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THE ADMINISTRATION OF AGRICULTURAL RESEARCH[1]

THE question of the advantage of administration in connection with the prosecution of research has been much discussed in academic circles. It has often been looked upon askance in that quarter, and there has been apprehension lest the attempt to organize for research should infringe upon that freedom to investigate which is conceived to be the birthright of every pioneer research worker. President Angell referred to this in an address before this Association a few years ago when he said: "A fairly prevalent conception of research associates it with the somewhat mystical intellectual operations of the genius or 'near genius,' to tamper with which is a kind of profanation."

Such a view is based on the academic or university conception of research and relates, doubtless, to the more abstract field of inquiry in which the individual follows out his own course in the pursuit of that elusive thing, an idea. But much research at the present time is not of that personal or essentially individual type, carried out for the gratification and advancement of scholarship of the principal; it is institutional in that it is conducted by individuals associated in groups. They may work independently or in varying measure of cooperation, but they are members of an organized agency, designed to serve a particular field or purpose. Such agencies are developing rapidly. They deal quite largely with industrial or applied research, since their ultimate purpose is to solve problems or acquire information for the more immediate benefit of an industry or the public generally.

Agricultural research—using the term broadly—is the largest example of this type, and it is almost wholly supported or subsidized by public contributions. Practically all of it is organized, carried on by units constituted for the purpose by law; and, being organized, there must be administration by a responsible head. For organization and administration are twin brothers, in research as well as in industry. This condition does not interfere with the opportunity of the individual—it often contributes to it; but it does affect his relationships, and it imposes responsibility which the independent investigator does not accept.

[1] Paper presented at the Chicago convention of the Association of Land-Grant Colleges, November 14, 1923.

Of course, it is possible for administration to go too far, to be arbitrary and unreasonable, to exceed its function; but that is not the tendency at present in our agricultural institutions. Rather it may not go far enough in some cases.

A research institution is a public trust. It carries a very definite obligation, to humanity and civilization. Research is one field in which responsibility for the use made of opportunity and resources can not be shunned. It is not a private affair. It is a matter of public concern wherever it is done, for it is the means of growth of civilization and human welfare.

Perhaps the primary function of administration may be defined as making the most of the resources at hand, to the highest advantage of the field designed to be served. If it is true to those dependent upon it, it should aim to secure the maximum output for the funds used, to express the fullest use of the facilities at hand, the largest practicable return for the investment. "It is not the money itself but the skill and intelligence with which it is applied that determines the amount of service rendered." This is the business side. It is the principle of good business understandingly applied to research, but it is as different from the administration of business as research is from industry or commercial life. The attainment of success and the measure of it require scientific as well as business judgment.

The fundamental principle of administration in research has frequently been stated in the simple terms of selecting good men and giving them freedom and sustained support. To me, it is emphatically this, but something more—certainly more than a passive attitude toward their work after the group has been assembled. It implies an attitude of continued interest, of sympathy, understanding and encouragement; and it also implies expectation. The latter may show itself in a close study of the progress of the work and its competence to attain the ends sought, a questioning of whether delay or failure is due to the worker, his methods or his environment. It may lead to counsel and suggestion, or even to restraint, for the continued support of projects will usually bear relation to the degree with which expectations are being met. Even the most abstract research looks toward the completion of its project, and does not carry with it unlimited freedom to follow at random wherever interest or inclination may lead. A spirit of friendly criticism, of expectancy and the weighing of prospects, is an attribute of the keen administrator, although it may rarely come to the surface.

In such an organization as an experiment station, the selection of a working program out of the multitude of things which might be undertaken is naturally one of the large functions of administration. Otherwise, as usual, what is everybody's business is nobody's business. Someone must familiarize himself with the leading agricultural questions of the State or region, and maintain contacts with the industry as a whole. This usually centers in the director, for, although he needs the counsel of his specialists, in the last analysis he will be called upon to decide upon and to assume responsibility for the way in which the station is discharging its mission.

Theoretically the working program is a general expression of what most needs to be done to meet local needs or to advance problems of wider range. Naturally it deserves to be well studied and properly balanced. In this an advisory committee may be of much help.

It usually happens at the present time that this program is in part inherited and can only be reshaped gradually, but it is for the director to size up the various features of it, determine their adequacy and relative importance, and work out a policy for further development. For such a research institution must be constantly going forward.

One of the most difficult tasks of administration is the selection and recruiting of the staff. This is one of its largest responsibilities, so much depends upon it. It is naturally governed by the lines to be emphasized, and within these it depends on disposition to search out men and ability to judge them. The choice may be influenced by the fact that other college duties are to be involved, but even when this is the case, the representations of the director as to the necessary qualifications for research may have much weight.

It is sometimes said that the efficiency of an experiment station is the sum of the efficiency of its staff, to which should be added, in my judgment, judicious administration, for even with a highly competent staff the effectiveness with which their work is carried on will depend to no small extent upon conditions which center in the administrative office.

The fact that over half the workers in the experiment stations have other calls upon them—either teaching, extension, regulatory or service—gives opportunity for administrative attention. In a sense research has often to meet the competition of other college duties and interests, some of which are regular and imperative. Hence the necessity for insuring to the workers the necessary time for research, and avoidance of the frequent tendency of individuals to take on too many different projects. This latter needs to be guarded or it may result in good intentions degenerating into protracted routine with too little study. Opportunity is required, not only for the making of experiments, but for the exercise of the thinking function indispensable to research.

Furthermore, individual workers vary in their qualifications and experience, and they are grouped in college departments in which the research spirit

often varies. The wide range of station work, from routine determinations and observations, and the making of relatively simple tests and experiments, to the more original abstract and theoretical inquiry, affects the standards and the outlook of workers. The director may help to correct this in individual cases, and give opportunity for growth. He may supply incentive which will encourage workers to strengthen their attack and look deeper into their problems. Administration can not put into a man what is not in him, but it can stimulate his development, if the basis is there, and it may lead and help him to make better preparation and to elevate his standards. It may give him a chance, and impress upon him both his opportunity and his responsibility.

Similarly the standards and type of work of different departments may call for attention. For while departments can not expect to be self-contained it is now very evident that the fundamental research can not be done in one place or department and the applied work in another. Departments themselves may need to be strengthened. Certain ones will usually stand out more prominently in their work than others, for a symmetrical organization is rarely attainable, but the research spirit should be in evidence, with encouragement for its development as opportunity offers. Without a well-defined research policy, competent workers can not be attracted to a department; and on the other hand, ambitious investigators whose efforts are not sympathetically supported will seek other fields or lose their zeal.

In practise, administrative attention is usually needed in some directions more than in others. Different men work according to their particular aptitudes and habits. Research in the more abstract fields can not be systematized to the extent that less exacting types may be, and in large measure the investigator in that field must be free to follow his vision. Not infrequently, however, well qualified investigators respond to suggestion which directs them into channels germane to the station and the special subjects it desires to study, or prevents their wandering too far afield. Naturally, the director should come to know his men, for in a sense the freedom accorded an investigator usually will be earned.

It has been said of one of our most successful station directors, recently retired, that he performed "the difficult and delicate task of administering research in such a way as to enable his associates to put forth their best." This is one of the highest tributes that could be paid such an officer, for as another has said, "the chief problem of the research director is to maintain the freshness of view, enthusiasm and keenness of his staff."

Again, administration may insure that each undertaking is well considered at the outset, that so far as feasible it has been thought through, that its real nature and what it will likely involve have been gone into, and that if insufficient in itself it may have the support of workers in other lines. If administration does this it will lend real service, to the investigator as well as to his organization.

It is now generally conceded that owing to the complex character of problems in agriculture there is a substantial basis for cooperation. Rarely are departments sufficiently broad or complete in themselves to solve these problems in a thorough way, or to make the contributions applicable unless they are supported by the studies of other branches. The drift toward specialization emphasizes this and calls for correlation of effort and of forces. The attitude of the director can do much to develop the cooperative spirit and effect union of effort where needed.

This may seem a large program for the administrative officer. It implies that his heart and understanding are in research, and it involves the maintenance of close contacts. But the duties connected with administration do not necessarily all devolve in detail upon the administrative head. Especially in the larger stations he may so organize these as to bring to his aid committees and councils of various kinds, and supply means for keeping himself informed. These constitute the machinery of administration, and they have been found decidedly helpful in many cases. They may promote alike the spirit of unity and of individual responsibility, and cement the feeling of partnership in the carrying out of a great enterprise.

What then of the qualities of an administrative officer to discharge the functions of his important office? According to the Report of the Commission on Agricultural Research, made to this Association in 1907, "The immediate executive officer of a research agency should be a broadly trained scientist . . . whose time and thought should not be seriously absorbed by other duties. Such expert direction is essential to securing proper unity of work and the efficient coordination of the efforts of individuals." The same idea was recently expressed by the staff of a station where the position is vacant, in maintaining that the director "should be a man who through first-hand experience understands the methods and purposes of modern agricultural experiment."

To quote from a leading English authority on the subject:[2]

> The director of a research organization requires not only the qualities of a research worker, but those of an administrator. Scientific training of a high order should be combined with considerable practical experience in the industry concerned. . . . He must have a wide knowledge of men, be tactful in handling them, and able

[2] Fleming and Pearce, *Research in Industry.*

to inspire them with enthusiasm he himself must feel. He must be primarily a leader. In no way will his capacity be more demonstrated than in the manner in which he attracts and retains the services of able men.

Evidently the director of a station can not hope to be an expert in all the parts of the station's work, but he can know something about them and the elements essential to their success. In the more conventional lines of experiment, which comprise a very considerable part of the station work, he may claim some judgment regarding their competence to advance beyond a certain point, and their need for supplementing by more exact inquiry. Even in the more advanced lines, it is possible for an officer trained in science to determine whether the investigation is definitely aimed and keeping to its course, whether it is constantly constructive and not falling into an unstudied routine.

It is apparent, therefore, that the administrative officer ought not to lack for time, for his duties to his staff and to the public, the weighing and evaluation of efforts, and the maintenance of the work upon a plane adequate to the needs, will make no small demands upon him. There is danger in such an officer having too many other duties and outside interests which tax his strength and divert his attention, sometimes for protracted periods. He ought himself to be a student, with opportunity for the full play of his vision of problems and possibilities and the means of meeting them. His chief task will be to maintain the objective of the station in the largest and best sense.

This may well be his first concern at all times. A fund of a hundred thousand dollars and upwards for research, such as over half the stations enjoy, amounting to more than a quarter of a million in ten States, is no small responsibility and gives opportunity for the best thought and judgment at command. It opens the way for the highest type of administration. It calls above all for that inspirational leadership which serves to spread the "contagion of ideas."

E. W. ALLEN

U. S. DEPARTMENT OF AGRICULTURE

RESOLUTIONS ADOPTED AT THE AUSTRALIAN MEETING OF THE PACIFIC SCIENCE CONGRESS

THE scientific problems of the Pacific are so numerous and varied and involve so many individuals, institutions and governments that it has been found profitable to organize conferences at which work in progress may be discussed and means and methods for further progress may be carefully considered. The probable value of such conferences was recognized by the Australian meeting of the British Association for the Advancement of Science, 1914. A conference on the Pacific, which included in its program science, history and international relations, was a feature of the Panama-Pacific Exposition at San Francisco in 1915; at the semi-centennial anniversary of the University of California in 1918 a similar conference was arranged; and the Exploration of the Pacific formed the central theme at the meeting of the Pacific Division of the American Association for the Advancement of Science in 1919.

The consideration of this subject by the National Academy of Science resulted in the establishment of the Committee on Pacific Exploration in 1915—a committee which, with changes of personnel, has become the Committee on Pacific Investigations of the National Research Council. The deliberation of this committee showed the advantages to be gained by a series of conferences which would bring together representative scientists from Pacific countries actively engaged in research. During the period of the war the scope and purpose of such conferences were discussed on the basis of extensive correspondence and in 1918–19 meetings of the Committee on Pacific Investigations resulted in arrangements for the conference which met in Honolulu, August 2–20, 1920.[1]

The Pan-Pacific Science Congress held this year in Australia had the same general function as the Honolulu conference, but was wider in scope and had a larger attendance. Its proceedings are to be published by the Australian National Research Council under whose auspices the Congress convened. By invitation of the Japanese National Research Council the Congress of 1926 will be held at Tokyo.

The scope of the Australian Congress, which was attended by delegates from Australia, British Malaya, Canada, Chile, Dutch East Indies, England, Fiji, Formosa, France, Hawaii, Holland, Hongkong, Japan, New Guinea, New Zealand, Papua, the Philippines, Scotland, Tahiti, United States, is shown by the resolutions adopted.

In selecting the resolutions for publication those primarily of local interest have been omitted, and from certain others explanatory clauses have been eliminated. The Australian Research Council has authority to revise the wording of resolutions before publication in the official proceedings of the Congress.

ORGANIZATION AND FUTURE MEETINGS

(1) That this Congress recommends the establishment of a permanent organization of the scientific institutions and individuals engaged in research on the scientific problems of the Pacific Region.

(2) That the President of the Third Pan-Pacific Sci-

[1] Proceedings of the First Pan-Pacific Scientific Conference, Bernice P. Bishop Museum Special Publication, No. 7, Parts I, II, III, 1921.