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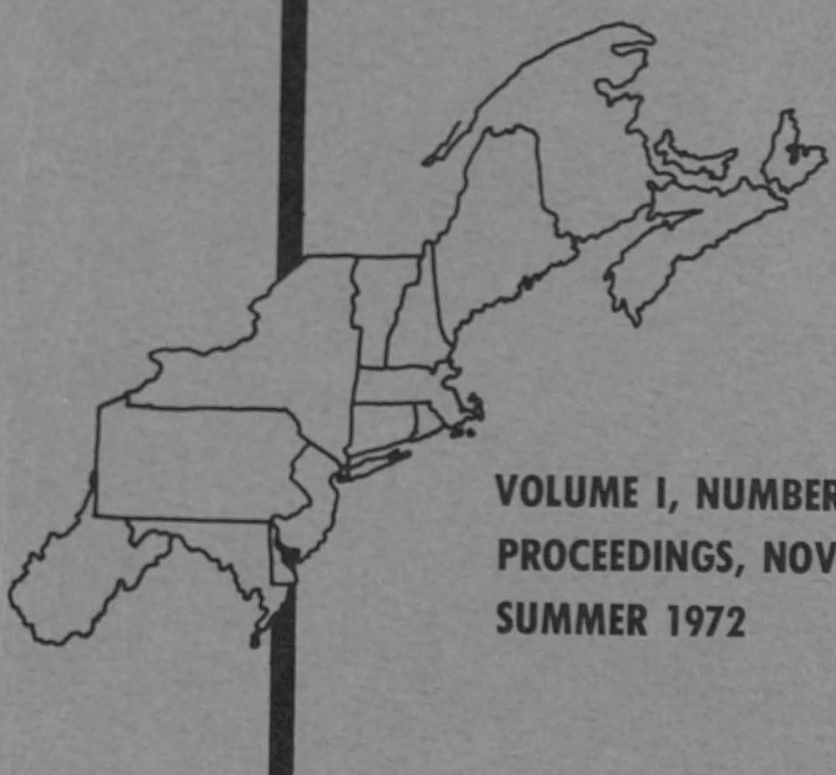

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PAST, PRESENT AND PROSPECTS OF THE POTATO INDUSTRY IN MAINE

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The principle potato producing portion of the State of Maine is located in Aroostook County adjacent to the boundary line which politically separates Maine and New Brunswick. A "natural home" for the potato, this area posesses a combination of climatic and soil features that has favored cultivation of the product to the extent that the area has become known as "The Potato Empire Of The East"; for the past 52 years, over 80 percent of Maine's crop has come from Aroostook. For several years between 1920 and 1958, Aroostook County alone grew more potatoes than any other state except Maine. To speak of the potato industry in Maine is to refer primarily to Aroostook.

Penetration and Permanence

The potato was first planted in the Aroostook area several years after the Scotch-Irish brought potatoes to Maine about 1750. As near as can be determined, Joseph Houlton - one of the earliest Anglo-Saxon settlers in the area - and for whom the town of Houlton was named - planted a variety known as Early Blue or Blue Nose in June of 1807. From then until several years later, potatoes were grown in Aroostook only as a garden product. Potatoes were grown in all counties in Maine, and grew quite well throughout the entire state. Quoting from a paper given before the Maine Board of Agriculture in 1869, "From 1820 to 1840, the enlarged cultivated acreage of the potato in this State was almost a surprise. In 1840, the aggregate number of bushels exceeded 10 million; in 1843, the rot made its advent with such widespread malignity as to cause general alarm that the potato was to be swept from the face of the earth and become extinct. Although the malady somewhat subsided after a few years run, a decade or more years were required to allay the panic and restore confidence. In 1860, the crop was computed at 6,400,000 bushels convincing that something had been learned of the nature of the disease and the preventatives, one or both." In 1862, a prophecy was made "and of all the places in Maine where potato raising will best pay, Aroostook will excel as soon as it shall have railroad facilities." In 1871, the first railroad came. Rail lines were extended from Debec Junction, New Brunswick, into Houlton (a total of three miles), and in 1875 the New Brunswick Railroad Company constructed a narrow guage spur from Aroostook Junction to the United States boundary, with the Aroostook

River Railroad Company constructing an extension from the boundary into Fort Fairfield. The next year, the line was continued to Caribou, and five years later extended from Caribou into Presque Isle. In 1880, 2,248,600 bushels were raised in Aroostook (about 28 percent of the state total).

Potatoes became a recognized factor in Aroostook when the peculiar adaptability of its soil for raising potatoes for starch making was discovered. The first starch factory in Aroostook had been started before the railroad came. An unused woolen mill at Caribou was made over to manufacture starch in 1871. With the railroad, came an increase in potato production and in the number of starch factories in the County. In the early days of the starch factories, farmers contracted a certain number of acres with the factory owner, the potatoes to be bought at the factory at 25 cents per bushel field run. By 1890, forty-two factories had been erected in Aroostook, and by 1904 there were 64 starch factories in the state of Maine, 62 of which were in Aroostook.

Productivity and Production Problems

Sections of Maine other than Aroostook which had started the production of starch as a specialty found themselves unable to maintain the fertility of their soil. This was in part due to the fact that the resources of their soil in the way of fertility were more limited than the loams of Aroostook, and that the crop rotation system, adopted very early in Aroostook, was not practiced in other areas of the state. In 1874, a representative of the central Maine area to the Board of Agriculture said, "Potato culture, from the time the seed is taken from the cellar, is hard, dirty, disagreeable, and laborious . . . it has but few redeeming features. It rapidly exhausts land unless highly manured, which militates against their soundness as thousands and thousands of acres in Waldo County bare solemn witness. We believe the true policy is never to sell off any potatoes, and raise only enough for use on the farm. Other crops can be grown that require less labor at greater profit and we should look to other sources for a market product than to the potato field." Walter Ballantine, Professor of Agriculture at Orono, added, "A few years ago, Aroostook County was believed by many to furnish a practically inexhaustible soil, but the bountiful crops of potatoes, oats, and wheat taken from these new lands have made such a draft on their fertility that many of our farmers are fain to supply defciencies by the use of commercial fertilizers." And so they did. In the contest for the American Agriculturist Prize in 1889, for the best acre of potatoes, open to all America, 3 of the 5 largest yields were raised in Aroostook County, more specifically in Presque Isle: The first prize which was for 738 bushels, the third prize for 537, and the fifth prize for 523.

It appears commercial fertilizer served as the impetus for the use of barrels in handling potatoes in Maine. The first barrels used in Aroostook, it is said, were those in which fertilizer had been shipped into the area. The farmers used also flour, sugar, and fish barrels. Then, as barrels were used to ship starch, the cooper's trade made them for both starch shipments and farmers use. In 1891, a law was passed in Maine to establish the standard weight of a barrel of potatoes at 165 pounds. Indications are that bags were used in the field at one time. A comment made in 1886 was that potatoes "will usually scar and lose their fresh inviting appearance if tumbled into bags

or barrels in the field and out again at the market."

Cultural problems facing the potato farmer were the "potato disease" - late blight - of which control was still an uncertainty, scab, and the Colorado beetle, which first appeared in Maine in 1876. Scab was considered a product of high civilization as it was not found on virgin lands. The beetle was controlled by plaster, most of which was ground from rock obtained from Plaster Rock, New Brunswick, and Paris green. Commenting on control of the beetle, it was said, "There are a few people who have tried taking off the beetles with their fingers rather than to use the Paris green, but in a little while they get tired of that kind of work and take Paris green." Bordeau mixture, for the control of blight, was at first applied with knapsack sprayers that the operator carried on his back, then with barrel sprayers drawn by one horse and equipped with a hand pump. However, it was not long before traction-powered sprayers came into use.

Progression of Production and Packing Paraphernalia

Acreage and production had continued to increase and the definite future of the potato in Maine, particularly Aroostook, was established. Farmers shifted from hand labor and oxen to horsepower when and where it was possible and feasible. Planting and digging continued by hand, but plowing, harrowing, hilling, and hauling were done with horses.

Beginning in the decade of the 1880's many machines were brought into the county by demand of the farmers. Early in the decade, sulky plows and wheel cultivators were used by some and some of the first planters appeared. A satisfactory digger seemed to be the greatest machinery need as production increased. One type of digger, advertised in 1858 as Allen's new potato digger, was described as "simply a double mould-board plow, the boards being shoal and but little curved and slit longitudinally so as to allow the earth thrown up to sift more or less through the openings. It is light, weighing only 85 pounds, of light draft and simple in its construction and with a pair of horses or oxen and a boy to drive, will dig potatoes as fast as 20 men can pick them up, turning them out so clean that not one bushel in 50 is left uncovered. The price is ten dollars."

This "new" digger and others developed in the next score years were used but little if at all in Maine. An Aroostook representative to the Board of Agriculture commented in 1886, "Every machine that is manufactured for digging potatoes by horsepower are brought to us up here, but the perfect digger has not come. Our machine for digging potatoes is the Madawaska Frenchman and his wife and children. And when they will dig, sort, and put in potatoes at 10 cents a barrel, we calculate that is cheap enough. My potatoes were all dug by one man and three children - the oldest 7 years old and the others coming along in order."

After 1890, however, a horse drawn traction drive potato - the Hoover digger - became widely accepted. A few tractors were brought into Aroostook prior to World War I, although most were not too powerful. As tractors improved, several other pieces of farm machinery used in conjunction with

tractors improved also. Nevertheless the Hoover, horse or tractor drawn, remained the prominent digger for about a quarter of a century. Then the snows and freezing rains of the fall of 1925 prompted greater use of engine-driven diggers in Aroostook, even though a few had been tried previously. Four or five years later, another step was taken and power take-off diggers made there first appearance in the County. Tractor farming increased rapidly between 1926 and 1930 with over 1,200 tractors sold in the County during that time.

As Aroostook increased its production to include potatoes for shipment as tablestock, frost-proof storage houses were built - the first being at the rail siding in Presque Isle. Storage houses then became a measure of growth for the industry. Movement of potatoes within the trackside storage houses was at first strictly a manual operation. Bins were filled by rolling barrels up a plank which rested on the potatoes already dumped. Vertical movement was accomplished by rolling barrels on a plank from one level to another. Later horsepower was put to use in this part of the industry also. With block and tackle, a horse moved forward seven feet to raise a barrel fifteen feet to the second deck or from the cellar. After some experience, most horses, as a matter of habit, walked the prescribed distance hoisting a barrel, then back to the starting point lowering an empty.

Sizing and grading, such as it was, were accomplished by allowing the potatoes to roll over a rope rack which consisted of several parallel ropes properly spaced and suspended within a frame. As the potatoes rolled down the inclined rope rack, the small ones would drop through and culls were picked out. One of the first steps in machinery for handling potatoes was the introduction of a chain sizer. A continuous wire mesh belt was carried by two wooden rolls permitting all potatoes below a given size, as determined by the size of the mesh, to drop through. These early chain sizers were hand powered.

In the twenties, electricity was put to use in potato houses. Chain sizers and barrel hoists were the first pieces of electrically-powered equipment used in handling potatoes. Electricity for the central Aroostook area was generated at Tinker Dam in Aroostook Falls, New Brunswick.

Prior to 1924, tablestock potatoes were shipped largely in common box-cars in bulk. Seed shippers, however, had used 165-pound burlap bags since the turn of the century. About 1920, the 150-pound bag came into use, then the 120-pound and the 100-pound sacks. About 1925, roller-type grading tables and rubber pintle roll brushes were introduced. In the mid-thirties, the first roll sizers were brought into use, and with it was the first attempt to offer the consumer a pack of potatoes of uniform size: two State of Maine grades were introduced, Super Spuds and Chef's Special.

Many of the changes in production equipment after World War II stemmed from changes in farm tractors. The newer tractors were larger, more powerful, and could be operated at higher speeds, thus other pieces of production equip-ment became larger and adapted to the greater tractor speeds.

The growing season of potatoes was lengthened by chamical control of diseases and insects, and top killing prior to harvesting became a practice. Harvesting equipment excited the Aroostook farmers interest most. Some thoughts in mechanical harvesting were tried out after World War II, but the first commercial machines were those that had proved successful in other areas. There were twelve harvesters in commercial use in Maine in 1955, and about 430 in 1965. The number probably exceeds 1,000 in 1971, with 80-90 percent of the crop harvested mechanically.

The grading and packaging equipment were developed as being portable and could be moved within the storages to the potatoes to be packed. They also were often moved from one storage to another. Between 1950 and 1955 several changes or additions were made in packing and grading lines including semi-automatic weighing and bagging machines, the expanding roll type of sizer, potato washing machines, and use of polyethelene bags. Particularly with washing, packing lines became more permanently located, with potatoes moved to the packing line rather than vice versa. Some used mechanical conveyors, a few installed fluming systems, and some pallet box type storage and handling systems were introduced. Bulk scoops became popular in the 1960's. In the early sixties a rotary, scale-per-head bagging machine was introduced and became used quite extensively.

Pedding, Promulgation, Perpetuation, and Processing

The potato as an industry began in Aroostook because of the demands for starch. The sales of potatoes for use outside of the area as table potatoes or as seed was limited. The branches of the Canadian Pacific Railway which had been extended into Aroostook, had facilitated the expansion of the industry, but because of the long circuitous route through a foreign country to Boston, the desire for a direct route became intense. Between 1891 and 1902, the Bangor and Aroostook Railroad was built providing the direct route.

Tablestock shipment in bulk and in large burlap sacks eventually gave way to market demands for small units. In the late 20's and early 30's, the common bag size for tablestock dropped from 100-pound sacks to 50-, 15-, and 10-pound bags. Marketing in bulk had been of concern to some, one of whom said, "Many of our potatoes are spoiled in getting to the market. In the first place, they dumped them into vessels, walk over them and shovel them over and spoil the potatoes before they get to the market and usually such potatoes are not sold as Maine potatoes. The potatoes that do come to Boston in good shape are Maine potatoes no matter where they come from." During World War I, farmers and shippers took advantage of the increased demand, shipping practically every potato they had to market. It was during this period that grades were first issued by the government to insure a standardized product on the market. In 1922, Maine joined the Federal Government in a cooperative agreement with inspection performed at the shipping points. The standard grades established were U. S. No. 1, 1 7/8 inch minimum diameter with no maximum, with a maximum tolerance of 6% grade defective potatoes, and U. S. No. 2. These requirements for U. S. No. 1 were not changed in 50 years that followed.

In the mid-thirties, two laws were enacted by the Maine legislature which had direct bearing on the potato industry. The Potato Branding Law required that packages of potatoes must be marked with a grade designation, and that the package contain potatoes meeting the standards of the grade stated. Its purpose was to keep inferior potatoes off the market. The Potato Tax Act imposed a tax, of one cent a barrel on all potatoes marketed, for the purposes of advertising Maine potatoes and for research in handling and merchandising Maine potatoes. In 1954, the law was amended and the tax increased to two cents per barrel marketed - one cent to be paid by the grower and one cent to be paid by the handler-packer. Included in the program for use of this money was promotion of Maine potatoes.

The mid-thirties produced another change in handling potatoes, which some believed ended Aroostook's "orderly marketing" of potatoes. Roads were opened to winter travel for automotive vehicles. Prior to this, those potatoes moved from farm storages were hauled to the track side grading and shipping points mostly on horse drawn wagons, or on long sleds in the winter. This pace of transportation necessarily meant that much of the crop - approximately one-half of the crop was stored in farm storages - was taken to market over a relatively long period of time . . . orderly. With plows to keep the roads open, farm-stored potatoes could be moved by farm trucks hauling larger loads, much faster, and in a shorter, more selected space of time.

Packing operations remained small in size and large in number. There were about 2,800 registered shippers during World War II because of the regulation that one needed to be a licensed shipper in order to obtain a permit to have a rail car allocated to them for shipment. Following the war, many small packing operations continued to be the rule. A few comparatively large packing operations evolved in Aroostook. However, a predominance of small packing operations continued in existence, with many farmers "packing their own", making sales through local dealers. True brokers are not to be found in marketing potatoes from Maine, and commission merchants comprise but a small number of the sales agencies.

Some potatoes for seed purposes had been grown in "lower Maine" as early as 1870. Growing potatoes for seed in Aroostook was of no consequence until after the railroad was established in the area. Beginning in 1914, a certified seed program was adopted in Maine. Acres of potatoes certified increased from its 1914 start of 222 acres passed, to 14,700 in 1924, on to the 60-79,000 acres of the 1960's. By 1930, Aroostook had become the leading producer of certified seed potatoes in the country. Maine "blue tag" seed became known for its quality and had much to do with the increase in seed sales for the state. Many of the farmers in Aroostook produced for both the table and seed markets and the acreage certified as seed quality often comprised about half of the total acreage harvested in the state. A few farmers preferred to be known primarily as seed-growers. In the 1960's some 35-40 different varieties were raised in Maine and sold in some thirty different states.

The industry which found 62 starch factories operating in the County in 1904 could number but 5 in 1970. A new processing potato industry was

established in Maine after World War II, introduced possibly by war-time potato dehydration plants at Corinna and Fort Fairfield and a potato alcohol plant at Caribou. Maine can point with pride to the fact that the Snow Flake Canning Company at Corinna was the first commercial manufacturer of frozen french fries in the United States beginning with the 1946 crop. By 1949, two processing plants producing frozen french fries were located in Aroostook, then in 1961-62, three more processing plants began operations, and another in 1972. For the 1961 crop approximately 9 percent of sales were to processors (not including those for chipping) which increased to about 28 percent for 1965 and to 33 percent of sales for the 1968, 1969, and 1970 crops. In 1968, the plant at Corinna was destroyed by fire. Producing for potato chips has not been very successful in most of Aroostook, but in central, southern, and western Maine, potatoes for chips constitutes the largest portion of the acreage grown.

Prices and Programs

The turn of the century saw Aroostook well on its way to an economy based on a single money crop, and as such, subjected to "accelerating ups and murderous downs." As examples of the variation in prices, consider the crop years 1914 - $.91 per barrel; 1919 - $5.34; 1924 - $1.29; 1925 - $5.17; 1934 - $.55; 1935 - $1.82; 1936 - $2.53; 1937 - $1.02. The average price received by farmers during the 1910-19 decade was $2.66 per barrel; it was $2.52 in the 1920's, and $1.47 in the 1930's. The fluctuation in prices led to the phrase in the song "Glory to Aroostook" of: "When the price is high enough, we have a little cash; and when the market's on the bum, we eat a lot of hash."

Fluctuations in prices were limited somewhat during World War II under the Price Support Program (1942 through 1950) as price was established at a certain percent of parity. For the 1940-49 decade, prices averaged $3.01 per barrel. From 1950 to 1970, with no control on price, year-to-year variations again became quite pronounced, average prices generally ranging between $1.75 and $4.00. The crop of 1953, however, averaged only $1.21 per barrel while the crop of 1964 averaged $6.30: within these years, prices as low as $.50 per barrel and as high as $10.00 per barrel were quoted.

The Maine potato industry approved a Marketing Agreement and Order in November of 1954. Among the conditions established were a U. S. No. 1 grade potato, $2\frac{1}{4}$ minimum to 4" maximum, as the lowest quality potatoes that could be put into interstate commerce from the state of Maine. All potatoes shipped were to be inspected by Federal-State inspectors, and diversion payments were made on stock of U. S. No. 2 grade or better that were diverted for manufacture into starch. After being in effect for nine years, the industry voted out the Marketing Order in the Spring of 1963.

In 1964 and early 1965, adverse climatic conditions occurred in other potato producing areas of the nation greatly affecting the supply situation. Prices for potatoes rose sharply in the Spring of 1965, reaching, as occasionally had been done in years before, the utopian value of $10.00 a barrel.

After the one flash-in-the-pan period of high prices, prices in the next several years remained at about the same level as during the Marketing Order.

Futures trading in Maine potatoes on the New York Mercantile Exchange was authorized in 1941 but activity was practically nonexistent or very light until after the Price Support Program was dropped. Activity on the Exchange then increased considerably. From less than 20,000 contracts traded annually in the late 1940's, the number increased to a high of nearly 591,000 in 1966. The number decreased steadily during the following five years to about 152,000 in 1971. Originally there were seven months of the year, November to May, for which futures contracts were transacted. The months of December, January, and February were later discontinued. Most transactions have been with May contracts - in the range of 60-80 percent of the total transactions. Among Maine potato farmers, there are different opinions toward futures trading in Maine potatoes, as to whether it is in fact a benefit or detriment to the individual grower or to the entire industry.

Several organizations have been formed over the years as an aid to the industry. They have had varied histories. In the 1930's, a Grower's and Shippers Committee was formed which later became the Potato Industry Council of Maine which still later was replaced by the Maine Potato Council. In 1944, a group of young farmers ages 18 to 40, organized the Young Farmers Association of Aroostook. Other organizations have been the Northern Aroostook Potato Growers Association in the 1880's; Farmers Union, begun in 1911; Aroostook Federation of Farmers, organized about 1920; the Maine Potato Growers Exchange and the American Potato Growers Exchange of the early 1920's; Maine Potato Growers Inc. in 1932; the United Potato Producers of Maine in 1964; and more recently the National Farmers Organization was extended into Maine. In 1970, the Agricultural Bargaining Council was incorporated.

Present Prevailing Position

Maine yielded its position as the leading potato producing state to Idaho in 1958. Maine's annual production has remained relatively stable at between 34 and 38 million hundredweight since 1958 while the lands in the west continued to be opened to production by means of irrigation, and potatoes were the primary product planted. In the recent past, Maine has produced 14 to 15 percent of total fall crop, and 11 to 12 percent of the total U. S. production. The number of farms and of farmers producing the Maine crop has continued to decline. Census data indicates 1,892 potato farms in Maine in 1969 - a drop from 2,649 in 1964. Since 1969, several hundred farmers have lost, or are presently in position to lose, their farms through foreclosure or voluntary withdrawal. Acreage in potatoes, however, has remained relatively constant during this time, with only a slight downward trend. The average yield for the State had been relatively constant at about 240 hundredweight per acre after an upward trend for 75 years.

The varieties produced in Maine are changing in importance. In the past three years, Katahdin has dropped from 52 to 40 percent of the total, Russet Burbank has constituted about 27 percent, Kennebecs increased from 12 to 15 percent of the total, and other varieties - Chippewa, Superior, Pungo, etc. - increased from 9 to 17 percent. Changes in varieties have

stemmed partly from changes in intended use. Potatoes for processing into food now constitute about 1/3 of the crop; for seed, about 1/10 of the crop. The portion for processing has shown a slow rise in recent years, while proportion of seed sales outside of the state has shown a slight decline.

Newer storages are generally above-ground entirely, with many constructed of steel. Some new farm storages have been constructed - quonset type buildings with a foam insulation.

Bulk shipments of potatoes for the table and seed market have increased; bulk constituted 11 percent of the seed shipments last year. Seed shipped in 50-pound paper bags constituted about 10 percent of the total. The remaining 79 percent of seed shipments were in 100-pound burlap bags. For tablestock, small packs are increasing with 50-pound packs decreasing.

Marketing agencies in Maine have changed little, if any, in recent years. A study of the 1964-65 marketing season showed some 28 percent of the supply obtained by wholesalers and retailers was from their own buying offices in Maine, 26 percent from Maine dealers and sales agencies, 17 percent from their own warehouses in Maine, and 10 percent directly from the growers.

A substantial majority of the shipments from Maine are by truck. About 79 percent of the 1970 crop was moved by truck as compared with 62 and 51 percent for the two preceding years. For the 1971 crop, the percentage will probably be between 85 and 90 percent.

Possibilities and Projection

Potatoes will probably still be the best economic alternative for growers in Aroostook County for several years to come. Changes, however, must be as sure as death and taxes.

In the production area, there will be continued concern about the land itself---the depth of the remaining topsoil, the stone population, and the organic matter content. It appears to me that potato production in Maine will level off between 140,000 and 160,000 acres. The use over 160,000 acres would mean production on marginal soils which would be unprofitable. Production of fewer than 140,000 acres of potatoes would be dependent upon development of some other crop or crops that produce an acceptable return. However, alternative enterprises and alternate crops in the potato rotation will become more important, not only for additional sources of income, but also for the resulting agronomic benefits in the production of potatoes.

Fertilization practices will be examined, and disease control will continue to be a problem as chemicals are restricted in their use. New potato varieties will appear in efforts to obtain higher yeilds, more disease resistance, and the quality characteristics demanded by both the fresh market and the processing market. Technological changes will demand

greater capitalization in production and handling. Existing credit agencies will maintain a relationship with the industry, but with altered policies. The availability of agricultural labor, and its power to bargain, will be issues for the industry to face. The trend toward fewer farms and farmers is expected to continue, although the decrease probably will not be at the excellerated rate experienced in the late 1960's and early 1970's. Farm size will increase in order to afford the farmer a living wage and a return on invested capital.

Prices for potatoes will be near the cost of production because of economic competition from other potato producing areas. Potatoes produced for processing will increase, but will face fierce competition from the West. Freight rate differences will continue to give Maine some advantage in Eastern markets. Existing processing plants will probably expand somewhat, and there probably will be construction of new facilities in certain areas. Processors will continue to raise potatoes, up to 1/4 of their requirements, to assure themselves of a minimum level of supply, and contracting arrangements between processors and growers will increase. Bargaining between producers and processors will be highlighted in the next few years, but will eventually attain a level of effectiveness in influencing farm prices.

Seed sales will continue to decline. The market for Maine seed will shrink as there will be a reduction of acreage in the "hot summer months" production areas and in those areas where potato production will yield to the pressure of urban development. In seed production, two possibilities exist. The one selected may depend upon the new varieties expected to be introduced. One alternative is that of increased specialization in seed production with a decline in the number of those who produce both for seed and table markets. The other alternative is that only the smaller tubers will be marketed as seed, improving the size of the remaining portion which will go to the table and processing markets. This is similar to the way the Katahdin variety has been handled in the past. I am inclined to think the path taken will be more specialization in seed production.

The proportion of the Maine crop marketed as tablestock will decrease as per capita consumption of fresh potatoes decreases. Fresh potatoes will become more of a specialty item. Packing of potatoes in consumer size packs at the shipping point will decrease, and there will be more centralization in shipping point packing facilities. Growers will have less ability to compete by packing their own crop. Shipping potatoes in bulk for packaging at terminal facilities will increase. The grower will become more integrated with the market he is supplying, and the current fragmented marketing system will become more centrally organized.

The Maine potato industry of tomorrow will not be as it is today. Changes surely will be made in each phase and part of the industry. But the potato industry will be one of the agricultural survivors in Maine, and potatoes will remain the principle product in "The Potato Empire of the East".