

# RETIRING FACULTY REVIEW AGRICULTURAL RESEARCH

Six long-time faculty members of the Agricultural Experiment Station have announced their retirements this year. With cumulative years of service approaching two centuries, these six have touched the lives of thousands of students, authored thousands of publications and conducted hundreds of research projects that have profoundly affected the course of North Dakota agriculture and agribusiness. All six have appeared in the pages of NORTH DAKOTA FARM RESEARCH many times in the past. In this issue we have given them the opportunity to submit "guest editorials" about their careers at North Dakota State University and/or their observations about the course of agriculture.



**Charles G.M. Edgerly**

Twenty-nine years ago I had my first look at North Dakota when I came to Fargo to interview for a possible job at North Dakota Agricultural College. At that time I was working at the University of Maine. The state of Maine had the highest percentage of its land in forests and was a seacoast state. North Dakota was the wide open prairie state with the least area in forest land and about the farthest from the seacoast. When I informed people that I was moving to North Dakota one informed individual stated, "Oh, that's just a little north of Alabama."

The change in my life and that of my family was considerable as we were originally from New Hampshire. However, we feel that North Dakota has been an excellent place to live and raise a family. Now we feel more like this is home and we appreciate the many things and opportunities we have had since we arrived here. We really appreciate the life style of this area. We hope we have been able to contribute something to the area that has done so much for us.

In this day of rapid communication and travel the distances are smaller, in time at least. Students who are trained in North Dakota are spreading their influence over wider areas and affecting the changes that take place around us. I am sure that more people now have a better idea of where North Dakota is really located!

Looking back over the years I have been associated with North Dakota Agricultural College and North Dakota State University, the one thing that stands out most vividly is change. This is as it should be and as it will continue to be. To the old saying that the only things certain in life are death and taxes should be added change.

Not everyone will feel that all changes have been for the better, but how many of us really want to go back and live under the conditions as they were in the "good old days?" North Dakota State University and the North Dakota Agricultural Experiment Station have made great contributions to change in North Dakota. To keep abreast of the rapidly increasing rates of change, the University and all of its divisions will need to continue to lead in those areas where the best use of available resources can be made.

The greatest resource of this state, or any state, is its people. It has been a pleasure and a very rewarding experience to work with the people of North Dakota, especially the many students I have worked with over the years. There will always be problems but when they are solved the rewards are so much greater than the problems that the later are soon forgotten.

As I look toward the future I see a great need for young people that are trained in many areas that were hardly considered a few decades ago. Use of the com-

puter in business, on the farm, in the home as well as in research and teaching will continue to exert influences on the ways things are done and the rate they are done. The use of space for communications, for weather observations and determinations as well as viewing soils, crops and other conditions important to agriculture will bring changes not yet considered. However, in spite of all these changes and progress it becomes very necessary for people to sit back, relax, and evaluate where they are going and, hopefully, to make more improvements for the well being of all. There is a place for the dreamer and the people with vision to question the hows, wheres, and whys of things around them. We all need to be dreamers at times.

As rates of change and progress speed up, there will still be a need for the basics if we are to be able to communicate with those around us and for those to come after us. A study of the past is always a help to understanding the present and even to some possibilities for the future.

Recently while looking at an issue of a farm publication one title that caught my attention was "Accent on Accuracy." It was a brochure by DuPont Agricultural

Chemicals, but I feel that the title has a much wider and greater need today. With all the claims and counter claims for what various products will do for us, the accent on accuracy cannot be overstressed. This is especially true in the agricultural and nutritional areas where challenges are continuing to be made for and against many natural and synthetic products. Accuracy in advertising and in merchandising and in daily lives as well as larger national and international affairs is of the utmost importance for peace and security for all.

Over the years the agricultural experiment stations have played a very important role in developing the topic of accent on accuracy and bringing the results to the people of the state and nation. This should never be sacrificed for any consideration whether it be for increased publications, to gain increased support or any other reasons.

As I change hats from academic and research areas to more private and personal activities, the years at and the influence of North Dakota State University will always remain with me. As the University approaches its centennial, greater and larger changes will be over the horizon for fulfillment during the next hundred years.



**Verlin K. Johnson**

Thirty-one years of observation of the animal production industry from one position provides the sight of many changes. Beef cattle, for instance, have gone through several important changes over the past years. The dwarf problems of the 1950s were treated with considerable success by extermination through heritage. Then came the change of type, the plunge toward size, the importance of cross-breeding and finally, performance. All of these could have emerged and passed in lesser time if observations and goals had been more definitive.

Livestock production is obstructed by many fads. Someone comes up with an idea and others follow to get on the band wagon. Money to be made supports fads that aren't of specific merit to the industry — thus, they

get underway before measures of real value or progress can be established. The expanding economy of the fifties and sixties had little need for high performance animals. However, the fad for big became far too important before people started to realize that maybe this wasn't the total answer to economical performance. Thus, general economy causes changes in types.

Unwanted animal characteristics not recognized in popular lines creep into a breed unnoticed until they have spread over wide segments of the industry. The novelty to make big money sometimes creates changes that aren't particularly advantageous. Standards of evaluation sometimes create great change in the industry before they are adequately tested. The most effective tools to increase efficiency of production are an adequate scale, accurate breeding records, calving records, growth weights and selection for long lifetime soundness. Eyeball evaluation cannot be the only factor anymore than any other single measurement. The need for teaching basic livestock selection never ceases. All of these are involved and no one measurement or record stands alone.

One of the best examples of the importance of selection is the NDSU sheep flock. The period of 30 years, 1951-52 through 1981-82, saw the increase in 90-day weights of a total of 30 pounds per lamb in three breeds. The late Merle Light kept accurate records, and with the use of these records and his "eyeball" selection, these weights increased continually without the influx of the extreme types. The extreme types were not brought in until Merle got tired of fighting the fad and went with

the rest of the industry. It is the opinion of several of Merle's co-workers that this increase in production would have occurred without the type changes that he brought in about 1978. The increase in production was gradual through the entire period and the reproductive efficiency did increase some, but generally changed very little.

The magnitude of change probably wouldn't be as great in cattle, nor needed, but the type of selection would work to improve total efficiency if applied with the same emphasis. Sheep production has gone through many changes in type during the past 30 years. There have been bad turns that required time for correction. Efficiency of production has emerged as the important emphasis at this time.

The year 1948 marked the beginning of the movement toward a meat type hog. There have been numerous fads and changes in swine type since that time and some of these changes have taken bad turns where corrections over a period of three to four years were required. The type changed from short and fat to long and too narrow, then back to too heavily muscled pigs that had stress problems. Most of the animals of this type have disappeared (thankfully) for they provided the packer with merchandizing problems. The swine people, with a longer span of production records than beef, have now gone to long and thick animals that have long lifetime soundness and are efficient users of feed. Rumblyngs do exist that somewhere in all these changes that swine have lost some litter size. This is a very important factor to slip away without knowing how or where.

The problem of maintaining a relevant research program is most difficult with cattle because of the long period of time involved in growth to maturity. The time required to answer the current needs of how to produce beef more economically without increasing the amount of beef provides a very interesting problem. The economy changes will probably indicate a change in the type of answers needed prior to completion of the presently planned work with beef.

The problems of associating research with the needs of the times are not as great with swine and sheep. The shorter gestation periods and shorter time to reach market weight provide answers in shorter total time so chances for economy changes are not so great. Many times our new findings in sheep and swine are not obsolete when announced.

Use of the basic selection tools may be the most successful means of increasing the efficiency of beef production. This requires basic operating procedures that have been around for a long time. However, we tend to forget these tools and try to grab on to a new single idea and forget old, tried and proven procedures. The first studies on the amount and types of product produced in relation to heredity in beef cattle began here at NDSU in 1954. Shortly thereafter a number of projects around the U.S. were "initiated" with that idea. So that type of research isn't too old. At present, there are noises that the product produced isn't that important. However,

visits to the packing house sales room wouldn't make such a statement valid.

The area of teaching brings to mind the importance of advising in the higher education field. There are several essentials to doing a good job of advising students, and working at these provides much satisfaction to the advisor. One must be sincere and honest to the nth degree with the student. The advisor must have faith and believe that young people will turn around after a mishap or two. Understanding the student's point of view is very important to the advisor. The advisor must recognize his responsibility and the need for help at most any time. Example: I have helped advisees three or four times when receiving calls after midnight in the past 30-odd years. Some of these were almost basket cases, but they did continue and graduate from school. This advising part of my work has been the most satisfying and rewarding. It is fun to watch people grow and make their own decisions after one explains some of the possibilities. I have said a number of times "It is nice to work with North Dakota's best crop — their young people."



**LeRoy Schaffner**

As I retire after 37 years of service with the Agricultural Experiment Station, I realize how agriculture has changed since my days as a student of agricultural economics at NDSU and Iowa State University and as an industrial economist with the Tennessee Valley Authority before joining the staff here.

Some of the changes in agriculture that have taken place are the amounts and types of inputs used in agricultural production. In 1947, North Dakota used 27,000 tons of fertilizer annually. Today the consumption is estimated at over 775,000 tons, an increase of about 28 times the 1947 tonnage. Chemical herbicides were just being experimented with in those days, compared to the vast array of chemicals available to producers today. Another big change is the large increase of capital investment in machinery and land.

My primary research efforts have been in farm management and agribusiness. This research has been directed toward economic analysis of practical problems affecting farmers, ranchers and the agribusiness community in the state. These studies have included the possibility of on-farm processing of sunflower oil as an extender for diesel fuel, economics of alternative weed control measures, machinery use efficiency analysis, and costs of production of North Dakota field crops. Studies relating to problems affecting agribusiness have included economic feasibility studies of malt production, commercial sunflower processing plants, and soybean crushing facilities. Time has also been devoted to evaluating natural resource-related problems such as irrigation development and the economic effects of added growing season rainfall.



**George E. Staples**

My earliest memories of mechanized agriculture include watching a horse-drawn binder spit out neatly tied bundles, then later watching a group of horses travel in a circle around a gear box that powered a thresher spitting straw into a big pile. I must have been about 4 years old. Later a steam-belching monster replaced the horse-powered gear box, but horses still plowed most of the fields. My grandfather's eyes would have popped at an air-conditioned four-wheel drive tractor equipped with power steering and a television or tape deck, plowing more ground in half an hour than his five-horse disk plow turned in 10 hours. His eyes would also have popped at the price, which in inflated dollars would amount to about four times the price of the family farm and livestock.

My earliest memory of animal nutrition was a picture in a farm magazine about 1925 of two littermate hogs showing how much bigger the hog grew that got alfalfa along with his grain. New knowledge of animal nutrition has almost kept up with inflation and has been a very significant advantage to both producers and consumers.

My in-depth knowledge of animal production problems required my attention as a high school freshman when my FFA project, raising turkeys, made me the largest producer in the area with about 300 birds. Now 30,000 birds are a small flock.

I returned from the Navy in 1945 and began pursuing a career in animal science, receiving a BS in animal science from Utah State University and an MS in animal nutrition from South Dakota State College before receiving a DVM from Colorado State University. Three chief impressions stand out from my animal related education and experience:

1) The numerous problems and decisions that face the successful livestock and poultry producers in regard to management, disease, financing and marketing.

2) The failure of numerous unsuccessful producers to implement many of the good management procedures that have been known and publicized for decades. If researchers were better salesmen, fewer of the discovered aids to agriculture would get lost in the files



**I.A. Schipper**

After thirty-one years, over 4,500 students, \$550,000 in outside grants, over 450 publications and two heart attacks, one naturally will form some opinions as to the past and the future. I was born in agriculture and have lived with it and from it for all of my life. I believe agriculture is what has made this country great and that everyone in this country is dependent upon agriculture.

The future of agriculture is wholly dependent upon competent, aggressive leadership. From the many students I have had the opportunity to work with I hope there will appear the dedicated, competent leadership that the future agriculture will require. Such leadership will be remiss if they do not remember that our land-grant colleges and experiment stations were established by acts of congress and under such presidents as Lincoln and Teddy Roosevelt and with the dedication of teaching and research in all phases of agriculture and related mechanical arts. They will also be remiss if they do not establish a precedent of peer review of research programs and teaching by persons active in and dependent upon agriculture and work to establish advancement and compensation of researchers and teachers based on ability and production.



and thrown out only to be "re-discovered" half a century later.

3) The confusion created by the so called experts, especially the "planners" and "regulators," which overall are detrimental to the agricultural sector despite doing good in some areas.

Between now and the year 2000, I suspect politics will continue favoring the consumer of agricultural products at the expense of the producer. Then as farming operations become larger and fewer and regulations become more stringent we may reach a point where there is a shortage rather than an excess in production of wheat, corn, milk, beef and pork. If that occurs will we be able to buy these products from the USSR?

However, perhaps agricultural scientists may find ways of improving production efficiency sufficiently to outrun inflation and the regulators then we can still eat both bread and meat.



**Joseph C. Zubriski**

In this guest editorial I will list some of the research projects that I worked on during the past 34 years and indicate some of the research findings and their effect on crop production in North Dakota.

One of the first projects that I worked on in the 1950s was to determine the effects of commercial fertilizers on soil moisture utilization by wheat. Data obtained on this project revealed that commercial fertilizers increased wheat yields from 5 to 7 bushels per acre but did not increase soil water use by very much. The results of this research encouraged farmers to use more fertilizers to increase small grain production and thereby use the limited supplies of soil moisture more efficiently. Commercial fertilizers increased water use efficiency by about 0.5 bushel/acre/inch of soil water.

Another project that I worked on in the 1950s concerned the determination of a chemical soil test for phosphorus that was correlated with soil phosphorus availability and response of crops to added phosphate fertilizers. For this project, radioactive phosphorus fertilizer was tested in both field and greenhouse trials to determine the proportions of plant phosphorus derived from fertilizer and soil sources. Once the proportion of

plant phosphorus derived from fertilizer sources was known, then an index of soil phosphorus availability was calculated and correlated with values from various chemical soil test procedures. Results of this research revealed that the sodium bicarbonate procedure (procedure used by the NDSU soil testing laboratory) correlated best with the index values determined from the radioactive phosphorus experiments. The soil testing laboratory began operations at NDSU (formerly NDAC) in 1953 and today many farmers test their soils to determine the fertilizer needs of their soils. Additional research in the 1950s showed that crops such as corn, potatoes and flax responded to the application of commercial fertilizers on deficient soils. The advantage of relatively high population of corn plants in fields with adequate soil moisture was demonstrated. Larger stands were found to produce larger yields and require more nitrogen fertilizer. This research also showed that germination injury of flax often occurred when more than 10 pounds of nitrogen and/or 20 pounds  $P_2O_5$  per acre were placed with the seed at planting. By broadcasting the major portion of the fertilizer needs of the flax crop, crop stands were improved and seed yields of flax were increased by several bushels per acre.

One of the major projects that I worked on in the 1960s was the determination of causes of high protein malting barley. These investigations revealed that either late seeding or amounts of nitrogen from either soil or fertilizer sources in excess of that needed to maximize yields was responsible for the high protein content of the grain. By seeding early and using nitrogen rates based on soil tests and realistic yield goals, barley growers increased their yields while reducing the incidence of high protein malting barley.

In the 1970s and early 1980s the two main research projects that I worked on were on effects of commercial fertilizers upon yield and quality of sunflowers and on fertilizer and water management of irrigated crops. Research results revealed that sunflowers responded to added nitrogen on about 70 percent of the non-fallow soils. The average response on dryland was about 500 pounds seed/acre. Use of commercial fertilizers, especially nitrogen, along with use of hybrid varieties and better weed and insect control has increased state average yields to about 1400 pounds seed/acre. The average yield in 1970 was about 1000 lbs seed/acre. On the fertilizer and water management project, three crops were grown under irrigation at various rates of nitrogen fertilizers. Wheat yields under optimum irrigation at Oakes, North Dakota reached yields of 72 bu/acre. Sunflower yields reached a high of 3700 lbs/acre and corn yields reached a high of 210 bu/acre.

In summary, the results of research on the soil fertility projects that I participated in have contributed to a greater use of the soil testing services in the state, a greater amount of fertilizer being used for all crops, a decrease in use of excessive amounts of fertilizer, an increase in quality of most crops, a more efficient use of fertilizer and water, an increase yield of crops, a decrease in cost of producing a unit of crop and more profit per acre for many North Dakota farmers.