To: Mr. Reinhard L. Korgen
Program Director, College Teachers Programs
National Science Foundation
Washington, D. C. 20550

From: Mark P. Mensheha, Assistant Professor
Wisconsin State University, Superior
AYE Grantee, 1964

FINAL REPORT

Introductory Explanation

I was born, educated, and worked before World War II in the Soviet Union. My education, professional, practical and research works, and publications were related to the closely connected fields: agronomy and agricultural engineering. After arrival in this country in 1949, I was impressed neither by the industrial development nor by the excellent transportation facilities; I was impressed by the high productivity and efficiency of American agriculture. Being very familiar with the Soviet agriculture and environment of Soviet farming I tried to explain to myself the reasons for great gaps between American and Soviet agricultural productivity, and between Soviet achievements in industry and backwardness in agriculture.

Most authors explained the difference in productivity between American and Soviet agriculture by the climatical reasons. This explanation did not satisfy me; it was too simple and it overshadowed the other not less and important reasons existing in the Soviet Union.
The spark for resumption of my research work in this country was ignited by Prof. Eugene C. Mather, University of Minnesota, in whose seminar, "Agricultural Geography," I worked in 1960. Prof. Mather proposed that I select analogous natural environment (soil, climate) regions in the United States and in the Soviet Union and compare the yields of certain crops in those regions.

I found then that the yields of sugar beets in analogous soil-climatical regions in the Soviet Union are lower, from one-third to one-half, than in the United States. I extended my search while working on my M.A. Thesis, "Geographical Distribution of Soviet Agriculture," for the Geography Department, University of Minnesota (Advisor, Prof. John H. Borchert). But neither time nor materials for continuing research with other crops and other regions were sufficient.

My interest in the problem increased in connection with teaching World Economic Geography and Geography of the USSR in the college, Superior. But lack of materials and facilities and time prevented me from continuing my search.

**NSF Summer Program Provided Fuel for My Research Works**

Having been accepted as a research participant in the summer program for college teachers at the Geography Department, University of Wisconsin, Madison in 1963, I found what I needed: full time for research, favorable environment (Prof. Robert W. Finley, Project Director), large libraries, meteorological data, and consultation of experts: Prof. Paul E. Lydolph (Geography of the Soviet Union), Dr. Wang in Agricultural Meteorology.

At the end of eight weeks summer session I presented a written and oral report, "Geographical Elements in American (U. S.) and Soviet Agriculture." In this report, I showed the example of two crops: sugar beets and cotton.
Mr. Reinhard L. Korgen, October 26, 1966, p. 3.

I demonstrated that the climate is not the main reason for lower productivity of Soviet agriculture.

To analyze deeper the comparison of Soviet and American agriculture in their regional aspects I needed field trips to the American sugar beet and cotton growing regions— for personal observation of fields, consultation with American experts, and collecting necessary materials. In addition, I needed the daily meteorological data from many stations in cotton and sugar beets growing areas in the Soviet Union, and Russian scientific literature.

During the summer of 1964, I made the field trips to areas of cotton growing in Texas, Arizona, California, and of sugar beet growing in the Red River Valley of Minnesota and North Dakota and in California. The 1964 field trips have provided me with a new gauge to measure the failures of Soviet agricultural policy. After visiting the Lubbock area irrigated by subsurface water, after talking with Texas experiment station specialists, and after reading their reports I tried to find an answer to the question: Why are the subsurface waters in Kazakhstan, in the Ukraine, and other regions of the Soviet Union not used for irrigation? Subsurface waters in those Soviet areas are closer to the surface than in the Lubbock area and they are almost inexhaustible. After visiting irrigated areas in Arizona and California, I started to analyze what retardation for Soviet agriculture was made when Khrushev dropped Stalin's decrees about irrigation of the Volga region, the South Ukraine and Crimea and replaced those projects by his own— plowing of semiarid Steppe in Kazakhstan.

The RPCT program gave me opportunity to collect materials to support my conviction that many reasons other than climatical have retarded the Soviet agriculture. To analyze those reasons I needed more scientific and periodical Russian literature from different areas of the Soviet Union; I needed also the students' assistance for deciphering the Russian microfilms with meteorological data from different regions, and for cartographical work.
Mr. Reinhard L. Korgen, October 26, 1966, p. 4.

The AYE gave me the opportunity to continue my work during the 1964-65 and 1965-66 academic years.

The first result of my study, in the form of a paper, "Soviet Cotton" (Compared With U. S. Cotton), was included in the program of the regional meeting of the Association of American Geographers in Winnipeg, Canada in October, 1965 (see attached). During the 1965-1966 school year, I developed this paper into article size (with addition of the results of the 1965 cotton growing season) under the title, "The Syndrome of Cotton Production in the Soviet Union" (attached to this report).

Watching closely the changing attitude of new leaders of the Soviet Union toward agriculture (my Russian is better than English), I turned my search toward the question: What are the potentialities of Soviet agriculture if destructive experiments and blunders are avoided, if full achievement of agricultural science is applied, and if a proper economic incentive for producers is permitted?

The conservative answer to this question was expressed in my paper, "Soviet Agricultural Potentialities and Reality," included in the program of the Sixty-Second Annual Meeting of the Association of American Geographers in Toronto, Canada, August 29, 1966. (One copy of this paper is attached to this report.) (Delivered for the inclusion of the 1966 farming results).

It was the first qualitative approach to the recognition of the Soviet agricultural potentialities rather than the quantitative calculation of them. It was made on the basis of the first results of the partial change of Soviet agricultural policy toward selected crops—cotton, sugar beets, rice—during 1964 and 1965. The radical change of Soviet agricultural policy was adopted after the removal of Khrushchev, first at the plenary session of the Central Committee of CPSU, March 24-26, 1965, and finally at the 23rd Congress of the CPSU, March 29-April 8, 1966.

For the first time in Soviet history the main reasons of the retardation of Soviet agriculture were admitted openly
in the speeches of top leaders of the Soviet Union: Breznev, Kosygin, and many top bosses of the union republics and provinces. Lack of economic incentive for farmers, neglect of irrigation of semi-arid lands and drainage of overwatered land, low capital investment in farming, mass introduction of destructive experiments and blunders rather than scientific achievements, were mentioned among the reasons of backwardness of Soviet agriculture. (All these reasons were mentioned in my MA thesis of 1961 and research papers of 1963 and 1964.)

The recognition of the reasons was followed by the adoption of radical changes in Soviet agricultural policy. The recently published results of the 1966 agricultural year indicate that my estimations of Soviet agricultural potentialities were conservative; the grain production in 1966 is the largest in the Soviet history; after the restoration of depleted reserves, the Soviet Union will resume the exportation of grain.

AYE project provides me with materials for teaching the Geography of the Soviet Union and partially the World Economic Geography which are not found in adopted textbooks. (I believe that my promotion from instructor to assistant professor rank was a partial result of my research work.)

RESEARCH IS NOT COMPLETED

My study showed the qualitative rather than quantitative characteristics of recent radical changes in Soviet agriculture. The change of agricultural policy involves significant changes in the entire Soviet economy. The early recognition of all these changes and their geographical distribution is very useful for teaching both above-mentioned subjects not only in my university but in all colleges of the United States.

I have very strong interest in watching and analyzing recent and foreseen future development of the Soviet economy
in different geographical regions, especially in the Asiatic part of the USSR along the Soviet-Chinese border.

What Do I Need to Continue My Research Works?

1. The supply of Russian scientific and economic literature and periodicals.

2. The microfilms with daily meteorological data from selected meteorological stations for the years 1962, 1963, 1964 and 1965. (I have them for the preceding years.)

3. To expand the comparison of Soviet and American crops by including also wheat, corn, some other grains, and potatoes, and to look for Canadian rather than American climatic analogues for spring wheat growing regions, which, like in the Soviet Union, have longer summer days because they lie farther north.

4. To search for special literature in the Congressional and USDA libraries in Washington, D. C.

5. To make field trips in the summer time to the wheat-growing provinces in Canada, the Corn Belt, and the potato-growing region in the U. S. Northeast.

6. To hire students for calculating and cartographic works.

7. To consult with some experts in American and Soviet economies.

8. To dedicate, in full, my summer spare time for the research work, particularly for field trips and for systematizing and analyzing a great deal of the material already selected from Russian recent literature and re-working it into papers which can be used by American teachers.
Where Could I Find Support for the Continuation of My Research Work?

My university's administration encourages me to continue the research work parallel to the teaching one. But the university has no funds to cover necessary expenses.

The nearest organization to which I may send the application is: Board of Regents of State Colleges, Madison, Wisconsin. I hope to find favorable consideration for the continuation of my research work, but my hope is not high because of restricted funds and numerous applicants to that organization. I was informed by the administration of our university that no money can be included into budgeting for the project for stipend during the eight summer weeks free from teaching. (I did not use my 1964 AYE grant for this purpose, but I had no opportunity to use full time for research either.)

My best hope to find direct or indirect support for continuation of my project is from the National Science Foundation, which gave me the opportunity to resume the research work interrupted by war, emigration, and a long period of readjustment in this country.

How big and for how long period support is needed?

On the basis of past experience with AYE grant and on the volume of research material I have now and I am planning to collect additionally in expanded fields, I expect to finish the project in two years, at the end of 1968. I estimate the financial support of the project in the sum of $2,000, with the following itemization:

Microfilms with meteorological data for 1962-65 from selected Russian station (obtained through U. S. Weather Bureau $100.
Literature and Stationary $150.
Students' assistance, cartography, clerical work $300.
Consultations $200.
Travel expenses $500.
Publishing expenses $150.
Summer stipend--$75.00 per week for 8 weeks $600.
Total $2,000.

Sincerely,

Mark P. Mensheha
Assistant Professor
Geography Department
Wisconsin State University,
Superior
**RED RIVER VALLEY FIELD TRIP**
(May 27 - June 1, 1964)

**Objective:** The study of sugar beets production on non-irrigated land.
(Climatic analogue to Voronezk-Kursk area of the USSR)

<table>
<thead>
<tr>
<th>Locality</th>
<th>Organization and Person Contacted</th>
<th>Information collected</th>
</tr>
</thead>
</table>
| Minneapolis, Minn.  | University of Minnesota  
Dr. Hugue, Director of Experiment Stations in Minnesota  
Dr. H. R. Jensen, Agric. Economics                                                               | Experiment station at Crookston and works with sugar beets  
Cost of sugar beet production in Red River Valley  
Sugar beets at different soil temperatures, hail damage of sugar beets, weed control |
| Crookston, Minn.    | Experiment Station, U. of M., Dr. Johnson                                                        | Environment and results of sugar beet growing during time from 1953 to 1964             |
| East Grand Forks,   | Sugar refinery, Y. C. Tanner, District Manager of Red River Valley Sugar Refineries at East Grand Forks, Crookston, Moorhead | Inspection of sugar beet field, photographing, conversation with farmer                 |
| Minn.               |                                                                                                  | Inspection of sugar beet fields in Cass County, weed control by chemicals                |
|                     | W. R. Fisher's farm (400 acres of sugar beets) visited USSR sugar beet areas in 1963             | Costs of sugar beet production                                                          |
|                     |                                                                                                  | Observation of sugar beet cultivation, photography, conversation.                      |
| Fargo, N. D.        | North Dakota State University  
Mr. Lee E. Fabricins, Asst. to Dr. Y. Caster, Head of Dept. of Agronomy  
Dr. L. D. Lofsgard                                           |                                                                                         |
|                     | Mr. Oswald Swenson; farmer (75 acres of sugar beets)                                             |                                                                                         |
**SOUTHWESTERN FIELD TRIP**  
(July 19 to August 10, 1964)

Objective: Familiarization with the environments of agricultural production, primarily cotton and sugar beets, to compare them with climatical analogues in the Soviet Union.

<table>
<thead>
<tr>
<th>Locality</th>
<th>Organization and Persons Contacted</th>
<th>Information collected</th>
</tr>
</thead>
</table>
| Greenville, Miss. | Delta Experiment Station, USDA and Mississippi State University  
|                  | Joe W. Petiet, Agronomist                                                                        | Detailed information about the program of experimentation, results and environment for cotton growing in Yazoo-Mississippi Delta area  
|                  |                                                                                                   | Inspection of fields, photographing.                                                   |
| Lubbock, Texas   | Texas Agric. Exp. Station, USDA--Mr. James S. Newman, research irrigationist                      | Detailed information about the techniques, environments, results and problems of cotton growing in Texas; High Plain, irrigated by subsurface waters. Inspection, photographing of fields. |
| Tuscon, Arizona  | University of Arizona  
|                  | Dr. Ken Frost, Sr.                                                                              | Distribution of irrigated cotton in Arizona; environment techniques and results of cotton growing in Phoenix and Yuma areas |
| Phoenix, Ariz.   | Phoenix Experiment Station  
<p>|                  | Bill Fitzgibbens                                                                                 | Field inspection and information about the environment for cotton growing in Maricopa and Yuma areas |
| Yuma, Ariz.      | Phoenix Cotton Research Center, Dr. Ernest Jackson                                               |                                                                                         |</p>
<table>
<thead>
<tr>
<th>Locality</th>
<th>Organization and Persons contacted</th>
<th>Information collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imperial Valley, Calif.</td>
<td>Southwestern Irrigation Field Station, USDA&lt;br&gt;Dr. P. H. van Shain, agronomist for cotton experim.&lt;br&gt;Mr. Kenyon Beatty, agronomist for sugar beet experim.</td>
<td>Detailed information concerning cotton and sugar beet growing in Imperial Valley</td>
</tr>
<tr>
<td>El Centro, Calif.</td>
<td>U. S. Soil Conservation Service&lt;br&gt;Mr. Jack Smith</td>
<td>The copy of written report about the desalination of soil</td>
</tr>
<tr>
<td>Bakersfield, Calif.</td>
<td>USDA Exper. Station at Shaffer.&lt;br&gt;Mr. Marvin Hoover, public relations</td>
<td>Program, results and problems of cotton growing in the area.</td>
</tr>
<tr>
<td>Salinas, California</td>
<td>USDA Sugar Beet Exper. Sta.&lt;br&gt;Dr. W. Savitsky and Dr. H. Savitsky</td>
<td>Inspection and photographing of cotton fields and irrigation systems</td>
</tr>
<tr>
<td>Salinas, Calif.</td>
<td>Spreckels Sugar Refinery&lt;br&gt;Mr. George W. Wheatley, Agronomist</td>
<td>History and results of the transition to monogerm seeds in sugar beet industry</td>
</tr>
<tr>
<td>San Francisco, Calif.</td>
<td>Spreckels Sugar Company&lt;br&gt;Dr. Russel Johnson</td>
<td>Sugar beet fields inspection, observation of technology of sugar refining, competition with vegetable and fruit industry in area</td>
</tr>
<tr>
<td>Woodland, Calif.</td>
<td>Sugar Refinery&lt;br&gt;Mr. Duckwood, Superintend.&lt;br&gt;Mr. Jay Hill, Field Superint.&lt;br&gt;Mr. W. M. Crone, Chief Chemist</td>
<td>Fields and refinery inspection, information about sugar beet growing in Sacramento Valley</td>
</tr>
<tr>
<td>Locality</td>
<td>Organization and Persons contacted</td>
<td>Information collected</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Salt Lake City, Utah</td>
<td>Utah-Idaho Sugar Co., Mr. Bion Tolman, Vice President and General Agricultural Superint.</td>
<td>Conditions, problems, and perspectives for sugar industry in Utah, Idaho, and Washington</td>
</tr>
<tr>
<td>Salt Lake City, Utah</td>
<td>West Jordan Sugar Refinery, G. Peterson, Superint. Burton Webb, Fieldman</td>
<td>Inspection of sugar beet fields on salinized soils in Salt Lake City area</td>
</tr>
<tr>
<td>Lincoln, Nebr.</td>
<td>University of Nebraska, College of Agriculture, Mr. J. S. Swinhank, Crop Extension Service</td>
<td>Phenological data and conditions of wheat growing in the State of Nebraska</td>
</tr>
<tr>
<td>North Platte, Nebr.</td>
<td>University of Nebraska, Experiment Station</td>
<td>Alfalfa growing on irrigated fields.</td>
</tr>
</tbody>
</table>
Appendix 3

SOUTHEASTERN FIELD TRIP
(August, 1965)

Draining of agricultural lands in Iowa,
Rice-growing in Arkansas and Louisiana,
Cotton-growing in Georgia
Sugar beet-growing in Saginaw area of Michigan.

Ames, Iowa
Iowa State University
Dr. Howard Johnson,
Agric. Engineer
Agric. and Home Econ.
Exper. Station

Ames, Iowa
Mr. Grant D. Rannin,
District Soil Conservationist

Nevada, Iowa
Field trip to the site
of the work of tile
pipes installing
machine; inspection
of technics and cost
of operation

Stuttgart, Ark.
USDA Rice Experiment Station,
Dr. Johnson, rice breeder
and Dr. Williams, Director

Crowley, La.
Rice Experiment Station

Athens, Georgia
University of Georgia

Saginaw, Michigan
Michigan Sugar Co.,
Mr. Morey Flanes

Conditions, technics,
results and problems
in draining of
agricultural lands

Inspection of rice
fields on the station
and in the area.
Collection of data and
materials concerning
rice production

Collection of informa-
tion, published re-
ports, inspection
of rice fields

Collection of data and
material concerning
cotton growing in non-
irrigated area. Ob-
servation of fields

Observation of sugar
beet fields in Saginaw
area, information about
agro. technical and
economic conditions
for sugar beet
growing in area.
Appendix 4

RUSSIAN PERIODICALS SUBSCRIBED IN 1965 AND 1966

A. Daily Newspapers:
   1. ИЗВЕСТИЯ
      (The News, Moscow)
   2. СЕЛЬСКАЯ ЖИЗНЬ
      (The Country Life, Moscow)
   3. ПРАВДА УКРАИНЫ
      (The Truth of the Ukraine, Kiev)
   4. СИЛЬСКИЕ ВИСТИ
      (The Village News, Kiev)

B. Weekly Magazine:
   5. ЭКОНОМИЧЕСКАЯ ГАЗЕТА
      (Economical Gazette, Moscow)

C. Monthly Magazines:
   6. ДОКЛАДЫ АКАДЕМИИ СЕЛЬСКО-ХОЗЯЙСТВЕННЫХ НАУК ИМ. ЛЕНИНА
      (The Reports of the All Union Academy of Agricultural Science, Moscow)
   7. ЭКОНОМИКА СЕЛЬСКОГО ХОЗЯЙСТВА
      (Agricultural Economics, Moscow)
   8. ЗЕМЛЕДЕЛИЕ
      (The Agriculture, Moscow)
   9. ВИСНИК СЕЛЬСЬКО-ГОСПОДАРСЬКИХ НАУК
      (The Agricultural Science Herald, Kiev)
  10. ХЛОПКОВОДСТВО
      (The Cotton Farming, Moscow)
  11. ВЕСТНИК СЕЛЬСКО-ХОЗЯЙСТВЕННЫХ НАУК
      (The Agricultural Science Herald, Kazakh SSR, Almaata)
12. НАРОДНОЕ ХОЗЯЙСТВО СРЕДНЕЙ АЗИИ
(The People's Economy of Middle Asia, Tashkent)
13. СЕЛЬСКО-ХОЗЯЙСТВЕННОЕ ПРОИЗВОДСТВО ПОВОЛЖЬЯ
ЭКОНОМИКА И ЖИЗНЬ
(Economics and Life, USBEK, SSR; Tashkent)
14. СЕЛЬСКО-ХОЗЯЙСТВЕННОЕ ПРОИЗВОДСТВО ПОВОЛЖЬЯ
(Agricultural Production of Volga Region, Saratov)
15. САХАРНАЯ СВЕКЛА
(Sugar Beets, Moscow)
16. ХЛЕБОРОБ УКРАИНИИ
(Farmer of the Ukraine, Kiev)
17. ЗАКУПКИ СЕЛЬСКО-ХОЗЯЙСТВЕННЫХ ПРОДУКТОВ
(Purchase of Agricultural Products, Moscow)
18. МЕХАНИЗАЦИЯ СЕЛЬСКОГО ХОЗЯЙСТВА
(Mechanization of Agriculture, Moscow)
19. ГИДРОТЕХНИКА И МЕЛИОРАЦИЯ
(Hydrotechnics and Amelioration, Moscow)
20. ИЗВЕСТИЯ АКАДЕМИИ НАУК СССР, СЕРИЯ ГЕОГРАФИЧЕСКАЯ
(The Academy of Science's News, Geographic Series, Moscow)
21. СЕЛЬСКО-ХОЗЯЙСТВЕННОЕ ПРОИЗВОДСТВО СЕВЕРНОГО КАВКАЗА
И ЦЧО
(Agricultural Production of Northern Caucasus and Central Chernozem Oblast, Krasnodar)
SOVIET COTTON
(compared with United States Cotton)

Abstract

The Soviet Union is the world's third largest producer of cotton, growing approximately one-eighth of the world's total annual production of cotton.

The country's average yield of lint per acre in 1964 was the world's highest, 640 pounds per acre.

The case study of Soviet cotton is very illustrative for the understanding of the reasons for the permanent shortages in Soviet agricultural production. A close study of the history and geography of Soviet cotton production is also very helpful for the estimation of the potentialities of Soviet agricultural production, if proper agricultural technology be applied and reasonable incentive to producers be permitted.

In the Soviet Union all cotton production after 1953 has been concentrated on irrigated lands only, while in the United States two thirds of the cotton has been grown without irrigation. If we compare areas in the Soviet Union and the United States with analogous or closely matching environments (climate and soil), we will find that the average yield of Soviet cotton is significantly lower than the yield of American cotton.

The pre-war (1913) acreage, 1.7 million acres, was reached in 1925. In 1934 the acreage was doubled; in 1937 it was tripled; and in 1953 the acreage under cotton was five times as large as in 1913 (fig. 2).
The average yields of lint per acre, however, remained under the 1913 level during more than 25 years. The level of 1913, 325 pounds per acre, was reached only in 1940.

Reasons for the Stagnation of Cotton Yields During the 1920's and 1930's

More than one-third of the cotton acreage was located in areas climatically unsuited for the successful growing of cotton: Moldavia, Southern Ukraine, the Lower Volga Region, and Northern Caucasus. (Map 1)

Only after Stalin's death did the wasting of land not suited for cotton growing, come to an end.

Those attempts to introduce cotton on almost 2.5 million acres of unirrigated black earth deprived the Soviet people of approximately 50 million bushels of wheat annually at the yields of that time.

The second very important reason for the low yield of cotton during the 1920's and the 1930's was the absence of incentive for growers.

The first increase of procurement prices for cotton was made in 1949. The result was an immediate increase of yield of cotton from the country's average of 350 pounds per acre to 450 pounds.

The combined effect of the price increase and the concentration after 1952-1955 of cotton cultivation on irrigated land only was a rapid increase of yield to over 600 pounds per acre in 1953.

Period of Improved Cotton Growing

The importance of the farmers' incentive in the increasing yield of cotton is convincingly illustrated by the fluctuation of the yields between 1958 and 1964, following the analogous fluctuation in incentive for cotton growers. (Chart 2)
DISTRIBUTION OF COTTON IN FERGANA VALLEY
UZBEK SSR, 1964

▲ Ginning plants
○ Cotton growing state and collective farms
- 250 hectares (600 acres)
The Geographical Distribution of Soviet Cotton Acreage

After 1953 all Soviet cotton has been located between 37°N and 43°N., and the entire cotton acreage has been under irrigation since that time. Almost ninety four per cent of the cotton production in 1963 was concentrated in the Central Asian Soviet Republics.

Among the Central Asian Soviet republics the leading role in cotton production belongs to Uzbek SSR, which alone produced in 1963 70.6% of the total Soviet cotton.

Two other republics, Tadzhik and Turkmen, share second place among the cotton producers in the Soviet Union, producing ten and nine per cent of Soviet Cotton respectively. (Map 2)

Reasons for the Lower Yields of Soviet Cotton on Irrigated Lands.

The yield of cotton in equal natural environments is significantly lower in the Soviet Union than in the United States. (Chart 3)

The average yields in Uzbekistan are one-half of those in California in the poorest years, and less than two-thirds in the best years.

There was a tendency among the Soviet leaders to explain the lower yields of Soviet crops by poorer climatical conditions in the Soviet Union compared to those in the United States. But careful study of recent Russian publications disclosed many important additional reasons for the lower yield of Soviet crops, including cotton, on irrigated lands.

Negligence of careful levelling of fields before planting led to the uneven distribution of water on different parts of the cotton fields; some parts suffered from droughts.
High seepage of water through unlined bottoms of canals and distributing systems caused a shortage of water for irrigation in higher places and a destruction of cultivated land through bogging and salination of soil in lower places.

The seepage of enormous amounts of water caused also the rise of the ground water table and an increase in content of minerals harmful to the plants. Secondary salination of soil developed into the most important problem of Soviet cotton farming.

The building of an irrigation system has not been accompanied by the building of a drainage system for the removal of ground water with an increased content of minerals.

The large acreage of previously cultivated lands (about 300,000 acres in Uzbekistan only) has been destroyed by bogging or by secondary salination.

The detrimental results of the time gap between building the irrigating and draining-collecting systems was admitted by the government and a decision was made in 1964 forbidding the future building of an irrigating system without simultaneously building a draining and de-salinizing network. But most of the already-irrigated lands in Central Asia needed radical de-salinization.

The Soviet Union has about 4 million hectares of salinized or inclined to salination irrigated lands; it comprises almost 40% of the total irrigational fund.

To remedy past errors in irrigation, a tremendous task of reclamation of salinized lands faces Soviet agriculture, namely: the building of a drainage-collector system on new irrigational projects and simultaneously on most of the lands irrigated earlier.
In 1965 the draining systems are under construction in Golodnaya Steppe, in Fergana Valley, in the zone of the Kara-Kum Canal, in Central Asia, and in the Kura-Arax Lowland in Transcaucasia.

Utilization of Subsurface Waters for the Irrigation of Cotton

The low flow of rivers in Central Asia in 1965 forced Soviet authorities to turn their attention to the utilization of water from the subsurface sources. The sources of subsurface water are large in Central Asia, Transcaucasia, Northern Caucasus, the Ukraine. But the utilization of subsurface waters for irrigation has been neglected until 1965.

Destruction of Cotton-Alfalfa Crop Rotation System

The exclusion of alfalfa from the cotton crop rotation systems was the next reason for lower yield of cotton.

The policy of maximal concentration of cotton growing on irrigated lands in Central Asia led to widely-practiced cotton monoculture. The saturation of cropland in Soviet Central Asia is high, as can be seen from the following table.

<table>
<thead>
<tr>
<th>Region</th>
<th>1000 hectares</th>
<th>2,471 acres</th>
<th>total cropland</th>
<th>under cotton</th>
<th>per cent of saturation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkmen SSR</td>
<td>368</td>
<td>968</td>
<td>368</td>
<td>257</td>
<td>69.8</td>
</tr>
<tr>
<td>Uzbek SSR</td>
<td>2,899</td>
<td>7,433</td>
<td>2,899</td>
<td>1628</td>
<td>56.2</td>
</tr>
<tr>
<td>Tadzhik SST</td>
<td>837</td>
<td>2,088</td>
<td>837</td>
<td>217</td>
<td>26.0</td>
</tr>
</tbody>
</table>
These figures are the averages for entire republics. If we go to the next subdivision, oblast' (province), we will find that the saturation of cotton to the total crop land in 1959 was:

in Bukhara Oblast', Uzbek SSR....71%
" Khorezm " " " 70%
" Fergana " " " 69%
" Andizhan " " " 68%
" Kara Kalpak ASSR " " " 65%

If we go further down, to separate farms, we will find many farms growing cotton on 90% of their crop land.

Fertilizers

Under the system of priorities in Soviet planning, cotton is on the top of the list as a receiver of fertilizers. Cotton has been supplied with a sufficient amount of fertilizers, 80 to 120 pounds of N per acre, or approximately the amount applied in the United States.

Insufficient or untimely supply and uneven distribution of irrigational water, salinization of soil, elimination of alfalfa from cotton crop rotations, have reduced efficiency of the applied fertilizers.

Mechanization of Cultivation and Picking of Cotton

All field work in cotton growing farms, except for water distribution and picking of cotton, is sufficiently mechanized: 86% of the cotton cultivation was performed by machine in 1964.

Machine picking of cotton has been progressing rapidly during the latest years.
Perspectives for Soviet Cotton

The Soviet Union expanded the cotton production from 14 million bales in 1923 to 8.2 million bales in 1964.

The Soviet government established the following goals for future cotton production: 11.7 million bales for 1970 and 15 to 17 million bales for 1980.

Expansion of acreage is limited by the water resources. The land reserves, available for agriculture in Soviet Central Asia, exceeded by 3 to 4 times the water resources available for irrigation of that land. But the rise of the coefficient of water utilization from the present 50% to 75% by lining canals and distributors, by levelling fields, and by other improvements of water management, will make possible the expansion of acreage under cotton and increase yields. The utilization of subsurface water will be used much more extensively after dry 1965 than before this year.

It was calculated that the expansion of irrigation of new lands in Golodnaya Steppe, Karshin Steppe, Murgab and Tendzhin cases, and on the land of the lower Amu Darya River will make available 6 million acres of additional lands for cotton cultivation.

But most Soviet authors emphasized the increase of yields as the primary method for increasing cotton production. De-salinization of land already lost for cotton cultivation would return about 800 thousand acres to cotton growing and increase the average yield of cotton on de-salinized soils by at least 200 pounds per acre on 50% of Soviet cotton acreage.

The restoration of proper crop rotation with alfalfa would increase the average yield of cotton by at least 100 pounds per acre,
according to Soviet experiment data and according to the results achieved by progressive farms like the state farm "Pakhta Aral". Improvement of water management and utilization would also result in an increase of the average yield of Soviet cotton by at least 100 pounds per acre.

The combined application of all three factors would increase the average yield of Soviet cotton from 640 pounds, received in 1964 to at least 940 pounds per acre and the total cotton production from 8 million bales in 1964 to at least 11 million bales.

The new lands projected for the expansion of irrigation and the cultivation of cotton may produce about 4 million bales after the completion of projects.

All in all, 15 million bales, close to our present annual production of cotton, may be seen as realistic for 1980.

The big question is whether the Soviet economy can afford tremendous capital investments during the next decade for building draining systems on millions of acres that are already irrigated, simultaneously with building new irrigation-draining systems on newly developed lands. It is a question not of the financial but of the physical part of investments: land excavating and land leveling machines, tractors, pipes, trucks, cotton pickers, etc. Lack of machines and materials was the main reason for the retardation of much work performed up to the present time not only in Central Asia but everywhere in the Soviet Union.

The Special Geo-Political Position of Soviet Central Asia

This area is populated by people of Turkic-Mongol-Persian origin;
Uzbeks, Tadzhiks, Turkmen, Kirgiz, and Kazakhs. They are neither Russian nor Chinese in their ethnic characteristics, language, religion, and culture. Meanwhile, both communist empires, Russia and China, pretend that these parts should be inside their empires. Each blames the other in the colonial policy toward these people. Since the time of the split between Moscow and Peking, the bondage of the Russian Communist Party has not been sufficient to prevent the development of a centrifugal tendency among the non-Russian people of Soviet Central Asia.

To prevent being blamed for colonial exploitation, and to create conditions satisfactory to the local people and even attractive to the people beyond the border (in China), the Moscow government applied the wise policy of rapid economical development of the Central Asian republics. In this light, it is understandable why there exists the priority in supplying cotton-growing regions with fertilizers, machines, and materials; the priority in developing irrigational projects; and the relatively better remuneration of cotton growers than the growers of other crops in other parts of the Soviet Union.

There is no doubt that this policy toward the Central Asian republics will continue in the future. An understanding of this policy gives the author of this paper reason to expect that the production of Soviet cotton will continue to grow in the near future and will approach the present U.S. level of production in about 1980.

Mark P. Menseheha
Assistant Professor
Geology/Geography Department
Wisconsin State University
Superior, Wisconsin
Soviet Agricultural Potentialities and Reality

Future historian may characterize the first 50 years of the Soviet era as a war between peasants and the Communist Party. It was a long-lasting war, sometimes hot, mostly cold, with the specific strategy of both sides frequently changed in time and in space.

The war was long and extremely severe. The number of victims, mostly on the peasants' side, was in the millions. The Ukraine alone lost about seven million during the winter and spring of 1932/33. The number of livestock lost in this war was twice as high as in the World War II.

Defeated and forcibly collectivized, the peasants changed their strategy: they practiced "non violent resistance," producing for the government only one half of the total production of dairy products, meat, potatoes, and vegetables on 97% of the land administered by a government agencies; at the same time they produced the other half of those products for themselves on less than 3% of the land left as private plots.¹

Khrushchev increased sharply the procurement prices for animal products. The farmers responded to this concession by increasing the number of livestock and the production of milk, meat, and wool.
<table>
<thead>
<tr>
<th>Years</th>
<th>Cattle</th>
<th>Hogs</th>
<th>Sheep</th>
<th>Goats</th>
<th>Total</th>
<th>Periods of Years</th>
<th>Periods of Heads Increased or Decreased during Each Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1918-1922</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
But Khrushchev made a cardinal error by freezing the irrigation and the drainage of parts of Stalin's projects in the European part of the USSR and replacing these with his own projects of plowing 90 million acres of "virgin lands" in the semi-arid Asian steppe and the semi-deserts.

The most recent leaders of the Communist Party have recognized the force of the non-violent resistance of the farmers. They decided to recognize the agricultural producers as less unequal, if not fully equal partners in Soviet Big Business.

The Communist Party decided to significantly increase capital investment in agriculture and the prices paid to producers for commodities delivered to the government.

The farmers responded to this change of policy by significantly increasing production, especially in pilot crops such as cotton, sugar beets, and rice, where changes had been made earlier and or to a greater degree than in other crops.

Heavy commitments abroad -- in Egypt, Algeria, Mali, Afghanistan, Burma, India, Indonesia, and Cuba have drained Soviet resources and have retarded Soviet agriculture.

The Soviet Union could avoid the shortages of agricultural products and provide the Soviet people with an abundance of them if destructive experiments be avoided, if full achievements of agricultural science be applied, and if a proper economic incentive for producers be permitted.
The first evidence of the importance of non-environmental reasons for the low productivity of Soviet agriculture was found in a comparison of the yields of sugar beets in analogous or closely matching natural environments in the Soviet Union and in the United States. Two pairs of regions one with dry and one with irrigated farming were compared:

<table>
<thead>
<tr>
<th>Areas</th>
<th>Type of Soil</th>
<th>Annual Precipitation Inches</th>
<th>Sum of Effective Temp. °F.</th>
<th>Average Yields for 1954-1958, Tons Per Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crafton, N.D., USA</td>
<td>black earth</td>
<td>18.2</td>
<td>3310</td>
<td>11.7</td>
</tr>
<tr>
<td>Voronezh, USSR</td>
<td>black earth</td>
<td>18.2</td>
<td>3109</td>
<td>6.8</td>
</tr>
<tr>
<td>Salt Lake City, Utah</td>
<td>serozem</td>
<td>16.3</td>
<td>4685</td>
<td>18.5</td>
</tr>
<tr>
<td>Tashkent, USSR</td>
<td>serozem</td>
<td>13.7</td>
<td>5524</td>
<td>13.7</td>
</tr>
</tbody>
</table>

Average Yields of Cotton

<table>
<thead>
<tr>
<th>Year</th>
<th>Pounds per Acre Calif. 3)</th>
<th>Pounds per Acre Uzbekistan 1)</th>
<th>Uzbekistan California x 100 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>970</td>
<td>624</td>
<td>64.3</td>
</tr>
<tr>
<td>1969</td>
<td>1030</td>
<td>606</td>
<td>58.8</td>
</tr>
<tr>
<td>1962</td>
<td>1120</td>
<td>570</td>
<td>50.5</td>
</tr>
<tr>
<td>1964</td>
<td>1133</td>
<td>670</td>
<td>59.1</td>
</tr>
<tr>
<td>1965</td>
<td>1142</td>
<td>721</td>
<td>63.1</td>
</tr>
</tbody>
</table>

The small deviation from complete similarities of the compared areas in the distribution of temperature and precipitation does not justify the differences in yields.
Fig. 2. Yield of cotton (lint).
The Stagnation of Grain Production

<table>
<thead>
<tr>
<th></th>
<th>1913</th>
<th>1963</th>
<th>1964</th>
<th>1965</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield, 100kg. centners per hectare</td>
<td>8.2</td>
<td>8.3</td>
<td>11.4</td>
<td>9.0</td>
</tr>
<tr>
<td>Pounds per capita</td>
<td>1452</td>
<td>1162</td>
<td>1597</td>
<td>1258</td>
</tr>
</tbody>
</table>

The total production of grain and the production per capita in 1963 and 1965 were lower than 50 years ago.

The introduction of the virgin lands scheme retarded by 10 years the irrigation of Povolzhye, Southern Ukraine, and North Caucasus, principal grain growing areas. It was the most important failure of Khrushchev's agricultural policy.

The Irrigation of Povolzhye, Southern Ukraine, and North Caucasus

According to the decrees that Stalin's government issued in 1950, the building of dams and an irrigation system for 10 million acres in Povolzhye and Southern Ukraine had to be completed before 1957. The dams and hydro-electric plants (with the world's largest installed capacity) were built but the irrigational part of the projects was frozen by Khrushchev.

The Soviet scientists stated that irrigation increased the yield of grain crops from 3 to 4 times in the Trans-Volga Region, from 2 to 2-1/2 times in North Caucasus, and 2 times in Southern Ukraine. The results of the first few years of growing rice, wheat, and corn on irrigated land proved that statement. The state farm "Piatizerny" on the Crimean Peninsula received 5355 pounds of rough rice from each of 4,461 acres planted in 1964, and 5,551 pounds from each of
YIELDS

PRODUCTION PER CAPITA

TOTAL PRODUCTION OF GRAIN

Source: Narodnoe Khoziaystvo SSR, Soviet Government's Statistical Yearbooks for proper years.
AREAS NEEDING:
IRRIGATION

1. Southern Ukraine-North Crimea
2. Southwest Ukraine
3. Moldavia
4. North Caucasus
5. Trans-Volga
6. Azerbaidzhan
7. Southwestern Kazakhstan
8. Turkmenia
9. Uzbekistan

DRAINING

10. Belorussia
11. Western Ukraine
12. Northern Ukraine
13. Baltic Republics
14. Northwestern Russia
15. Central Russia
16. Meshchera Lowland
17. Volga Delta
18. Southern Part of West-Siberian Lowland
10,760 acres planted in 1965. The state farm "Komsomalsky" in Kherson Oblast in Southern Ukraine, located on salinized poor grazing land, obtained 5,400 pounds of rice from each of 1,118 acres planted and irrigated in 1965.

Winter wheat on the irrigated lands of Povolzhye, Southern Ukraine, and North Caucasus produced average yields 67 to 74 bushels per acre. 6

According to Soviet planning organizations there are 143 million acres of land suited for irrigation and assured of a water supply: 37 million acres in Soviet Central Asia, 50 million acres in Kazakhstan, 48 million acres in European part: Povolzhye, Southern Ukraine, North Caucasus, and 8 million acres in Transcaucasia. 7

In 1964 less than 1/10 of the potentially available lands were irrigated and used for growing:

<table>
<thead>
<tr>
<th>Crop</th>
<th>Acres</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>cotton</td>
<td>6.08</td>
<td>46.6%</td>
</tr>
<tr>
<td>grain</td>
<td>4.81</td>
<td>37.0%</td>
</tr>
<tr>
<td>potatoes &amp; vegetables</td>
<td>1.38</td>
<td>10.4%</td>
</tr>
<tr>
<td>sugar beets</td>
<td>.33</td>
<td>2.5%</td>
</tr>
<tr>
<td>rice</td>
<td>.46</td>
<td>3.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>13.06</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

"Treasure Under Our Feet"

"While three quarters of Kazakhstan's surface, equalling all of Western Europe, is steppe, semi-desert, and desert, in the ground, just under the steppe and deserts are found tremendous basins of fresh water, the total volume of which is equal to 25 seas of Azov".... "Seventy enormous cup-like underground reservoirs with an area of tens and hundreds of
thousands of square kilometers are found there]. In many places those waters are located not too deeply from the surface.

Practically, local subsurface waters are inexhaustible"... "Being closely to water we continue to suffer from lack of water."

U. Akhmedsafin, a member of the Academy of Science of Kazakh SSR, Izvestia, February 27, 1966.

This is still a potentiality for the Soviet agriculture; and here is the reality: the average for 43 million acres of wheat planted in 1963 in Kazakhstan yield was 3-1/2 bushels per acre. 8

The Draining and Reclamation Of Overwatered Lands

There are 163 million acres of overwatered lands in the agricultural zone. These lands are found in the Baltic Republics, Belorussia, Western and Northern Ukraine, Northwestern and Central parts of Russian SFSR, Western Siberia, Far East, and Transcaucasia.

Of 163 million acres available for reclamation, only 3.45 million acres, or 2%, were drained with tile drains. In addition to this 16.55 million acres, or 14%, were drained with open ditches, not the best way of improving land productivity. 8

One hundred, forty-three million acres are still waiting for reclamation. They are a large potential reserve for the expansion of agricultural production.
The collective farm "Novoe Polesye" in the Pripiat Lowland, Brest Oblast, Belorussia, reclaimed 5,500 acres of peat bog and obtained 60 bushels of barley from each of 2,717 acres, 24 bushels of rye from each of 2,717 acres, and 11.6 m.tons of potatoes from each of 740 acres.9

The directives for the 1966-1970 five-year plan include the drainage of 15 million acres of overwatered lands.

### Real and Potentially Possible Grain Production

<table>
<thead>
<tr>
<th>Selected Regions</th>
<th>Yield m.tons per hectare</th>
<th>Sown Area hectares (1000)</th>
<th>Total Production m.tons (1000)</th>
<th>Yield m.tons per hectare</th>
<th>Hectares (1000)</th>
<th>Produce m.tons (1000)</th>
<th>+ m.tons (1000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ukraine</td>
<td>1.77</td>
<td>17,201</td>
<td>30,448</td>
<td>2.5</td>
<td>18,000</td>
<td>45,000</td>
<td>+14,500</td>
</tr>
<tr>
<td>North Caucasus</td>
<td>1.60</td>
<td>9,688</td>
<td>15,546</td>
<td>2.5</td>
<td>10,000</td>
<td>25,000</td>
<td>+ 9,500</td>
</tr>
<tr>
<td>Central (Russian) Chernoz Region</td>
<td>1.49</td>
<td>6,316</td>
<td>9,407</td>
<td>2.0</td>
<td>8,000</td>
<td>16,000</td>
<td>+ 6,600</td>
</tr>
<tr>
<td>Povolzhye</td>
<td>1.12</td>
<td>19,908</td>
<td>22,387</td>
<td>1.8</td>
<td>20,000</td>
<td>36,000</td>
<td>+13,600</td>
</tr>
<tr>
<td>Central (Russian) Industrial Region</td>
<td>0.74</td>
<td>7,508</td>
<td>5,545</td>
<td>1.2</td>
<td>9,000</td>
<td>10,800</td>
<td>+ 5,300</td>
</tr>
<tr>
<td>Belorussia</td>
<td>0.72</td>
<td>2,987</td>
<td>2,147</td>
<td>1.2</td>
<td>5,000</td>
<td>6,000</td>
<td>+ 3,850</td>
</tr>
<tr>
<td>Northwestern Region</td>
<td>0.69</td>
<td>1,134</td>
<td>783</td>
<td>1.0</td>
<td>1,500</td>
<td>1,500</td>
<td>+ 720</td>
</tr>
<tr>
<td>Northern Kazakhstan</td>
<td>0.98</td>
<td>24,415</td>
<td>23,850</td>
<td>1.0</td>
<td>15,000</td>
<td>15,000</td>
<td>- 8,850</td>
</tr>
<tr>
<td>Total in Selected Regions</td>
<td></td>
<td></td>
<td>110,113</td>
<td></td>
<td></td>
<td></td>
<td>+45,220</td>
</tr>
</tbody>
</table>
Fig. 1. Fluctuation of the yields and the production of cotton in the Soviet Union and in the United States from 1913 to 1965.
Fig. 3. Fluctuation of the yields of cotton (lint) depending on government subsidies and bonuses.
Conservatively calculated potentialities in grain production only in selected regions indicate that the total grain production would be increased by 40 percent. Additional grain production due to better organization of agriculture would have prevented the import of grain in 1964 and 1965 and would have created significant reserves.

Reasons for the Stagnation of Soviet Agriculture

After Stalin's death, the lack of incentive for collectivized farmers was officially admitted as an important reason for the stagnation of agriculture.

After Stalin's death all cotton growing was concentrated on irrigated land only in Central Asian and Trans-Caucasian republics. This decision was accompanied by the establishment of the priority system in supplying growing cotton areas with machines, fertilizers, and insecticides. These measures, together with increased prices, the supply of food grain, and the establishment of bonuses for cotton growers lead to a rapid increase of yields and production.

As yields reached 600 pounds of lint per acre bonuses and food grain delivery were abolished (in 1959). Cotton growers responded by lowering yields by 100 pounds of lint. After bonuses and grain deliveries were restored the yield rose again to 799 pounds of lint per acre in 1965. (fig. 1) But in natural environments analogous to those in the U.S. Soviet yield are significantly lower than those in the U.S. (fig. 2)

Land is not always properly leveled; water is distributed
unevenly; the distributing canals were not lined by waterproof materials; seepage of water is high; drainage systems not always accompany irrigating systems, and, as result of this, soil is secondarily salinized. Drainage systems should be built on millions of acres of already irrigated lands to flush the salts. Tremendous efforts have been made recently to improve the situation. The completion of all this work will narrow the gap between cotton production in the USSR and that in the U.S.

For more than 40 years the country's average yield of sugar beets was under the 1913 level of 6 tons per acre. The main reason was the lack of incentive for beet growers.

Prices for delivered beets since 1964 had been increased, partial payments in kind, sugar and molasses, in addition to rubles were added. Special bonuses were established for farmers and supervising personnel in collective and state farms. Ample amounts of fertilizers and machines were supplied for beet growers.

The result was remarkable: the production of sugar beets increased by 72% (without the expansion of acreage) - 76 million m. tons in 1964 compared to 45-50 million in previous years. The production of sugar beets in 1965 was again higher than in 1964. New additional sugar mills were built.10

Note: This paper is a part of my research work for college teachers, supported by N.S.F.
AGRICULTURAL PRODUCTIVITY OF ESTONIA, LATVIA, AND CONTIGUOUS
PSKOV OBLAST.

<table>
<thead>
<tr>
<th>Soil-type</th>
<th>ESTONIA</th>
<th>PSKOV</th>
<th>LATVIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climatical region</td>
<td>the same</td>
<td>the same</td>
<td>20</td>
</tr>
<tr>
<td>Number of years under the Soviet system</td>
<td>20</td>
<td>43</td>
<td>20</td>
</tr>
<tr>
<td>Average yields of grain crops, bushels per acre:</td>
<td>17</td>
<td>9</td>
<td>15.4</td>
</tr>
<tr>
<td>in 1959</td>
<td>23</td>
<td>7</td>
<td>16.7</td>
</tr>
<tr>
<td>in 1964</td>
<td>31</td>
<td>8</td>
<td>21</td>
</tr>
<tr>
<td>Average production per 100 hectares (247 acres) of agricultural land in 1959:</td>
<td>4.7</td>
<td>2.3</td>
<td>5.0</td>
</tr>
<tr>
<td>Meat, metric tons</td>
<td>42.3</td>
<td>22.0</td>
<td>51.5</td>
</tr>
<tr>
<td>Milk, metric tons</td>
<td>73</td>
<td>35</td>
<td>55</td>
</tr>
<tr>
<td>Eggs, thousands</td>
<td>2,678</td>
<td>1,786</td>
<td>2,559</td>
</tr>
<tr>
<td>Average yield of milk per cow, kg</td>
<td>20</td>
<td>?</td>
<td>50</td>
</tr>
<tr>
<td>Percent of agricultural land furnished with drainage system</td>
<td></td>
<td></td>
<td>50</td>
</tr>
</tbody>
</table>
Conclusion

In 1966, I repeat a statement which I wrote in 1961 at the conclusion of my Thesis.

The main reason for the low productivity of Soviet agriculture is not the climatic obstacles.

Agricultural science provides the means to combat those obstacles: dryness by irrigation, excess of moisture by drainage and reclamation, shortage of the growing season by selection of the proper crops and strains.

The main reasons for the low productivity of Soviet agriculture during Stalin's and Khrushchev's eras were:

1. too little freedom and too few incentives for farmers;
2. too little application of agricultural science;
3. too few capital investments; and
4. too much politics.

Now we have reason to expect a narrowing of the gap between Soviet and American agricultural productivity. The disastrous years made Russian leaders wiser.

But we also have to remember that abundant agricultural production made Soviet leaders more aggressive. Khrushchev's promise to surpass us and to bury us, as well as his banging on the table with his shoe in the United Nations, was made after the best agricultural year, 1958. After the lean year of 1963, Soviet leaders were less aggressive.

This paper is not the final stage of my research work; it is, rather, a preliminary report of my findings concerning the reasons for the backwardness of Soviet agriculture in comparison with the achievements in industry and space science.
Sources

1. Calculated from Narodnoe Khoziaystvo SSSR.
PROGRAMME
OF THE
SIXTY-SECOND ANNUAL MEETING
OF THE
ASSOCIATION OF AMERICAN GEOGRAPHERS

Royal York Hotel
Toronto, Ontario
August 28-31, 1966
M.R.C. Coulson (University of Calgary): "The Spatial Distribution of Population Age Structure Within the 1960 Tracted Area of the Kansas City S.M.S.A."

D.E. Buerle (University of Rhode Island): "Social Hinterlands of New York City and Boston in Southern New England"

C. Commission on Applied Geography, Territories Room
Chairman: Peter H. Nash (University of Rhode Island)

10:45 - 12:00
(Three Concurrent Sessions)

A. The U.S.S.R., Confederation Room
Chairman: Chauncy D. Harris (University of Chicago)

B. Guest (Northern Illinois University): "The Soviet Seven-Year Plan for Gas Pipelines"

11:05
A. Velacin (The City College of New York): "A View of Soviet Regionalization"

11:25
D.J.H. Hooson (University of California, Berkeley): "Some Geographical Traditions in Pre-Soviet Russia"

11:45
M.P. Mensehaha (Wisconsin State University): "Soviet Agricultural Potentialsities and Reality"

B. Report of the Census Advisory Committee, Territories Room
Arranged by Julian Wolpert (University of Pennsylvania)
Chairman: Julian Wolpert
Panel Discussants:

W. Fay (Geography Division, Bureau of the Census): "New Look in Geography for the 1970 Census"

W.L. Garrison (Northwestern University): "The Activities of the SSRC Small Area Committee"

P. Simkins (Pennsylvania State University): "Content of the Population Census Questionnaire"

R.C. Klove (Geography Division, Bureau of the Census): "Statistical Areas and Mapping"

C. Geomorphology I, Alberta Room
Chairman: Alfred R. Meyer (Valparaiso University)

10:45
H.J. Walker (Louisiana State University): "Delta Lakes in the Arctic"

11:10
R.Z. Murphy (University of New Mexico): "A Spatial Classification of Landforms Based on Both Genetic and Empirical Factors - A Revision"

11:35
B. Zakrzewska (University of Wisconsin - Milwaukee): "The Nature of Geographic Studies of Landforms"
November 2, 1966

Mr. Reinhard L. Korgen
Program Director
College Teacher Programs
Division of Undergraduate Education in Science
National Science Foundation
Washington, D.C. 20550

Dear Mr. Korgen:

Attached is a proposal requesting continued research support for Mr. Mark F. Mensheha under the Academic Year Extension program. Mr. Mensheha received a letter from you dated October 12, 1966, indicating that some support for continued research was available through Supplementary Grants under the Academic Year Extension Program.

I am pleased to lend my support to Mr. Mensheha's application for continued National Science Foundation support. It may be of interest to you to know that we are reducing Mr. Mensheha's teaching load by twenty-five percent for the second semester of the 1966-67 academic year in order to allow him more time for research and writing.

We are anxious to support Mr. Mensheha's research activities and it is our hope that he will be the recipient of a Supplementary Grant which will aid him during 1967 and 1968.

Sincerely,

Karl W. Meyer
President

KWM/dd
Enc. (1)

cc: Dr. Haugland
    Mr. Mensheha
    file
October 24, 1966

To: National Science Foundation  
   College Teacher Programs  
   Division of Undergraduate Education in Science  
   Attn: Mr. Reinhard L. Korgen, Program Director

From: Mark P. Mensheha, Assistant Professor  
   Wisconsin State University, Superior  
   Academic Year Extension Grantee, 1964

Proposal Requesting Support to Continue the Research Under  
a Supplement to Original AYE Grant

Motivation

The shortage of scientists in this country, who can use  
Russian scientific literature directly without waiting a long  
time for the translation and publication, makes impossible  
the inclusion of information about the Russian achievements  
(and failures) in teaching materials concerning that country as  
quickly as it is needed.

Our textbooks about Russia are, in most cases, five  
years and usually ten years behind the developments in Russia.  
Meanwhile those developments are so important and changes in  
economic policy are so rapid and drastic that they should be  
presented to the students of Russian geography, economy and  
policy as soon as possible.

In addition to this the factual materials concerning  
Russia are not always cleared from Soviet propaganda; as a  
result of this, some Soviet "achievements" are still found  
in our textbooks, while in Russia they are already recognized  
as failures: cultivation of cotton, winter wheat, corn, at  
the world's highest latitudes, cultivation of kok-saghyz as  
a new source of natural rubber, unfavorable climate as the  
main reason for lower productivity of Soviet farming, in
comparison with our farming; these are only a few examples among numerous others.

My ability to be at home in Russian language, my knowledge of Russia, where I worked in teaching and research institutions up until World War II, have facilitated the close watch of recent development in Soviet economy, especially in Soviet agriculture. NSF grant (AYE) has helped me to receive four daily newspapers, one weekly and twelve monthly magazines, and a certain number of books in disinterested fields one week after their issue in Moscow, Kiev or Tashkent. As a result of this my students in two subjects, Geography of the Soviet Union and World Economic Geography, are informed about the economic development in Russia to date.

The Recent Stage of My Research Work

The NSF grant made it possible to make field trips to the areas of cotton, sugar beets, and rice growing in the United States during two summers, in 1964 and 1965, to collect necessary material and to discover the Soviet agricultural production was much smaller than in the United States in analogous soil-climatical environments. (See my final report)

The second result of my search was the finding and formulating of reasons retarding Soviet agriculture other than the climatical factor. As a result of this search, the article is prepared for publication.

The next stage was the estimation of the potentialities of Soviet agriculture if the reasons retarding it could be avoided. The results of this first estimation were formulated in the paper, "Soviet Agricultural Potentialities and Reality," read to the annual convention of the Association of American Geographers in Toronto, August 29, 1966. (See final report)
Recent Developments in Russia

Meanwhile the new leaders of Russia admitted the failures and blunders made in Soviet agricultural and economic policy prior to 1965, and made drastic changes in this policy, removing most of the reasons hampering the agricultural production. The results are seen in 1966: rapid increase of production of grain, sugar beets and other products.

The changes occurring in agricultural production have influenced the total economy of the Soviet Union. The early recognition of close watch and careful analysis of those changes, their geographical distribution, especially along the Sino-Soviet border is very important for teachers and students of Soviet geography, economy, and policy and their influence on world affairs. I am planning to expand and deepen my search in this field by:

1. adding wheat, rye, corn, soybeans, sunflower and potatoes to previously studied cotton and sugar beets.

2. taking under observation the development of animal husbandry in the Soviet Union and comparing it with that in the United States.

3. selecting climatic analogues in Canada to that in the Soviet Union with the same length of daylight, and comparing the agricultural production in those areas.

4. comparing the weather conditions in Soviet and American analogous areas during 1963-65 period in addition to the previous period already made.

5. detailing the aforementioned comparison from monthly average data already made to the daily data grouped into phenological periods for specific crops.

6. closer study of agricultural production in Maritime Province (Primorye) and in Soviet Turkestan.
I will continue to collect from the Soviet press information about expansion of irrigation of arid and semi-arid land, drainage of overwatered lands and their influence on the agricultural production.

I am planning to prepare a series of articles for publication to share my findings with other teachers and students of the Soviet Union.

Using the scientific publications of Russian geographers, climatologists, agronomists, and economists, collecting the current publications about agricultural production during 1965, 1966 and 1967 in different regions of the USSR, I hope to write a dissertation estimating quantitatively the Soviet agricultural potentiality as a whole and its geographical distribution.

In my research work, I would like to continue to consult Paul E. Lydolph, Professor of Geography, University of Wisconsin, Milwaukee, author of the textbook, Geography of the USSR (John Wiley & Sons, New York, 1964). I have Professor Lydolph's consent for this.

My university has facilities for performance of planned work: microfilm reading projector, small cartographic laboratory, IBM calculating machines; no special equipment is needed. The university's library has adequate literature in my field, except Russian, which I have obtained with NSF support and hope to continue to do so, if supplement AYE is granted.

During 1964-65 and 1965-66 academic years I used my spare time and summer periods for my research work (without payment from NSF grant). But the spare time was not sufficient to perform research work as fast as needed and as collected materials demand. To dedicate more time for the research work, if AYE is extended, I hope to obtain university administration's consent to reduce my academic load in the second semester of 1966-67 twenty-five per cent. In addition to this, I am planning to use in full for research
work four weeks each summer (1967 and 1968) if the NSF stipend ($75 per week) is granted.

I need the students' assistance for deciphering Russian weather microfilms, for translating temperature data from °C to °F and precipitation data from millimeters to inches, and for cartographic work; in addition to this, I need secretarial assistance.

In the past I had financial support in my research work from the NSF and from no other source. I hope to have the support for the next two years from the same organization.
Budget for a Supplementary Grant for 1967-68

Requested by
Mark P. Mensheha,
Assistant Professor
Department of Geography
Wisconsin State University
Superior, Wisconsin
NSF, ASE grantee, 1964

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<th>Item</th>
<th>1967</th>
<th>1968</th>
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<tr>
<td>1. Purchase of 35 mm. microfilms of machine listings of synoptic observations for selected Russian stations for 1963-1965</td>
<td>$100</td>
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<tr>
<td>2. Literature, stationary, photos</td>
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<td>$150</td>
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<tr>
<td>3. Student assistance, cartography, clerical work</td>
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<td>4. Consultations</td>
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<td>5. Travel expenses</td>
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<td>6. Publishing expenses</td>
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<td>7. Summer stipends of $75 per week</td>
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<td><strong>$1000</strong></td>
<td><strong>$2000</strong></td>
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Mr. Mark P. Mensheba  
Department of Geology-Geography  
Wisconsin State University  
Superior, Wisconsin 54881

Dear Mr. Mensheba:

After a careful study of the reports submitted by recipients of Academic Year Extension awards, the Foundation has come to the conclusion that some of you, although not yet having carried your research far enough to obtain the assistance of basic research-supporting agencies, have indeed arrived at such a point that, given the opportunity to carry on for another year or two, may well be able to gain such support. It also seems clear that if the research you have initiated is continued it will be productive of further scientific results and will continue to contribute to the effectiveness of undergraduate instruction at your institution.

Although funds available are not large, the Foundation hopes to make a few modest Supplementary Grants for the use of a group of 1964 AYE-holders who are teaching in the same institution to which the original AYE grant was made and who are able to make a good case for continued support of their research.

I am pleased to be able to extend to you an invitation to submit a proposal to the Foundation requesting support to continue your research under a supplement to your original AYE grant. I am sure that your summer research supervisor will be willing to give you advice in preparing the proposal if you wish to ask him to do so. This proposal should be submitted to the Foundation prior to November 7, 1966.

Your proposal should describe your research and briefly indicate its relationship to the present state of knowledge in the field and to your previous work; it should also provide a clear description of the general plan of the work to be undertaken and a justification of Foundation support on grounds of its significance as a contribution to knowledge and also to the academic atmosphere of your department or your institution. It will be well to give a description of the facilities already available and of additional equipment needed, and an estimate of the time that you may be able to devote to the project over the period of the proposed grant.
You should give information as to the source and extent of financial support in the past, and of possible future support for the project. Add a brief description of other research now being carried on in your department with or without outside financial support. If there is no other research in the department, or if there are no other science departments in your college, your letter should so state. In short, your proposal letter should contain pertinent information in sufficient detail to permit an accurate evaluation of the proposed program and its effect on science education in your institution.

You should include a proposed budget reflecting the magnitude of the research effort and indicating specific needs. It may be of interest to you to know that most of the Supplementary Grants made to selected 1963 AYE awardees were for $2,000.

In the proposed budget, funds may be requested to provide a summer stipend for full-time summer work up to an amount not exceeding 2/9 of your normal academic salary provided that you are not during the same period receiving salary from other sources; you may also request support for released time, student assistants or laboratory technicians, and for secretarial assistance and publication costs. Allowances for travel in furtherance of the project, permanent equipment not already available, and for expendable supplies may also be included in your request for support, as well as an indirect cost allowance of up to 15% of the total direct costs indicated. It would facilitate review if the budget items were listed on a separate page that precedes the narrative portion of your proposal letter.

As in the case of your AYE grant, the Supplementary Grant will be made to your institution if the Foundation selects your project as one of those to be awarded continued support. For this reason, we ask that your letter be countersigned by an official authorized by your institution.

Sincerely yours,

Reinhard L. Korgen
Program Director
College Teacher Programs