Agronomic Research and Development

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EXPERIMENT Stations and Agricultural Research Services have played a dual role; they have contributed to research and they have likewise been deeply involved with the practical application or development of this research. Such dual responsibility will, and probably should, continue for some time. However, to a disturbing extent, there appears to be a lack of balance between these two activities and a tendency for a strong emphasis on application to continue long after the critical need has ceased. Since funds and personnel are limited, any unnecessary emphasis on application means that research must receive less attention than it merits. In any situation where research and application compete for time and funds, application commonly receives the lion’s share of both since the public pressure is for information that can be put to immediate use. No correspondingly vocal group clamors for research.

It is my opinion that too large a proportion of the work titled “research” conducted by the publicly supported Experiment Stations more correctly falls in the development category. Since corn breeding is the field in which I have had the most experience, I shall use this field for my illustrations. It should not be inferred that the imbalance between research and development is confined to the breeding of corn or even other plants. I believe this imbalance extends throughout the entire area of agronomy. However, I shall let each of you make the extrapolation to areas other than corn breeding to the degree that you feel may be justified.

Research is undoubtedly one of the most abused and most indefinite words in common usage. The confusion becomes greater if one attempts to recognize different classes or categories of research. Basic and applied research have been variously defined, and I do not propose to add to the confusion by presenting a new definition. It is my intention to avoid this distinction completely. What I shall be concerned with is research, however defined, on the one hand versus routine application on the other.

Lacking a universally acceptable usage of the term research we shall have to be satisfied with a pragmatic definition. Of the several criteria which might be used I shall consider only two: the current state of information and the intent of the investigator. At any given time when knowledge concerning a given process, function, or activity is inadequate, experiments to clarify, unify, or expand can certainly be classified as research. However, once the phenomenon is reasonably well understood, successive repetitions of the same techniques or procedures may be desirable from a practical standpoint; but if they produce no new fundamental information, such repetitions become development rather than research. The great bulk of the production and testing of inbred lines of corn to-day must be considered development rather than research. It is true that a considerable element of trial and error is involved, but that does not in itself warrant the designation research.

The intent of the investigator must also be considered. For example, two men may be engaged in the development of lines and the evaluation of hybrids. One is concerned solely with the practical aspect: the development of a superior product. Regardless of the success of the venture no new information has been accumulated. Development rather than research has been involved.

The second man, performing somewhat the same operations, is concerned primarily with the reasons for the results obtained. The superior end product is welcomed, but its occurrence is somewhat secondary to a more complete understanding, a clarification, or an addition to our backlog of knowledge. The accumulation of such new information constitutes research. Regardless of any inadequacies involved, the criteria mentioned will constitute my basis for the distinction between research and development.

The story of the events leading to the production and utilization of hybrid corn has been told many times, and I shall not repeat it here. Rather, my objective is to consider the adequacy of the present public programs with respect to relative emphasis on applied breeding and basic research. To place the present situation in its proper perspective it will be necessary to review briefly past developments. In this review, I shall be concerned with the Corn Belt only. However, the situation in other corn-growing areas appears to be following trends exhibited in the Corn Belt but with a somewhat different time scale. For this reason it is hoped that any suggestions or conclusions may have general pertinence.

Since we shall be concerned with a geographical area rather than any single state, specific detail must be omitted leaving only the general developmental pattern. Most of the public corn programs giving emphasis to the then new development of inbreeding and hybridization were organized in the early 1920’s. Several of the now major hybrid corn companies came into existence and began their breeding programs at about this same time. The first trickle of hybrid seed reached the farmer about 1930. For the first few years farmer acceptance was slow.

At that time few people envisaged the ultimate role of hybrid corn. Some thought that only a fraction of the corn