shipped all the way back to Port Sudan to
be exported to the animal feed industries of Europe. Rural mills are
not only close to the source of cereal grains but the mill feeds can be
used locally to increase animal production.

I should like to say a word now about how the milled cereals are
used for human consumption in the less developed world. In Africa
millet, sorgum, and corn and to some extent locally grown wheat are
eaten mainly in simple forms resembling either ^{porridge} ~~porage~~ or dumplings,
and usually with a ^{Served} ~~sauce~~ ^{Sauce} derived from vegetables such as ^{okra} ~~okra~~ and
spices or ^{Ground} ~~ground~~ peanuts. However, in many of the countries of Asia
and Africa there is now a significant demand for bread and to a lesser
extent for various forms of noodles. Bread consumption throughout
Africa is increasing by more than 8% per year. The Government-owned
Modern Bakeries which now have manufacturing units throughout India
have increased their ^{Bread sales} ~~outputs~~ from 0 to more than 250 million loaves
per year in a little over three years, ~~on their existence.~~ Though
the urban centres are the major outlets for bread, significant
quantities are consumed in the rural areas. Recent study in India:

37% of bread made by medium and small bakers
Sold in rural areas. // MAREK VILLAGE TANZANIA.

Though most of the bread consumed is made from white wheat flour, usually according to a British or European type formula^{and} process, there is a growing interest in bread made from wheat flour mixed with locally produced cereal grains, root starches and high protein meals. When bread is made by a traditional, conventional, straight dough or sponge and dough process requiring several hours fermentation, any addition of non-gluten-forming flours inevitably leads to a depression of loaf volume and a deterioration of crumb structure. Good bread can now be made by mechanical development or a combination of mechanical and chemical dough development and these systems are far less influenced by what we call flour strength. For instance, using a mechanical dough development process without any bulk fermentation one can make excellent bread from mixtures containing only 50% of wheat flour mixed with corn or tapioca starch, millet or sorgum flour plus oilseed or legume protein to improve the nutritional value. These processes will enable the less developed world to have their bread and eat it by using larger quantities of their home produced grains and protein meals. Fortunately a base flour made from a strong Canadian wheat permits larger additions of non wheat flours without detriment to loaf quality. Consequently in spite of the great improvement in cereal productivity throughout the less developed world the demand for strong wheats will probably continue for many years in those countries where bread consumption is growing and probably will continue to grow. Nevertheless there is ~~a~~ strong desire in almost all of the less developed countries to be self sufficient in milling capacity. I therefore cannot be as optimistic concerning profitable exports for Canadian flour as I am for Canadian wheat.

With your permission

~~If I may~~ I should like to express a personal opinion which I have held for some time and which grows stronger with every visit I make to the less developed world. It relates to this probable continuing demand

for strong wheats and the declining desire to import wheat flour. Many of
the less developed countries which are establishing their own mills have
been obliged to import both the management and the technologists to operate
the mills. Throughout Africa, Latin America, Asia, the Caribbean, one
finds French millers, German millers, Czech. millers, Australian millers,
Greek millers, Lebanese millers but with one solitary exception nowhere
does one find Canadian millers. Yet in ^{most}~~many~~ instances he who controls
the mill greatly influences the mill's wheat purchasing policy. I am
aware that several attempts have been made by Canadian milling companies
to purchase or obtain control of mills in certain foreign countries.
But unless the combined efforts of Government and the milling industry
are more successful in the future than in the past we may find ourselves
losing wheat sales to competitors whose friends control the flour milling
operations of those less developed countries which may soon become the world's
major wheat importers. Quite a number of these less developed countries
welcome foreign investment and even those which have centralized nationally
controlled economies are sufficiently realistic to ^{negotiate}~~let~~ management contracts
for the operation of their government-owned enterprises. I am convinced
that not only the milling industry but many other Canadian owned industries
have been lacking either in imagination, ^e foresight or courage or some
combination of the three and have missed good opportunities whereby to
capitalize on their managerial and technological skills. There is no
question that Canadians present a much more congenial image in many of
the less developed countries than do some of the larger developed nations,
and Canadians and Canadian companies would be welcome where other
industrialized nations are not. But for Canadian companies to realize
these opportunities I believe will require a far more effective system
of commercial and industrial intelligence within the less developed

world and a more impressive display of courage, imagination and energy
to realize these opportunities. I recently visited Korea where both
the owners of the largest flour mill in the Orient and the most rapidly
expanding cereal processing industry in Asia both said how much they
would welcome investment by Canadian companies. The Koreans do not
relish the prospect of economic domination by one or two major powers
in the same way that many African countries are far from content that
most of their industries are controlled by their former Colonial masters.
As I said at the outset, these are my own personal opinions and I shall
be glad to try to defend them or discuss them with you either during or
after the meeting.

One final subject I should like to discuss briefly and that is
the subject of commodity aid. Considerable quantities of Canadian
wheat and flour are given away through bilateral and international food
aid programmes. One could ^{CITE} ~~quote~~ a number of instances particularly in
times of disaster and emergency in the developing countries when gifts
of wheat and flour have not been particularly helpful. I remember both
in the Congo and in Nigeria at the end of the war seeing little children
try to eat raw flour simply because there were no bakeries or kitchens
in which the flour could be baked. A few years ago the United States
produced what might be called the new generation of food aid products.
The first of these was corn soya milk which for the benefit of the
Nigerians was produced in a partially pre-cooked form. This new
generation of aid foods come close to being nutritionally complete
and they are comparatively easy to use. Several months ago, bearing
in mind that we have substantial quantities of skim milk powder and
a large capacity to produce wheat flour we developed a product,
a sample of which I have here which consists of 85% of a straight
grade wheat flour together with 15% of skim milk powder made into

a pasta dough and extruded and dried in a form which closely resembles
a grain of rice. This product contains almost 20% of protein, it is
significantly superior in nutritional properties to both bread and rice,
it can be cooked in boiling water in 4 or 5 minutes, the grains retained
their shape when hot or cold, it can be eaten like rice. It is extremely
stable, readily digestible and it was manufactured in a Canadian pasta
plant using existing conventional equipment. I understand that the Canadian pasta
industry ~~has~~ ^{of products} throughout the year has the capacity to produce substantial
quantities of this kind. This product which ~~has~~ ^{was} by a chance remark has
come to be known as "Uncle Joe's Rice" is now being tested in about 10
countries in various parts of the world and the first response from
the World Food Program and from CIDA's bilateral tests are indeed most
encouraging. This product is purely a manifestation of the basic
marketing principle ^{of} providing what people ^{want} ~~need~~ rather than what the
factory would like ^{most} ~~best~~ to get rid of. It is really quite remarkable
how many large companies who on their home territory display ^{impeccable} ~~impeccable~~
marketing tactics appear to forget all they ever learned about marketing
when they set foot on foreign soil. Perhaps we have ~~all~~ been hypnotised
to some extent by the universal demand for Coca Cola. But whether we
are talking in terms of trade or aid the old commercial maxim "know thy
market" is as relevant in Ouagadougou as in Winnipeg. I hope therefore
that in the future we shall see a closer cooperation between the Canadian
milling and other food industries and the ^{appropriate} agencies of Government to
ensure that we become far better aware of the needs and the demands
of the less developed world and how to satisfy them through Canadian
products and Canadian technology. I am certain that there are and
will be in the future many mutually profitable opportunities for honest
and sincere cooperation between Canadian owned industries and the
Governments and industries of the less developed world.

Handwritten notes and signatures on the right margin, including the name "C. J. [unclear]" at the bottom.