

FROM THE DIRECTOR

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equivalent of 45 individuals but are receiving the talents and services of 105. This is what the combination of research and teaching is all about, and why it is so outstandingly productive when fresh minds of students are constantly challenging the maturity and experience of the professional teacher. This phenomenon is particularly notable at the postgraduate or graduate degree level.

The Ph.D. offerings in the College of Agriculture were not developed or initiated at the specific added cost to the teaching program. Neither did the offerings require the addition of specific positions or particular individuals. Rather, the offerings came as a natural result of the simultaneous increase in the number of undergraduate students enrolled in the College of Agriculture and the increase in agricultural research undertakings. As the number of undergraduate students and the agricultural research program increased, so did the number and wider capability of professional personnel also increase. This was true not only in the College of Agriculture but also in other colleges of the University.

Additionally, the location on campus in the early 1960's of the Metabolism and Radiation Research Laboratory of the United States Department of Agriculture added the potential of about 50 scientists with capabilities in animal science, entomology, plant science and many related specialties such as genetics. Twenty of these individuals have subsequently been extended courtesy appointments in several departments of the College of Agriculture and have also been included in the graduate

faculty of the University. They actively take part in the programs of individual graduate degree candidates, both in teaching and research.

Fifteen research scientists provided by the U.S.D.A. are located in several of the College of Agriculture and Agricultural Experiment Station departments. These individuals are taking part in a highly integrated and cooperative program of teaching and research with our staff, all of whom have a dedication not only to maintain but also to improve the agricultural potential of this geographic area.

Graduate students in the College of Agriculture serve as "additional research hands" as well as active and productive minds. This is a mutually advantageous arrangement for the student, for the teaching program and for the agricultural research program. Even though there might be only one Ph.D. candidate in a particular department at a given time, the potential for contribution to the total goals and missions of the College of Agriculture and the Agricultural Experiment Station is very great. A cursory examination of several theses which have been produced will show that results have been applied either directly or indirectly to current problems and situations.

Further evidence of the import of the Ph.D. degree program in Agriculture is the constant and fruitful contacts with industry which serves agriculture. As a result of these contacts, industry substantially supports the graduate research program. Industry receives the benefits of research results and also finds that our institution is a good source of well-trained personnel for employment in their organizations. Without the Ph.D. degree program, many of these contacts would cease.

Bibliography of Livestock Waste Management

Research in livestock waste management has been greatly expanded during the past decade. Several researchers, some previously unfamiliar with the field, have begun research projects. Researchers and other interested persons have experienced difficulty in locating and retrieving information on livestock waste handling.

A "Bibliography of Livestock Waste Management" was prepared to simplify the search for waste management information. Over 1500 different periodicals plus conference proceedings, theses, etc. were searched for titles. This work was done under the direction of Dr. Ronald Miner at Iowa State University. The bibliography was printed and made available through the Midwest Plan Service, an organization of Agricultural Engineers of the 12 midwest land-grant universities.

A computer system was used to document items in the printed bibliography. Items are assigned a cross-reference code, and the printed booklet divided into Bibliography, Author Index, and Keyword Index sections. Appropriate items and related information are found in one of these sections.

Copies of the "Bibliography of Livestock Waste Management" are available at \$2.00 per copy from the Extension Agricultural Engineer, North Dakota State University, Fargo, North Dakota 58102.