

# Journal of RANGE MANAGEMENT

## Editorial

### Wildlife and Range Biology—A Single Problem

A rancher calling upon a state or federal agency for help in solving his problems nowadays can seek specific advice from each of a wide variety of agricultural disciplines. Ranchers are learning to expect this refinement of service—indeed to depend on it. More than likely the specific advice will come from a specialist representing the particular discipline, and quite often several specialists will provide advice on a single general problem.

In advising the landowner, out of the valuable information and experience available from our various specialities, we too often seem to leave him with some uncertainty and confusion.

What can we do about it?

There probably are factors dealing, for example, with techniques of transmission of research data to landowners, with "salesmanship," or with inter-agency communication and cooperation which bear on my question, but I wish to discuss a different kind of factor: the influence of the concepts upon which agricultural practice is based.

I think a major cause for the confusion we may be generating at the management level is that

behind any diversity among the recommendations we specialists are making there too often are very diverse concepts of the nature of the problems of land management.

Diversity among concepts admittedly is a potent force in the growth of knowledge. But we know that there is also an evolutionary force acting on these diverse concepts—a force which slowly refines them all until a few, most generally applicable ones, remain. Each of us would like our pet concepts to be among those few remaining which are "best." This desire need not make charlatans of us in the eyes of the practical man, however. We can teach him the way in which concepts develop. We can let him share the knowledge that all concepts do not have equal status in the chain of evolution toward the full reality. We can try to show him just where we think our particular concept stands in the evolutionary line before we ask him to follow a practice based upon it. I feel sure that the practical manager can learn to know that new concepts are not necessarily best just because they are original, or that concepts which have gone unchallenged for the longest time

are not the most reliable just because they are the most venerable. The agricultural practitioner should be told that the best concepts for him probably are those which show a record of survival through the greatest number of well designed, carefully directed research challenges.

There is another way to deal with this problem of diversity among concepts. It is to attempt, through frequent review and criticism, to bring about a greater degree of order among them.

I therefore direct your attention to a few of the concepts about rangelands and wildlife which should, in my opinion, be marked for immediate revamping, or for elimination from use. I suggest this for two reasons:

(1) The first is that each of these concepts has, for a long time, exerted great influence on the outlook of research and management of rangelands and wildlife. Should any of them be seriously in error they will have contributed appreciable blindness or bias to our research and management efforts.

(2) The second reason is that each of the contemporary concepts I have in mind has achieved its present status not through much exposure to rigorous tests by the scientific method, but largely as a reflection of the history of human societies. Such concepts may serve to bind a society together, but they may

not be conservative or realistic about natural resources.

With which concepts am I dissatisfied?

*First:*—The concept that research in agriculture should be applied first to those aspects of biology for which an immediate or clearly foreseeable economic implication can be seen—that pressing needs in land management are best met by initiating research at the points where the economic implications are most obvious. I call this the concept of treating symptoms, disregarding underlying biological processes.

The influence of this concept on research and management is sometimes minimized, possibly on the theory that if the worst symptoms can be relieved then there may be time for, and sufficient faith in, agricultural research to permit more fundamental studies. The situation need not be thus. American manufacturing, in the last 20 years, has demonstrated that fundamental, "abstract" research is much superior to "symptom treating" empiricism for producing usable knowledge.

Then there is the responsibility of the scientist for his science. If we really are to be biologists, we must study *biology*. The biology of rangelands is not just the pounds of beef per acre; it is the totality of biologic processes which make or prevent a desired yield. Biology is not just the control of unwanted plants, animals or insects; it is the biologic processes which provided for them in the first place, or which may replace them with other, possibly less desirable, ones later on. Biology is not just how many deer can live on one area as compared with another; it is also why the difference exists.

I have no quarrel with bio-

economic studies. They are necessary for maximum refinement of land use. But these studies must be based on a sound biology. Successful range and wildlife management is a socioeconomic problem, based on, and subsequent to, knowledge of the fundamental biologic process which characterize rangelands. Let us separate clearly the search for the fundamentals of the biology of rangelands from the treating of economic symptoms. A *d v a n c e m e n t* of the biology of agriculture in the western world has too long followed the onset of pathological relationships between man and nature. We should be using our acumen primarily to prevent agricultural disasters—not just to cure them. Until the public which invests in range and wildlife research understands the necessity for this separation, we may be forced to continue with our symptom-treating approach. But, we must know biologic processes before we can utilize them. Let us tell our backers, the public, that this is so.

*Second:*—The concept that the biology of rangelands and the biology of wildlife are things separate and apart from each other.

This unnatural split has developed, it can easily be seen, because in the past at least two different segments of society have had separate interests in rangelands. The livestock producers worked to maximize livestock production, and wildlife, if recognized, was either an incidental pleasure or an irritating interloper on his rangeland resource. The sportsman, as a share holder in the public's wild game, demanded that the rancher give him access to that which is his, and at the same time held a fond vision of forests

primeval in which to stalk his quarry.

Both sides are beginning to recognize the incompleteness of their separate viewpoints. Our rangelands are made up of, and depend just as much on, their native fauna as their native flora. Wildlife is an *inevitable* and *necessary component* of *rangelands*. Let us work to change the meaning of the word rangelands to the end that whenever the word is used, both its native flora and its fauna are always brought to mind. In the same vein, let us come to think of wildlife as a resource that is a product of its natural food supplies, its physical environment, and the history of its individual members. It is well to add here, also, that game animals are only a small part of the wildlife of rangelands. For every game species there are a dozen other native animals equally well established, equally influential and equally characteristic of the total biology of rangelands.

*Third:*—The concept that biological organisms are things of constant, unchangeable character, like physical forces such as heat, pressure or magnetism.

The totality of life and substance that is rangelands is a very complex, tightly interwoven matrix. This matrix has history—that is, the sum of previous events conditions and limits the course of future events. A clump of *Andropogon scoparius* does not exert the same influence on the surroundings—is not the same force—throughout its life. Clumps of it on one soil in the midst of the other kinds of plants are not exerting the same kind of force as clumps on another soil where this grass forms a continuous colony. A colony of cotton rats which has experienced years of existence in a

stable, climax vegetation will not exert the same force on its surroundings as one which has endured violent fluctuations in food supply as a result of periodic overgrazing by cattle. We are too prone to expect that all members of a species of life, wherever found and whatever their history, are going to exert the same influence on, and be equally influenced by, their environment—that they are unchangeable forces. The life which comprises rangelands can be said to accumulate “experience,” and its influence and susceptibility to influence are modified by this experience. By experience I mean here both the long term adaptive responses and the short term acclimatization responses of the organisms which form a rangeland matrix.

Ignorance of this vital characteristic has led us into an erro-

neous experimental practice. We expect that the characteristic behavior of an organism, or population of organisms, can be discovered by studying the form under the simplified conditions of an isolated laboratory experiment. Fortunately, for the progress of agricultural research, like organisms do seem to have some characteristics largely independent of their individual histories. However, we are now at the stage, if we are to progress, where we must recognize that the history of environmental influence is a critical part of the forces at work, and that taxonomically similar forms may have very different roles in the rangelands matrix if they have different histories.

This brings me to my conclusion, which is stated in the title.

The most realistic concept of the nature of rangeland is to con-

sider it as a single, complex matrix in which the native fauna is as influential as the flora, the soils, and the physical environment. The most realistic way to study rangelands is to consider them as a complex so tightly interwoven that to remove any organism for study, or to control many of the organisms in order to study in place one or a few of them is to change the whole character of the system of forces involved.

My thesis, then, is let's face our problem—which is the study and management of a matrix of life. To understand it is to learn to study it as a matrix. The investing public will back us if they know what is required. Let's tell them.—Richard B. Davis, Dept. of Wildlife Management, A & M College of Texas, College Station.