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PROBLEMS AND METHODS INVOLVED IN COORDINATING RESEARCH
AND ADMINISTRATIVE ACTIVITY IN LAND-USE PLANNING 1/

By

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The subject assigned to me is not a problem of land-use planning alone. If one were to substitute for the words "land-use planning" the words "industrial investigations" or the phrase "engineering problems," my subject would cause no astonishment if it were found on the program of the Institute of Chemical Engineers or on that of one of our national engineering societies. In short, the problems involved in coordinating research and administrative activities are very similar in any field of applied science, be it land-use planning, bridge building, or the development of a new chemical manufacturing process. Even in chemical industry problems of economics, notably of costs and of marketing, must be solved, while from bridge-building there often result social problems such as shifts in population and redistribution of industry. Hence what I propose to present to you today must of necessity be general in character. There is no distinct and specific method for coordinating research and administrative activities in land-use planning.

There are many ways in which one might classify research. One might divide it into two categories, pure and applied, or one might classify it according to subject matter, for example as social and natural science research, or one might use methodology as the classifying principle; for instance, one might distinguish between experimental and descriptive research. For my present purposes, I shall use none of these. I propose to divide research problems into two categories: those requiring new and original ideas for their solution and those that can be solved by well-known methods of investigation and by existing techniques. I realize, of course, that it is quite impossible to draw hard and fast lines between these two categories. Opinions will inevitably differ regarding the definition of the phrase "new and original." For example, is a novel combination of well-known ideas or techniques to be regarded as "novel and original"? For my present purposes I would not so regard it. If we take this position, I believe that most of us would have little difficulty in assigning any given problem to one or the other of our categories.

Progress in applied science often waits upon the development of new and novel ideas. For example, wireless communication was impossible until Herz discovered his waves, certain problems of metallurgy could not be solved prior to the discovery of the X-ray

1/ Land-Use Planning Conference, Berkeley, June 19, 1934

and the use of these rays solved the problem of diagnosing certain pathological conditions. The solution of problems requiring the application of new ideas cannot be organized. It's very much as though one were to try to organize the writing of great lyric poetry or the composing of great symphonies, or the creation of great works of art. One cannot have great poems written to order; one cannot contract for the delivery of the score of a great opera, one cannot have a great statue made to specifications. If one is wise, one selects a poet, a composer, or a sculptor who has already done great work and one gives him a commission in the most general terms, for if one ties him down to specifications and does not permit the free play of his creative powers, even a genius is likely to do merely hack work.

The organization for the solution of a problem requiring new ideas comes down then, simply, to the finding of a man who has already demonstrated that he is capable of original thinking, to interesting him in the problem and to creating favorable working conditions for him. It is less important that he be familiar with land utilization problems than that he be endowed with an original mind. If he has such a mind, he will soon get the necessary point of view and technique. The life of Pasteur is everlasting proof that this is easy for a first-class mind; he began as a mineralogist and crystallographer and became perhaps the first biologist of his time.

Unfortunately really first-class men are few and these few it is often impossible to divert from their chosen field of research. It is therefore of the utmost importance not merely for the sake of better land utilization but for the advancement of all science to multiply the number of first-class men in science. This can only be done by creating favorable conditions for their emergence. A society must be developed which is appreciative of scientific research, which honors great scientists, and furnishes a livelihood for large numbers of scientists of all sorts. Most of these, to be sure, are likely to be mediocrities, but by encouraging the existence of a large number, one increases enormously the probability that among them will be a few geniuses.

To my mind, perhaps the most telling argument for universal education is that it increases the number of those from among whom the leaders in all fields of intellectual endeavor may be recruited. Universal education therefore multiplies enormously the probability that in any given society the number of first-class minds available for intellectual activities will be large, and that few men of genius will remain submerged.

And so, about all one can do to stimulate the solution of problems requiring new and novel ideas is to create favorable conditions for research in general, to train large numbers of investigators, and to make careers for them possible in the expectation that among them will appear a few first-class minds and an occasional

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man of genius. If we have many people supported in research directly or indirectly of importance to the field of land utilization, we have done all that is possible. We can only hope and trust that among them there will be at least a few original minds.

It is, however, not enough to create conditions favorable to the emergence of original minds. One must pursue toward them a policy of laissez faire; let them alone. I fear it is in this respect that American government administrators and university presidents sin. It is natural for such officials to systematize administration, for system makes administration easier, reduces it to a routine and lessens the amount of intelligence required. And so we see in government as well as in universities the trend to organize in large administrative units. Organization reduces the freedom of the individual, tends to suppress individuality, and therefore to hamper the first-class mind and the genius by crowding him into the mold that fits the average.

As everyone knows, first-class minds and geniuses are often difficult personalities. Their own work means so much to them that they are impatient of restraint, resent direction, will not conform to red tape, and are therefore often poor cooperators. The large unit is excellent for cooperation, but it is bad for the genius. If he succeeds in becoming its director, he wastes his gifts in tasks of petty administration. I fear, therefore, that in our American universities we hamper the development of first-class minds because we insist on making them members of large departments. There is little excuse for this in universities, since cooperative research is not important there. The presence of more than one first-class mind in a department very commonly leads to personnel difficulties with all that is therein implied. It would often be better to have several small departments in a given field than one large one. Of course, this would put additional work on the university president, for he would have to deal with a good many more individuals instead of with a few department heads or a dean or two. Also, it would probably be somewhat more expensive to maintain two or three small, independent laboratories than to maintain one large one. However, the university with such a policy would find it easier to hold its brilliant young men or to call brilliant young men to it from elsewhere.

In the government services, in which resources are infinitely greater than in universities, the problem might be handled much more simply, though in fact it rarely is. It is comparatively easy, as I know from my own experience, to give the brilliant, queer genius his own little independent budget, and his own laboratory and personal assistants. However, this is very rarely done, more rarely than in universities, so that the government usually loses the brilliant men to the universities. Commonly, in the government service, advancement is only by way of administration. The brilliant man has therefore to choose between remaining in a minor position and continuing in his research, going to a university, or becoming an administrator. We have a mania in America for charting an organization. A bureau

in which a number of brilliant men are allowed to work independently doesn't chart well. Its organization chart shows a few large divisions in charge of division chiefs who are responsible to the chief of Bureau, and super-wise cooperative, routine, or applied research. In addition, the chart shows a few little excrescences, each representing a brilliant individual who is not part of the general organization, and who reports directly to the chief of Bureau. Since the chief of Bureau is a very busy man, this means that the independent worker is nearly as free as a university professor, for he need consult the chief of Bureau only in matters of general policy. He has not immediately over him an officious administrator, with whom he must have constant contacts. It is this sort of organization I had when I was chief of the Bureau of Chemistry. I was much criticised and had to struggle constantly to protect the more original minds in the Bureau.

Let us now turn to our second category of problems, those requiring no new and original ideas for their solution. These problems may be of a general character dealing with general principles of land utilization or they may be specific dealing with the best manner of utilizing a given area. In either case these kinds of research may be organized cooperatively or autocratically.

A cooperative organization would consist of a group of independent or semi-independent investigators in a number of fields, for example, soil scientists, bacteriologists, agronomists, agricultural economists, perhaps even engineers and political scientists. Such a group would constitute itself a planning committee to analyze the specific land-use problem under investigation, and to divide it into a series of discrete parts, which would be assigned for exploration to several members of the group. Each person with his group of assistants and associates would begin the investigation assigned to him, there would be frequent meetings of the group with reports of progress and much discussion of objectives and interpretation, with from time to time publication of results in specific fields. Such an organization will be successful if the leader of the group is wise and the individual members tolerant. Such a combination, however, is exceedingly rare. Even when it occurs, it does not often hold together, for scientists are always aiming at the goose and hitting the gander. An investigator begins on one problem and in the course of his work encounters unexpected phenomena, the exploration of which may not be significant for his problem. Usually, he is like an untrained bird dog who, instead of sticking to the scent of the bird, cannot resist the temptation to leave it to follow the scent of a rabbit, fox, or skunk that happens to have crossed the bird's trail. However, the cooperative type of organization is the one into which the original mind or genius most easily fits. It is the best way of utilizing for a specific purpose these rare workers when one is fortunate enough to have such available.

Usually it happens in cooperative research of the type under discussion that some of the cooperators allow themselves to be diverted from their original objective, either completely or else they give to it only a fraction of their efforts. Naturally, the solution of the original problem is either delayed or never found. This outcome is avoided by the autocratic

method of organizing research. In it, the responsibility for the problem is placed upon a single, able, broadly-trained individual, and he is given the means with which to employ a staff in all the fields necessary. In consultation with his staff, he outlines the plan of research and the staff under the conditions of their employment are required to concentrate upon the specific portions of the problem assigned to them. They are not allowed to be diverted to secondary issues, no matter how interesting and important these may seem. This is the method of the great industrial research laboratories. It gets specific results. If the autocrat in charge of the work has a first-class mind or is a man of genius, the results are bound to be important and valuable. If he is not, the results may look more imposing than they are.

The cooperative method, on the other hand, may not solve the original problem set, but there are bound to be some results of considerable value and perhaps many. This is recognized by some industrial laboratories, for side by side with the autocratic organization you sometimes find independent workers who are merely expected to keep in the foreground of their minds problems of the industry, and who concern themselves in their research only with its general field. We thus find in the laboratory of the General Electric Company, a Langmuir and a Coolidge, who have the widest liberty in their research in the general field of the electrical industry and who do a great deal of pure research. It is the experience of this company that the practical by-products of such free and independent research amply repay the company for the cost of maintaining able men in research without specific restrictions.

For research into general principles of land utilization the cooperative method is probably to be preferred - at any rate it is the only method possible in most of our universities. It may not lead to the solution of specific problems, but it is almost certain to produce results of value in advancing the knowledge of land utilization in general. It is better to hit the gander when you aim at the goose than to miss both the goose and the gander. If the men in the cooperating group are able, if the leadership of the group is wise and tolerant, if consultations and conferences are frequent enough, the subject will be advanced, though perhaps not in the direction and the way originally intended.

For investigations into the best way of utilizing the land in any given area, I have no hesitation in taking the position that the autocratic method is the best. Here you have a very definite and very specific objective. In consequence, it is possible to have effective leadership, that is an efficient autocrat, without requiring a genius for a leader. It is not necessary to have any new original ideas, though this is desirable. It is sufficient to know the techniques, the points of view, the objectives of earlier land-utilization investigations. The problem can be solved by picking out a capable, adequately-trained leader, who in turn will pick out a staff suited to the purpose. He will employ soil scientists, agronomists, marketing experts, economists, and others as the case demands. To these he will give instructions and definite assignments, and he will see that they stick to their instructions and complete their tasks. In the end, he will make the synthesis of their results, and will give a practical answer to a practical problem.

Such an organization is impossible in a university with its traditions of academic freedom and pure research. Professors, assistant professors, even instructors cannot be assigned tasks and held to them. If universities are to attack specific practical problems by the autocratic method, it is necessary to assemble a special staff recruited from outside the faculty ranks. This has in fact been done by some of them in separate research institutes. The autocratic type of organization might be employed in agricultural experiment stations more often and more successfully than it is if the stations were ready to admit that they need an organization different from the agricultural college. For teaching purposes it is proper to divide the field of knowledge by sciences; for the solution of practical problems it is best to organize functionally around problems; and this is the essence of the autocratic method.

I can perhaps conclude in no more effective way than to state that this is the conclusion reached for the Federal Services by a committee appointed in 1903 by President Theodore Roosevelt consisting of Dr. Charles D. Walcott, Brigadier-General William Crozier, Rear Admiral Francis T. Bowles, Gifford Pinchot, and James R. Garfield. The report of this committee contains the following passage:

"Its (the committee's) conclusions are based upon the theory, which appears to be sustained by the facts, that Government scientific work should be organized upon such a basis that the administrative unit should comprise all the elements necessary for the solution of a distinct scientific problem, or a group of closely related problems, the investigation of which is for the people in general. For example, whatever sciences and arts may be required for the investigation of the diseases of cattle should be employed in the various special lines which modern science has assumed, under the direction of the Chief of the Bureau of Animal Industry. This theory, presumes, on the other hand, that the individual sciences and arts should not be segregated in the separate bureaus and offices, unless there exists such a large item or group of items in which a single branch of science or art predominates as to render such separation a matter of distinct economy."