Journal of Range Management

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In this Issue

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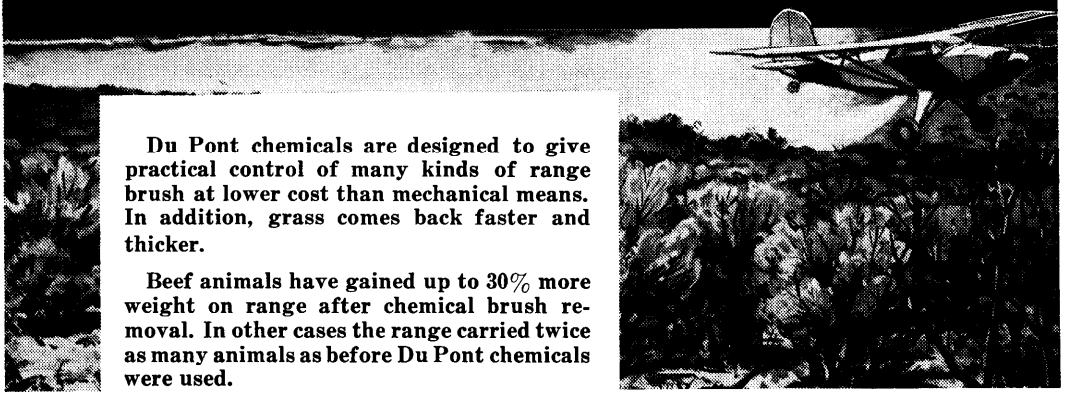
THE AMERICAN SOCIETY OF RANGE MANAGEMENT

Why It Pays To Use Du Pont Brush Killers To Get

Less Brush–More Grass–More Beef



Du Pont chemicals are designed to give practical control of many kinds of range brush at lower cost than mechanical means. In addition, grass comes back faster and thicker.

Beef animals have gained up to 30% more weight on range after chemical brush removal. In other cases the range carried twice as many animals as before Du Pont chemicals were used.

DU PONT CHEMICALS ARE TESTED AND PROVED TO KILL:

1. MESQUITE

For best results, spray from the air with low-volatile Du Pont 2,4,5-T Ester Brush Killer when foliage is growing and when soil moisture and temperature are high. Use 1⅓ to 1½ pints in 1 gallon light diesel oil plus 3 gallons of water per acre. Increase dosage for heavy growth.

2. SAND SAGE

Spray by air with 2⅓ pints Du Pont 2,4-D Ester Weed Killer in 3 or 4 gallons of water plus 1 gallon diesel fuel or kerosene per acre. For best results, apply in May or early in June when the soil moisture is high and plants are growing rapidly.

3. PRICKLY PEAR

Spray from the ground in summer with 1 gallon Du Pont 2,4,5-T Ester Weed Killer in 20 gallons kerosene or diesel oil and 20 gallons of water, wetting all the foliage thoroughly. Tests show that this same treatment also controls Tasajillo and Cholla cacti.

4. LOTE or BLUE BRUSH

A thorough, drenching spray on the foliage is highly effective, using 1 gallon Du Pont 2,4,5-T Ester Brush Killer in 96 gallons diesel oil or kerosene. For best results, spray from the ground when the plants are growing fast, and when the soil moisture is high.

5. HUISACHE

Spray from the ground in the growing season for best control. Spray the bottom 2 or 3 feet of trunks from the ground up with 1 gallon Du Pont 2,4,5-T Ester Brush Killer in 48 gallons of kerosene. For best results, be sure to wet the entire circumference of the stems.

6. McCARTNEY'S ROSE

Spray from the ground in the growing season with 1 to 1½ quarts Du Pont Ester Brush Killer or 3 to 4 quarts Du Pont 2,4-D Ester Weed Killer in 2 gallons of light diesel oil and 100 gallons of water. Use high-pressure spray to penetrate the thick clumps of brush so as to wet all foliage.

7. SCRUB OAK

For thick growth, spray the green oak leaves in the late summer or fall with Du Pont "Ammate" Weed Killer, 1 pound per gallon of water. For scattered trees growing in clumps, cut the trees and spray the fresh stumps with 4 pounds of "Ammate" per gallon of water.

For help in control of mixed stands of brush, *see your local agricultural experiment station, and write to Du Pont for full information. Du Pont has cooperated in extensive tests in the range areas. Address Du Pont, Grasselli Chemicals Dept., 5031 Du Pont Bldg., Wilmington, Del., or 513 Esperson Bldg., Houston 2, Texas*

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On all chemicals always follow directions for application. Where warning or caution statements on use of the product are given, read them carefully.

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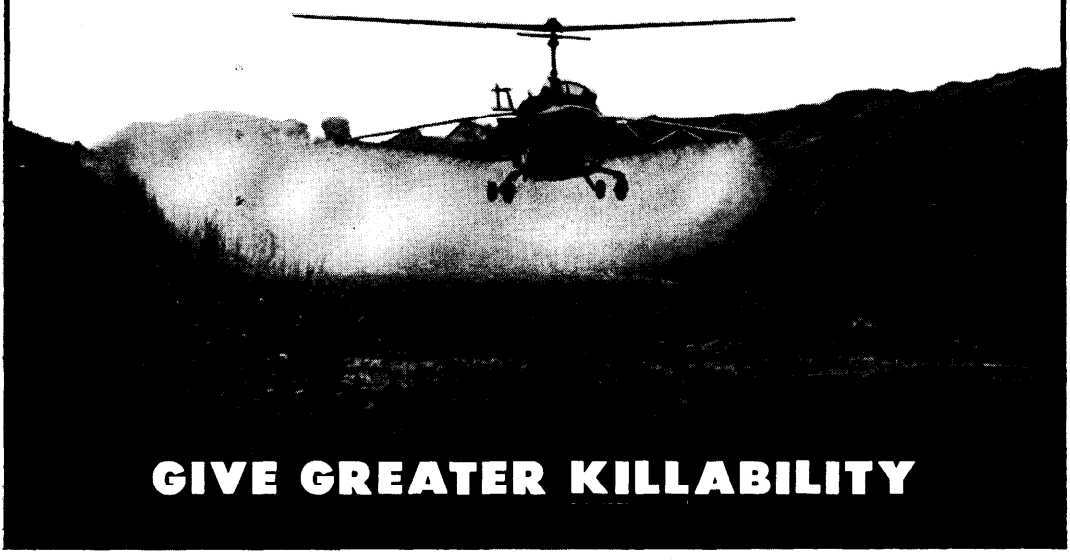

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DIAMOND ALKALI CHEMICALS

Top of Show prize photo in Photography Contest, Annual Meeting, American Society of Range Management, Boise, Idaho, Feb. 1, 1952.

SUMMER RANGE—Evan Blankinship summer grazing allotment in Tatoosh Mountains of Gifford Pinchot National Forest in Washington State. Allotment borders Mt. Rainier National Park. Blankinship has used this range for 28 years. Management of this range and its present condition won Blankinship 1951 Range Management plaque presented by Society's Northwest Section.

U. S. Soil Conservation Service Photo by John Chohlis, Range Conservationist, Yakima, Washington.

Volume 5, Number 3, · May, 1952

Journal of RANGE MANAGEMENT

WHERE DO WE GO FROM HERE?

Presidential Address—Fifth Annual Meeting The American Society of Range Management Boise, Idaho, January 30, 31 and February 1, 1952

DAN FULTON

Rancher, Ismay, Montana

FELLOW members of The American Society of Range Management—and friends: Our fifth annual meeting is underway. We hope that it will be a successful one. Each of our previous annual meetings has been more successful than the one before. If this meeting is successful it will be due entirely to the individual efforts of Committee Chairmen, Committee Members, and a host of individual Society members all impelled by a love and a feeling of duty toward a common interest and objective.

When our Society was organized, one of the functions to be fulfilled was to provide an avenue for exchange of ideas and experiences among range workers. Our Society has gone very far toward fulfilling this function. Our annual meetings contribute a large share toward it; our excellent Journal of Range Management does likewise, and the large number of meetings and field trips put on by our Local Sections contribute an even larger share to this particular function.

But, in addition to providing an exchange of experiences, it also provides many of us with some of the "experiences" themselves. Our meetings bring many of us to scenes and experiences with which we were previously unfamiliar. We all make acquaintances and are exposed to different viewpoints. Many individual members of our Society have told me of incidents illustrating the case where the functioning of the Society has provided the "experience" itself, as well as the avenue for exchanging it with other workers in our field.

My greatest experience to date is the opportunity you have given me to serve you as your President during the past

DAN FULTON

year. I wish to express my gratitude to you for giving me that opportunity and that experience.

I will not attempt at this time to cover all of our Society activities during the past year. A large part of our work is done by our Treasurer, our Secretary, and by Committees. Most of their reports will be available to you.

I do want to express my appreciation to the other officers and directors and committeemen who have labored so diligently on our behalf during the past year.

I especially want to commend our Editor, Bob Campbell, for the fine job he is doing with our Journal. That it is interesting, attractive, and scientific, without being too technically boring, is due largely to his efforts. One of the big chores of the new Board of Directors will be to find a man to succeed Bob at the end of the present year.

I must also commend the National Advertising Committee, whose Chairman is A. L. White of Berkeley, California. Mr. White reports that a gross of $1200 worth of advertising is already under contract for the 1952 Journal of Range Management.

It might be helpful at this time to review briefly the addresses of our past-Presidents, Joe Pechanec at Denver in 1949, Fred Renner at San Antonio in 1950, and Dave Savage at Billings in 1951. In a sense, these addresses are history and it is debatable if history repeats itself or if it is a valid guide to the future. Regardless of that, it seems obvious that history does give us a better understanding of where we are and how we got there, and that should be useful information to have before we decide where to go and what route to follow to get there.

Dave Savage, last year, pointed out to you the demand and the need for greater production of livestock products, and that our Society filled a critical need not provided by any other organization to which range officials and stockmen belong. He stated that the high ideals, practical aims, and feasible accomplishments of our organization demand extensive expansion, and that our objectives cannot be accomplished without the wholehearted cooperation, support, and concerted action of all stockmen and officials. Local Sections were pointed out as "the backbone of our organization", and the most effective means by which our objectives could be translated into positive realistic action.

Another very important angle stressed by Dave was the desirability of more comprehensive research to make possible even greater production, and that the importance of the range livestock industry demands a complete program of research, demonstration, and extension on range and grassland problems comparable with that now applied to cultivated crops.

Fred Renner in 1950 reported to you on the important developments during the preceding year and called your attention to some of the problems then confronting the Society. Very material progress had been made during the year. The Society had attained increased recognition in national affairs. The Society membership had nearly doubled during the year, and the largest percentage of increase had been among students and ranchers.

Then Fred pointed out a fundamental problem that all organizations have to face. Do we want 2000, 4000, or 10,000 members? It must be recognized that as an organization grows in size the interests of members tend to become more diverse; beyond a certain size our Society might find itself unable to function because of the divergent interests and viewpoints of its members. On the other hand, larger

organizations do have marked advantages. Divergent views provoke thought and discussion, and thereby lead to progress. A larger membership would certainly ease the financial problems, allow more and better Journals, and sponsorship of more and better projects in general. Fred did not answer the question for us; he stated, "The decision is up to us." He then said that the thing of even greater importance was the need to plan how best to maintain the interest of members and to increase their participation in Society affairs.

At Denver in 1949, Joe Pechanec spoke on the subject of "What's Ahead For the Range Society?" He pointed out two alternatives. We could ride on our laurels, be paper-readers, technique-perfecters, forever doomed to mediocrity, or we could accept the challenge presented by our objectives and become a constructive force in our field of range management. As Joe said, the first course would require little effort, but the second course would require personal effort, imagination, leadership, and participation of all members.

To me, it seems that this plea of Joe's for personal effort, imagination, leadership, and participation of all members is of vital importance. The same idea is expressed or implied in all of our presidential addresses to date. The success we have in getting individual member participation and individual effort and responsibility will pretty well gauge our success in moving in the direction of our objectives.

We must always remember that our Society is a "scientific" or "technical" society. We are interested in the practical application of the science just as much as we are in the science itself, but we want our application to be technically sound. We know that if it isn't practical, it isn't truly "scientific." We are developing authors to write in understandable and popular language, but we insist that they be scientifically, logically and quite precisely correct in their writing. We are attempting to discover and make available scientific facts which may be logically used to improve our "practical" performance. All this we are trying to keep as independent as possible of human emotion and folklore.

James Michener, in his book, "Return to Paradise," speculates that, considering all the people in the world, perhaps the only universal dramatic form ever conceived is the Western movie. If this be true, then there is probably more misinformation in the world about the range than there is about any other one subject.

I have heard that excavations in old lake beds in the Southwest indicate that groups of people have settled the area from time to time during prehistoric days. The remains of plants found indicate that no great change of climate has occurred. Apparently the people have just failed to adapt themselves to the environment in which they tried to live.

I have an 1885 map of the area in which I live, giving the location and names of the ranches in the area. Not one of the names on the map is known in my community today. Of the names which came into the community after the winter of '86 and '87, only two are still operating, and of the names which came into the community during the homestead days, only a comparative few are left, and their places are gradually being sold to new names. In my opinion, that is not conducive to good living, love of the soil, good range management or anything else good.

Individuals have time and again adapted themselves quite well to the environment. In general, it has been the

group activities that have provided the biggest barriers.

For examples of this, I will use some with which I am personally familiar. The lines of the county in which I live are so drawn that I can't truck stock to my own shipping point without a brand inspection. It is easier to get an extension man from our state agricultural college to talk about horticulture than to get him to talk about grass, and then easier to get him to talk about introduced grasses than about native grasses. What the Federal Reserve System did to our Montana Banks is too long a story to go into here, but Joe Kinsey Howard has a chapter on the subject in his book, "Montana, High, Wide and Handsome." The Federal Land Bank made the most inflationary land loans ever made in my community during the World War I land boom. During the depression of the Thirties, it wouldn't lend a penny in the community, nor would it compromise a penny on loans it had made during the boom, while making such compromises compulsory on private lenders in areas where it was making loans.

The marginal land buyers purchased the best crop land within our present ranch boundaries and the A A A put the wheat acreages on poorer land. The community contained about 3 percent Federal Range, so the Grazing Service put it into a Federal Grazing District.

Several years ago, I read a book by a broken down cowman who traveled all over the world looking for another open range. He lamented the fact that even the Indians had been left a few reservations to exist on, but no reservation had been set up for the cowboys. Now that he has been taken care of, too, because Louise Peffer, in her book, "The Closing of the Public Domain," treats of the Federal Grazing Districts as "Reservations", so now I am on a reservation just like the Indians, except that we pay taxes on most of the land in the reservation. Incidentally, this book of Louise Peffer's has a lot of good history in it. I commend it to you.

As an illustration of how insult may be added to injury, the marginal land buyers bought a tract of land in our ranch, including the fence all around it. We owned half the fence before the land was bought by the government, then the government owned it all. To straighten that out, we bought back all the fence from the government, including our own fence. Now, as a condition to the use of that land, we must keep up the fence which we built at our own expense and then bought back from the government to avoid the chance of its being rolled up by the W P A.

I cannot give examples, with which I am personally familiar, involving the Bureau of Reclamation, the Indian Service, or the Forest Service because those agencies do not operate in the area in which I live.

The examples I have given are not intended as criticisms of anything or anybody, but they are an indication that we (and I include myself in that "we") are still a bunch of Honyockers, stumbling around in an environment that we know practically nothing about.

During the first year of our Society's existence, the membership voted to keep it predominantly an organization of range men. This gives us a common interest, and that common interest is tied pretty close to that sub-humid area in which so many of us live and work. Our greatest effort is in the field of developing facts about that type of an area. Ours is probably the only organization, with broad membership requirements, which is specifically directing its major effort toward study of problems of this environment.

A few moments ago, I suggested that we don't know all the answers to some of

the broad general problems. In considerable part, this stems from the fact that we don't know the answers to the simple little scientific facts. We all know that we should use salt to get better livestock distribution in pastures. I know it, but I don't do it. How do I know it? Just because everybody knows it. I tried it a little while one summer, but I didn't notice much result. I have seen pictures of a salt box close to water, and the grass closely grazed in the vicinity of the salt box. It was only a few days ago that I stopped to think that I had seen closely grazed range around a water hole where there was no salt box. Does salt aid in getting distribution under various specific conditions throughout our area? No sound experimental evidence of a positive nature on this question has been brought to my attention.

We all recommend feeding of bone meal wherever we have any reason to suspect a phosphorus deficiency. A number of ranchers in eastern Montana have been feeding various phosphorus supplements and their results do not seem to indicate that bone meal is the proper thing to use. Have we any clear experimental evidence to provide the answer to this little problem? Apparently not.

In my opinion, Dave Savage was more than justified in stressing the need of a research program on range problems. I believe it is a subject on which we can get a considerable degree of agreement of opinion among all segments of our membership.

Dave Savage called attention to another extremely important point, the demand and the need for greater production of livestock products. This need of livestock products for human nutrition has been stressed in several Journal articles during the past year. It is especially important to range management because the need creates a demand that makes it economically possible to develop more range lands for greater production. This is the main reason that range management will progress at a much greater rate of acceleration than it has in the past.

The rate of progress of recent years has not been slow. The amount of fence that has been constructed on privately owned rangeland in the past few years must be tremendous. The demand for all kinds of fence posts has been so great that we can seldom find any in stock in local yards. Thousands and thousands of posts have been trucked from Texas to Montana and other points in the range area. Even under the comparative insecurity of tenure on the Federal Range, much livestock money has gone into fences. On this land, which a few years ago we all knew couldn't be fenced at all, there is now enough sheep tight fence that the effect of this fence on the movements of game animals is a hotly debated issue.

To me, it seems an absolute cinch that if this need of animal products continues, we will, in a very short time, be practicing fine management practices undreamed of today.

So far as our organization itself is concerned, it was Fred Renner who asked the $64 question. How many members should we have in our Society? Fred didn't answer the question, and I won't either.

The financial benefits of a large membership would be especially notable during inflationary times such as these. We undoubtedly should and can and will continue to increase our membership. However, I do think it a debatable question whether or not we can double or triple our present membership in the very near future without losing a valuable part of our present common interest. That common interest is, of course, in the field of range management, but, because of the many angles from which that field may be viewed, we do have plenty of viewpoints

to provoke the thought and discussion that Fred Renner rightly considered essential to progress.

I don't think that any of us want our Society and our Journal to go into the field already so ably and fully occupied by the farm journals. Neither do I think we can go into the broad fields of the so-called conservation associations without weakening our effectivenes in our own primary field which is set forth in our Articles of Incorporation.

If this be the case, then the occupational group from which further large membership increase must come is the rancher group, and there is a limit to the rate at which that increase can occur. That limit is broadly fixed by the rate at which we can enlist the ranchers interest and give sound answers to his questions resulting from that interest.

The Society of Range Management will not solve our problems for us. It is an extremely useful tool which we can use in solving our problems. The solution of those problems is a "blood, sweat and tears" sort of job, even with the aid of that tool, which we call our Society of Range Management.

The Society of Range Management has a job to do, and a membership willing and able to work on that job. These are the facts that assure the successful future of our Society.

CALL FOR NOMINATIONS

The Nominating Committee calls for nominations for 1953. To be elected are President, Vice-President, and two members of the Board of Directors. Petitions must be signed by at least ten members of the Society in good standing. Consult Articles II and III of the Bylaws for eligibility, conditions, and procedures (See March 1951 Journal, Vol. 4: 131–132).

Petitions should be accompanied by a letter from the petitioners stating that their nominee or nominees will accept the office if elected, and a brief biographical sketch of each person nominated. So that the list of nominees can be completed in time for the ballot to be sent by the Executive Secretary to the members before October 1, it is essential that petitions be in the hands of the nominating committee by August 1.—*Fred H. Kennedy* Chairman, Nominating Committee. U. S. Forest Service, Denver Federal Center, Building 85, Denver, Colorado.

CALL FOR PAPERS FOR 1953 ANNUAL MEETING

Members who wish to present papers at the annual meeting in Albuquerque, New Mexico in January 1953 are invited to offer them now. This is in accordance with Article V, Section 6 of the Bylaws (See March 1951 Journal, Vol. 4: 134).

Titles and approximately 200 word abstracts should reach the Program Chairman as early as possible to permit consideration by the Program Committee in completing a well-balanced program.—*B. W. Allred* Chairman, Program Committee. P. O. Box 1898, Fort Worth 1, Texas.

Breeds of Beef Cattle for the Southwest

J. H. KNOX

Department of Animal Husbandry, New Mexico College of A. and M. A., State College

(*Paper presented at annual meeting of Texas Section, American Society of Range Management, at San Antonio, Texas, on December 10, 1951.*)

PERHAPS if we will start with two obvious facts, we can discuss this subject frankly without too much danger of bodily injury to the speaker. These facts are that each breed must possess advantages or it would not exist, and, secondly no breed has them all or it would be the only breed.

Usually when this subject is discussed a statement is made that runs something like this: "There are good animals in all breeds, therefore the selection of a breed is simply a matter of personal preference." If this were true, there would be no more need to discuss the selection of a breed than the selection of a necktie which is purely a matter of preference. When such statements are made they clearly apply to our European breeds only, which are of the same species and have a similar background and are therefore adapted to roughly (but only roughly) similar environmental conditions. Such statements could not apply to comparisons of the Brahman and the Hereford which belong to different species and possess numerous physical, physiological, and shall we say, psychological differences? They, also apply best when the animals are produced under nearly ideal conditions. You find such conditions in states like Missouri where you see most of the major breeds in a few miles drive. Here in the Southwest we deal with extremes: extremely wet, extremely dry, extremely hot, and even extremely cold in some of the high elevations in Arizona and New Mexico.

The conditions to which a breed must adapt itself may be classified as: natural environment, management practices, and market outlet. The first and the last of these are largely regional, while the second varies from farm to ranch and from ranch to ranch. We will try to bring these into our discussion as we go along, but we should illustrate what we have in mind by each of them. Natural environment covers such things as temperature, rainfall, topography, and presence of troublesome insect pests. Management includes farm as compared to ranch production, size of pastures, distribution of water, use of supplemental feeds, as well as equipment for handling the cattle and skill and experience of men doing the work.

Our market outlets in order of importance are:

1. Slaughter calves in east and south Texas, southern Arizona, and southern California.
2. Feeder cattle in west Texas, New Mexico, and Arizona.
3. Grass cattle from south Texas, southern California, and the irrigated pastures of Arizona.
4. Fat yearlings produced on the farms of central Texas.

In discussing the three breeds assigned for consideration, we shall be interested principally in the way they fit into these various situations rather than purely structural differences such as thickness of quarters which exist more between individuals than between breeds, anyway. In this discussion I shall have to use proven facts, general belief, and personal opinion which means that you may accept as much or as little as you choose. The three

breeds assigned are Angus, Brahman, and Hereford. We shall discuss them in that order.

Angus

The Angus have numerous advantages.

1. The first important one is that it is the only breed pure for the polled characteristic. This means that not only all Angus are polled but all polled calves may be expected when Angus bulls are used on other breeds. This is an advantage under most conditions and may be important in parts of the Southwest where screw worm trouble is serious. It not only removes the need for dehorning the steer calves but reduces injuries in the breeding herd which may lead to worm trouble and in part account for the popularity of the breed in the South.

2. They possess proven carcass excellence. In matters of yield, development of high priced cuts, and percentage of meat to bone they probably have no superiors. In texture of lean and ability to put on high finish evenly without waste in cutting, they excel. These qualities make them sought after by the packer and in turn by the feeder. I think it is safe to say that it is easier to produce feeders that will sell for a premium price per pound with Angus than with other breeds.

3. The cows are uniformily good sucklers. They have neat, well shaped udders, and small teats which reduce the trouble from milking and spoiled udders. This is fortunate for frequently the job of milking an Angus range cow is hard on man and beast. This good milking characteristic is important and when combined with the carcass excellence mentioned above, explains the growing popularity of the breed on farms that produce high quality baby beeves.

4. Angus are highly resistant to cancer and are generally believed to have less pink eye than other breeds. This is probably a leading cause for their increased popularity in some parts of the Southwest.

5. The cows are supposed to have less trouble calving than our other European breeds. This may be due to a slightly shorter gestation period and smaller calves at birth. This has made Angus bulls popular in our state for use on yearling heifers. It is believed that their lighter weight reduces injury at service and the smaller calves give less trouble in calving.

6. It is claimed that Angus live longer. In the case of cows, at least, this claim seems well supported under farm conditions. I shall have to admit that I have not been able to observe this fact under semidesert conditions, although it is true that Angus cows are plagued less by some of the unsoundness that shortens the lives of cows of some other breeds.

These are in my opinion the more important advantages of the breed, which brings us to the less pleasant task of considering their disadvantages.

1. An obvious disadvantage is small average size. Although it is true that types have been produced in other breeds that are smaller than the Angus, I think there can be little doubt that on the average Angus are smaller. I know of no convincing proof that Angus do not produce as much as other breeds for the amount of feed consumed but there are still clear advantages for animals of good size. It is ironic that breeders of some other breeds decided that this smaller size was a point they should copy. Small size is not the secret of Angus carcass superiority. It lies deeper than that.

2. The temperament of the Angus has usually been considered one of the major objections to the breed. The importance of this factor varies with the type of range. Rough, broken ranges and bushy

ranges are less suitable for breeds that are nervous than open ranges. Extra care needs to be taken in working cows to prevent doggying young calves. In general it may be said that on open ranges with well constructed working corrals and men with patience and cattle sense the temperament of the breed need be no serious handicap. Nervous cattle and nervous men never make a good team.

3. Under range conditions injuries to bulls are frequent. This is probably due to the pendulus type of sheath which is frequently found in Angus bulls. It has been my observation that this is likely to occur in from 3 to 5 percent of the bulls in our country which by the way is not far different than the occurrence of cancer among Hereford bulls. It is said that the trouble becomes worse on ranges with many thorns and cacti.

4. The question of calf crop on the range is one of the most difficult to discuss, partly because of its importance and partly because of lack of definite information. My observation of the breed on farms has caused me to think that it is excellent in this respect. But we find a common opinion among ranchers that they produce smaller calf crops on the range. I have been forced to conclude that this is true on our dry ranges with big pastures and several miles between waters. I doubt if it need be true on ranches in much of Texas. I have thought much about why this is true, if it is. It may be merely an indication of lack of adaptability to our conditions. I am not sure that this is the case, however, for in other respects Angus do not appear to lack in adaptability. I am inclined to place most of the fault with the bulls. It seems to me that keeping bulls distributed and at their work is more of a job with Angus than some of the other breeds. They seem to enjoy each other's company and late in the season you too often find them on the range in groups. At any rate, if I were running Angus, I would try to have breeding pastures of not more than two or three sections or spend time in riding the pastures to keep the bulls distributed.

I might summarize on Angus by giving you the statement of a good friend who has run them in our part of the country for many years. He said, "I don't have the trouble and loss of weight from dehorning. I never have cancer and I think I would have very little pink eye if I didn't have some cattle of other breeds. I get at least one cent more for my steers." (This was in the days of eleven and twelve cent cattle). He hesitated a moment and added, "Perhaps they get a little better calf crop with their Herefords, however."

Brahman

When we consider Brahmans we are dealing with entirely different animals developed in an entirely different background. They belong to a different species than our other cattle and therefore differ from them in many respects. The most noticeable of these is their ability to thrive under tropical or semi-tropical conditions. They possess a tolerance for high temperatures, under humid conditions, and a resistance to insects and insect borne diseases not found in our other breeds of cattle. In fact the reason for bringing these cattle into the country in the first place was because it was difficult to take the other breeds below the tick line and they didn't do very well after they were taken there. Brahmans have proven, in the experience of practical stockmen and in controlled tests, to be more resistant to heat than other cattle. A number of traits help explain this fact. They are covered by a tight fine coat of short hair which allows heat to escape from the body more readily. This hair is

neutral in color, neither absorbs the heat as do the darker colors nor reflects the sun as does the white color. The hair lies over a dark skin resistant to blistering. They possess sweat glands and have a large skin surface which aid in heat elimination. Unfortunately some of these make the breed poorly suited to resist low temperatures, although it is true that Brahmans have ability to adapt themselves to some extent to cold climates. However this ability is limited. I see no reason to deny this. I know of neither animals nor plants which are adapted to both low and high temperatures.

The cattle reach large mature size and the cows under reasonably favorable conditions raise heavy fat calves. This is said to be due to the composition of their milk rather than an unusual amount. The characteristics mentioned make the breed and its crosses unusually well suited for producing slaughter calves so popular in the South and in southern California. It is a happy coincidence that this breed is so well suited to the areas which provide the best market for these slaughter calves. Crossbred Brahman steers make excellent gains on the pastures of these regions.

Brahmans differ from other cattle in their life span. They mature more slowly than other breeds and they live longer. Their grazing habits are different. They graze more continuously throughout the day. It is not surprising that associated with this habit we find a smaller paunch, which helps explain the high dressing percentage they usually yield and may also explain why their friends are sometimes disappointed in feed lot comparisons with other breeds. Another factor about their grazing habits is their capacity to travel long distances with ease. This is important in relation to range management in the dry country where pastures are large and distances between waters are great.

Some of their more commonly recognized faults have been mentioned. These include the fact that they do not stand cold weather well. The bulls are not ready for use as early as other breeds and they are hard to handle in rough country. Another handicap where feeder cattle are produced is the fact that they don't sell for top prices on the big feeder markets. To what extent this is due to prejudice and how much to actual feeder experience is hard to tell. The answer to this question may determine largely the future of the breed in west Texas and southern New Mexico. Here we have a breed which is clearly adapted to an important part of our region, probably not adapted to the colder more mountainous parts and whose place is yet to be proved in the vast semi-desert country west of the Pecos.

Hereford

Now we come to the Hereford, which is the dominant breed in the Southwest. This in itself speaks well for its usefulness. In fairness to the other breeds it should be mentioned that they were not present in numbers when the Hereford gained its position in this part of the country. The good characteristics of the Hereford have been well publicized by their many friends and an active association.

1. Their ability to adapt themselves to a wide range in temperature has been an important factor in giving them the wide popularity they have enjoyed. Their thick hides and heavy winter coats give them unusual resistance to storms and low temperatures. Associated with the thick hide, are rapidly growing hooves which make the Hereford less likely to get foot sore on the range than most other cattle. This is an advantage on most ranges but it may require more foot trimming on farms. There is no secret about a Hereford's much publicized ability to rustle in a storm. He is like a man with a warm

coat and a good pair of boots. In this connection a person can see some reason why breeders in Montana pay a lot of attention to heavy hair coats but it is not easy to see the advantage for much of Texas. Probably the animal which has a long winter coat but a sleek summer coat is suited to warm country. The curly summer coat may be good for showing but for nothing else in this part of the world.

2. The temperament of the Hereford is hard to improve upon. In my experience it is the best of any of our breeds for handling in big herds. This has contributed to their popularity on the range and in the feed lot.

3. Calf crops in properly managed herds are good. Hereford bulls are unusually well suited for range service. With Angus we find more to admire in the cow than in the bull; with Herefords the reverse is true.

4. Herefords appear to be more resistant to infections and some diseases than some of our breeds but perhaps not all of them.

5. The steers grow well and put on flesh on grass. The Hereford is a good grazing breed.

6. Some other breeds may make as much or more gain in the feed lot, some may produce a carcass of more quality, but there is no breed of my experience which, on the average, will show as much finish on a medium or short feed as a Hereford.

The Hereford has obtained its present position because it found general favor with ranchmen, feeders, and packers but the breed is not without serious faults.

1. A fault is the development of impractical types. Herefords are not alone in this but they have probably suffered more from it than the other breeds.

2. Hereford cows have been known for fifty years as poor sucklers yet no concerted effort has been made to correct the fault. Individual breeders have shown that it can be corrected but many still prefer to breed for a particular shade of color.

3. Cancer occurs altogether too often in this breed. There is strong evidence to show that the breed lacks resistance to this trouble and that it is aggravated by the effect of the sun on the white faces and unpigmented eyelids.

4. Many cows especially in purebred herds have their usefulness shortened by prolapse of the vagina. Some are going to take strong exception to this statement. It is true that this condition is not limited to the Hereford but it is my personal opinion that it occurs more often in this breed.

Summary

We can safely say that all these breeds possess much that is good. We are fortunate to have them because each has characteristics that cause them to fit particularly well into certain situations and because they give competition to each other. Complacency is the greatest enemy of any breed. Breeds and their position in our agriculture are not static. They are continually changing. Sometimes a breed loses a favorable position because of competition from a breed better suited to conditions or because of changing market demands. More often in my life time, it has been due to the failure of its breeders to produce really useful animals.

Range Improvement Experiments on the Arthur E. Brown Ranch, California

R. MERTON LOVE

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IN THE passing of Arthur E. Brown, July 16, 1951, the range improvement project of the Division of Agronomy lost a wonderful cooperator and true friend.

In 1944 Art asked what grasses could be seeded on 45 acres of non-irrigated hardpan land he had recently purchased near Wilton, Sacramento County. Native purple stipa (*Stipa pulchra*) would grow, but forage production was extremely low.

The land had been farmed to cereals for 40 years. It was producing from one-half to one ton of cereal hay every other year with a negligible amount of volunteer pasture in alternate years. In summer the fields were green, but this was due to vinegar weed (*Trichostema lanceolatum*) and tarweed (*Hemizonia* spp.), both unpalatable and odoriferous.

We agreed to work together to discover what could be done to improve the forage. Our results would apply to many thousands of acres of red land on the east side of the Sacramento Valley, where the annual rainfall approximates 16 to 20 inches.

Method and Procedure

In 1944 we seeded 11 acres to a "duke's mixture" which reads like a seed catalogue: one pound each of annual ryegrass (*Lolium multiflorum*), perennial ryegrass (*L. perenne*), orchardgrass (*Dactylis glomerata*), Hardinggrass (*Phalaris tuberosa*), tall fescue (*Festuca arundinacea*), burnet (*Sanguisorba minor*), burclover (*Medicago hispida*), yellow sweetclover (*Melilotus officinalis*), birdsfoot trefoil (*Lotus corniculatus*), and California common alfalfa (*Medicago sativa*). Plots for single varieties were reserved in the middle of the field. These included 40 strains of nodding stipa (*Stipa cernua*), 30 strains of purple stipa, and 22 other grasses and legumes.

The results were not very encouraging. But Art, Bill Coupé (his ranch superintendent) and I decided to have a Field Day in early June, 1945. "We should take the ranchers along with us," said Art. "They have a right to see the failures as well as the successes" (Fig. 1). Thirty persons attended that first range field day.

In 1945 we seeded another five acres to seven varieties. Our plots included a total of 35 varieties of grasses and legumes. About 70 persons attended the field day in May, 1946. At that time three species appeared likely to be successful: rose clover (*Trifolium hirtum*), Hardinggrass, and alfalfa. The stipas did well, but we now had other more productive plants.

For the 1947 field day we had an additional five-acre planting. More Hardinggrass and alfalfa were showing up in Field I, and rose clover was spreading from its one-hundredth acre plot to other parts of the field. In Field III, rose clover was the only success.

Field II was the "eye-opener." In the upper part of the field there had been an old corral bed where the seeding rate of one pound per acre each of Hardinggrass and alfalfa produced not only a good stand but also healthy, productive plants. As soil fertility decreased down the hill, so did the stand and vigor of the plants.

Thus, a new concept entered our thinking. It had been taken for granted that

moisture was the limiting factor in California range production. Here obviously, fertility—or lack of it—was more limiting than the rainfall, for the same amount of rain fell on the good and poor soil alike. Dr. John P. Conrad, of the Agronomy Division, put out the first fertilizer trials in 1945. For several years the results were discouraging for everything except manure.

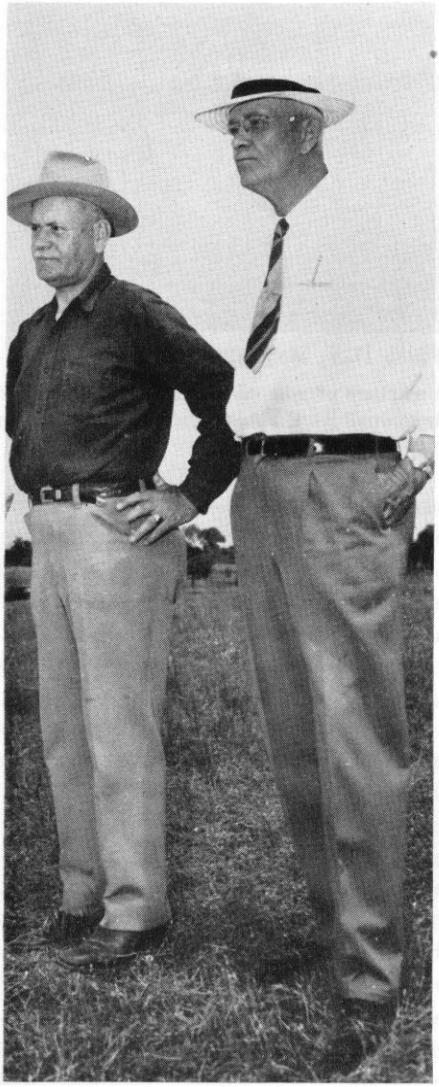

FIGURE 1. Arthur E. Brown and B. A. Madson, Agronomy Division, Davis, California at the Field Day, May 1949. *Photo Courtesy Sacramento Bee.*

By 1948 it was realized that little success was likely in seeding Harding and alfalfa on worn-out land. The newcomer, rose clover, would grow where burclover or subclover (*Trifolium subterraneum*) would not. It prepared the way for desirable grasses. Even ryegrass, which had done poorly in initial plantings, was volunteering in areas where rose clover had been growing for several years.

So in 1949 Field II was replanted, this time with a mixture of rose clover, subclover, and crimson clover (*Trifolium incarnatum*) at the total rate of 10 pounds per acre. Treble superphosphate was applied at 200 pounds per acre. It was disked dry, seeded, and cultipacked before the fall rains began (Fig. 2). A new field, V, was similarly treated.

At the 1950 field day, Dr. Conrad reported that there were worthwhile responses from fertilizers applied 1.5 and 2.5 years before and up to 1949 little used by range plants. Rose clover especially was responding apparently to the residual phosphates applied more than two years before. Two examples of Dr. Conrad's results as of April 11, 1951, serve to point up the possibilities of increasing forage yield through fertilization of annual legumes.

Treatments	*Pounds dry matter per acre*
1. Check plot	900
218 lb. TSP applied 1948	4250
2. Check plot	1738
218 lb. TSP applied 1948	5625

RESULTS AND DISCUSSION

Work at the Brown ranch and elsewhere, (Jones and Love, 1945; Love and Jones, Revised 1952) has shown that the

herbaceous range plants of California can be grouped into three main types: undesirable annuals, desirable annuals and short-lived perennials, and long-lived perennials.

Undesirable Annuals

Examples of winter growers are fescues (*Festuca myuros*, etc.) and ripgut (*Bromus rigidus*). They have strong seedling vigor, mature early, are heavy seed producers, and are obnoxious when ripe because of rough awns on the panicles that fail to shatter readily. Many are good feed when green, but their season of use is short.

Examples of summer growers are vinegar weed and tarweed. These are unpalatable.

Desirable Annuals and Short-lived Perennials

Examples are soft chess (*Bromus mollis*), burclover, rose clover and mountain brome (*Bromus marginatus*), respectively. Seedling vigor is not quite so strong and they are not quite as competitive as the undesirable annuals. They mature later than the first group and provide good feed even when mature. They have no obnoxious seed characteristics.

Perennials

Examples are Hardinggrass and alfalfa. In general this group is characterized by poor seedling vigor and low competitive value the first year. They remain green later than the annuals in the spring, and provide range-readiness earlier in the fall. They are particularly susceptible to continuous summer grazing if practised year after year.

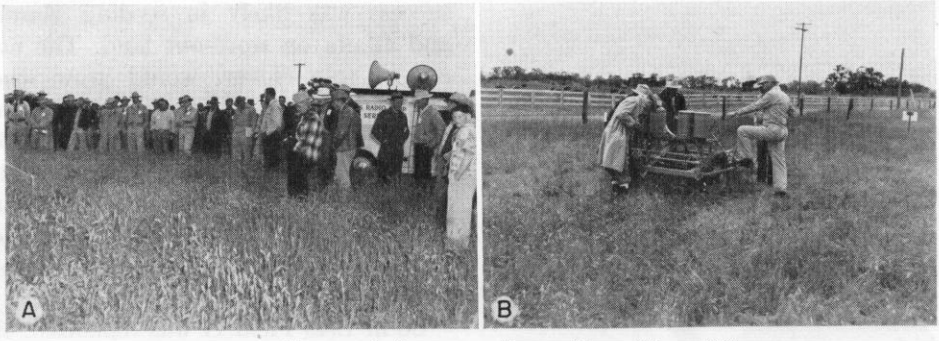

FIGURE 2. SEVENTH FIELD DAY, MAY, 1951

A. Visitors inspect Field II containing ideal range mixture of soft chess, annual legumes and scattered Hardinggrass. B. Two-row range seeder developed by the Agronomy and Agricultural Engineering Divisions. *Photos by J. E. Street.*

The season of use by livestock has a profound effect upon the quality of forage under a Mediterranean-type climate. Livestock use should be based on a knowledge of the types of plants present on a range. Removal of animals before the last spring rains will allow the desirable annuals and perennials to recover and set seed. If this is done at least once in three years there will be a gradual reduction of undesirable annuals, even including the summer annuals which depend upon residual moisture for their growth. When this moisture is used by the desirable annuals and perennials there is none to support the summer weeds. Deferring grazing has the opposite effect and results in a decrease of desirable annuals. Data for this have been presented elsewhere (Love, 1944).

The improved fields at the Brown ranch now carry three times the livestock possible in the unimproved fields. This verifies the yield results obtained by Dr. Conrad.

Conclusions

Six fundamental points have emerged from the work at the ranch and verified in other parts of the State:

1. Soil fertility must be improved before good stands and high production of annuals or perennials can be expected.

2. Soil fertility can be improved by a combination of winter annual legumes and phosphate fertilizer (or soil amendments that encourage legume growth).

3. Even 18 inches of rainfall is sufficient for profitable dryland pastures of alfalfa, Hardinggrass, rose clover, and soft chess once soil fertility is sufficient to support their growth.

4. Protection is not the answer to California's annual-type range problem. Protection only increases the undesirable annuals.

5. Seasonal use, involving if necessary a heavy stocking rate before the weedy annuals mature, with removal of stock to irrigated pastures or the mountains before the last spring rains, will increase the desirable annuals and perennials (both grasses and legumes).

6. Rose clover is an ideal plant for infertile lands and should be included in most range seeding mixtures in California. It should be retested in other areas where the climate is such that burclovers and crimson clovers would survive.

Truly, the Arthur Brown Hereford Ranch has been an outlying experiment station for the range improvement project. Besides the cooperation throughout the years, Art's generosity as host at the field days has been outstanding. The attendance has grown from 30 in 1945 to about 300 in 1951. Visitors have come from all over the state and from Nevada. Perhaps even more important is the fact that many ranchers in the upper Sacramento Valley and even in other parts of the state (notably Santa Clara County) are now applying these new techniques to improving their own ranches.

The Arthur Brown Hereford Ranch has achieved international recognition because of distinguished visitors from many foreign countries, including Britain, Canada, France, Italy, Greece, Israel, South Africa, Morocco, Argentina, Brazil, Uruguay, Chile, Mexico, New Zealand, Australia, India, China, and Japan. All who have seen the experiments and enjoyed meeting Art will join with us in mourning his passing, but in a prayer of thankfulness that it was our privilege to have known him.

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The Soil Profile as an Aid to Range Management

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TOO OFTEN our consideration of range maintenance or improvement stops short at the surface of the soil. We are concerned with what grows on the surface but not with the material in which it grows. For successful range management we need to know more about the character, composition, and present status of soils on our range lands. Information of this kind on agricultural lands has already become the basis for land classification, treatment, and use. Knowledge of the soil as it exists—of the soil profile—is no less important in classifying, treating, and using our western range lands.

Soil may be defined broadly as the natural medium for the growth of plants. To understand this natural medium fully, it is necessary to understand not only that soils differ from place to place, but how they differ. The more outstanding differences in soils may be easily observed when the soil layers are exposed in cross section, as in a freshly cut road ditch, a trench, or a pit. These exposed layers, which may be distinct or merely gradual blendings, are called horizons. The whole arrangement of the horizons, from top downward and extending into the parent material, is known as a soil profile.

The character and arrangement of these layers are determined by climate, vegetation, parent rock, relief, and time. The same set of these factors anywhere produces the same set of soil layers—the same soil. Thus soils occur in orderly, discoverable, and entirely reasonable patterns. The various layers may differ from each other in texture, structure, consistency, thickness, color, drainage, degree of acidity or alkalinity, and inherent fertility. It is, of course, the total effect that these layers have on soil moisture, plant food, and aeration that determines the relative inherent productive capacity of any soil.

Other things being equal, two soil profiles alike in all details will produce, or will be capable of supporting, the same kind and density of plants. It is also true that two soils having different profiles only rarely have the same productiveness for native or crop plants. This does not mean that the reason for this difference in plant growth can quickly be found in every instance. In some cases it remains obscure even under rather careful study. But the fact that differences in productivity are associated with distinct profile combinations is in itself important enough to be of great practical use.

Relating Profiles to Range Areas

Examination of soil profiles will, among other things, help the range manager determine which areas are basically different even though the present more or less depleted plant cover may be quite similar. This is especially important in areas where one general range type is found overlying several kinds of soil, each of which may have a significantly different response to management. Information and experience regarding land use can be more accurately extended from enclosures, study plots, pastures,

and other small sites to the larger areas to which they apply, if soil differences are carefully considered.

Some of the range and watershed study enclosures have wide application. They have been well placed on soil-cover complexes that represent relatively large areas. Others, which may also be well placed, have a more limited direct application because of their having been located on less extensive complexes. Obviously it is highly important to the range manager that he have a clear idea of just what areas are represented by each enclosure.

Occasionally sites for enclosures may be selected that tend to make the observer draw the wrong conclusions. For instance, an enclosure may be placed in an area having generally shallow soils and supporting one broad general range type throughout, but on a pocket of soil much deeper than the surrounding average (Fig. 1). If this happened, an observer could easily draw erroneous conclusions. It might appear that the vegetative difference inside and outside the enclosure was due entirely to the improved management and that the entire area could be expected to give the same response under similar management. In reality, the response or growth made within the enclosure would be typical of only a small portion of the range type. Unsound interpretations of this sort can be held to a minimum if the soils are intelligently examined to insure proper placement of enclosures or other study areas.

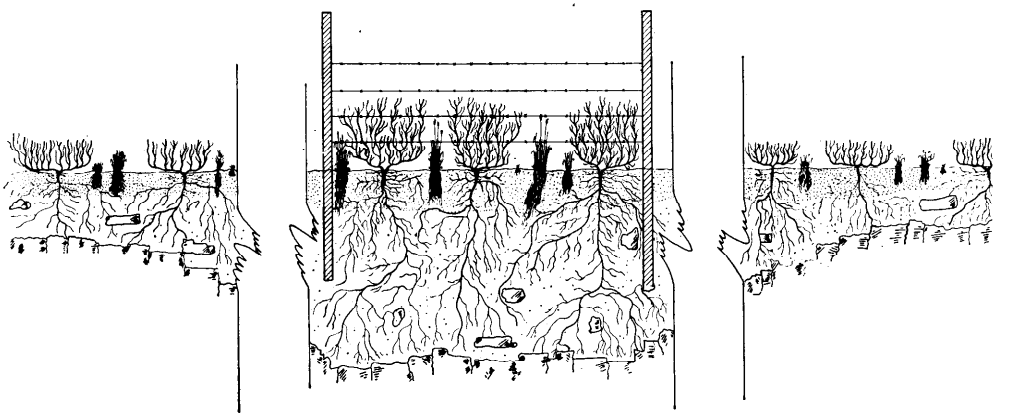

FIGURE 1. Sketch of an enclosure (center) located on a site where productive capacity is above average for the surrounding range because of deeper soil. Knowledge of the depth of soil profile, as well as other characteristics, is important in determining differences in productivity within a general range type.

CHARACTERISTICS OF THE SOIL PROFILE

Review of several hundred soil descriptions made in the Intermountain region on a wide variety of range lands has shown that three soil variables stand out over the rest as being particularly valuable for soil profile comparisons under any one broad range type. These are color, texture, and the thickness or depth of soil, which should be determined for each of the layers concerned. Although adequate for many valley soils, these three variables have their widest application in the evaluation of plateau and mountain soils.

Among other factors, structure, al-

though of great importance in most soils as far as productivity is concerned, assumes a secondary role in the kind of soil comparisons that we are concerned with here. Consistency, another important characteristic in many soils, seems to be more dependent on texture than on soil development. The sandy soils are loose or open, the medium textures are usually friable or mellow, and the heavier textures tend toward the dense or tight side. One reason for this close correlation is that many of our range soils have been formed under conditions where parent materials and relief have overpowered the other soil factors. This has resulted in the formation of soil profiles in which the subsoils have not fully developed and which profiles are therefore relatively uncomplicated. This is in contrast to the more complicated soil profiles in which subsoil development has often compacted, cemented, or in other ways significantly affected the air, water, and root relationships of the subsoil material. However, it is important in field observations to note any such variation that may occur.

Color

The principal soil colors are black, gray, brown, red, and yellow. There may be combinations of these colors which may be further modified by the terms of light and dark. Soil color is one of the more important characteristics of the profile because of its indicator qualities. The darker colors generally indicate high quantities of organic matter but may also indicate certain minerals in the parent materials. Red colors may indicate either good drainage and aeration but more likely in the Intermountain region will be due to the color of the parent materials. Imperfectly drained soils are frequently mottled with gray, yellow, and brown at some depth below the surface. Variegated coloration, on the other hand, often occurs in parent materials which are not completely weathered. Regardless of the reason for the color patterns, it is obvious that in order for two soils to be comparable, the colors of the various soil layers should be similar.

Texture

The second important soil characteristic to observe is texture which refers to the relative size of the individual soil grains. In the laboratory, texture is the distribution of the gravel, sand, silt, and clay particles in a soil sample as determined by a mechanical analysis. In the field, texture is determined by feeling the moistened soil. Five broad textural classes commonly used are sands, sandy loams, loams, clay loams, and clays, each of which may be modified further by the terms gravelly or stony. In making a soil comparison, it is sufficient as far as textural determinations are concerned to decide merely whether the soil of the respective layers feels alike. If the examination is more thorough and a written profile description is desired, familiarity with the above textural classes is necessary.

The following descriptions are offered for those desiring more detail. These have been adapted from California Agricultural Experiment Station Bulletin 556 (Storie, 1933).

Sands.—Sands are loose and granular. The individual grains can readily be seen and felt. Squeezed in the hand when dry the material will fall apart when the pressure is released. Squeezed when moist, it will crumble when touched, although fine sand and very fine sand have a certain amount of cohesion when moist.

Sandy loams.—Contain much sand but have enough silt and clay for coherence. Have a gritty feel and sand grains can be seen. Squeezed when dry will form a cast which will readily fall apart, but if

squeezed when moist a cast can be formed that will bear careful handling without breaking.

Loams.—Even mixtures of different grades of sand, silt, and clay. Mellow, of somewhat gritty feel yet fairly smooth and rather plastic. Squeezed when dry they will form casts that will bear careful handling, while those formed by squeezing the moist soil can be handled rather freely without breaking.

Clay loams.—A clay loam in the field breaks into clods or lumps, which when dry are hard to break. When the moist soil is pinched between the thumb and finger it will form a thin "ribbon" that will break readily, barely sustaining its own weight. Moist soil is plastic and will form a cast that will bear much handling. When kneaded in the hand it does not crumble readily, but tends to work into a heavy compact mass.

Clays.—Dense and compact, forming very hard lumps or clods when dry. Composed of very fine particles which when wet stick together to make a very putty-like and plastic mass. When the moist soil is pinched out between the thumb and fingers it will form a long flexible "ribbon."

Most of the textures with which we are concerned relate directly to the parent material. If these parent materials are high in clay, heavy-textured soils are produced, perhaps clay loams or clays. If the rocks are coarse grained the resulting soils are similarly coarse or sandy. For this reason soil classifications based solely on parent materials are in common use. Granitic soils, limestone soils, sandstone soils, and similar groups of soils often express textural grades as well as certain other soil characteristics, such as inherent fertility. They do not usually give any clues as to soil depth or drainage, for example. However, where the parent material can readily be determined it is advantageous to consider it whether the soil examination is merely a hasty field check or one of a more thorough nature.

There is hardly one best texture. Most heavy soils—those high in clay content—are capable of holding large amounts of water but much of it is unavailable to the plant because it is held too tightly. Sandy soils on the other hand allow too much water to drain away. In humid regions the very sandy soils are the most droughty; but under arid conditions these soils may be the least droughty. They allow the water that falls to infiltrate at a faster rate and then readily give water back to the plants. Under average conditions the medium-textured soils are usually the most efficient in releasing the moisture that they receive.

Depth

The third factor to be considered, and often one of the most important in comparing profiles, is depth. Of all the common characteristics that we use in evaluating mountain soils, this one perhaps means more by itself than any of the others. This is especially true when the term is qualified and used to mean depth of permeable soil and soil material. Shallow soils, regardless of how good the other characteristics may be, lack abundant capacity for water retention and root growth. This deficiency is vitally important from the point-of-view of adequate productive capacity and response to management.

A study made in the Wasatch Mountains of Utah disclosed interesting relations between soil depth and accelerated erosion (Olson, 1949). The deep soils (generally 4 to more than 6 feet of readily permeable soil and soil material over bedrock) were found covering 71 percent of the total area studied. Soils underlain by tight clay or bedrock at shallow depths (generally 6 to 18 inches of readily per-

meable soil) were found to cover 19 percent of the area with rock outcrops making up the remaining 10 percent. Eighty-five percent of the severe class of accelerated erosion mapped was found on these shallower soils which made up less than one-fifth of the total area studied.

The time necessary for restabilization of an eroded site under proper management will depend largely on the quality of the remaining soil profile in relation to the other environmental factors. Many of our shallow, inherently poor soils, along with those soils made poor through severe accelerated erosion, remain in poor condition for long periods even though complete protection from livestock grazing has been afforded them.

Most shallow sites have been stabilized in the past or they would not now have a soil profile developed on them. But under heavy use—heavy for the site—they have in general broken down and become unstable. Recovery or restabilization has been notably slow in most instances observed. The deeper, more permeable soils, on the other hand, respond readily to improved management in a relatively short period of time.

In examining most soils, it is not necessary to expose the entire profile down to bedrock. Only with the shallower ones is this practical or necessary. The combined topsoil and subsoil layers of these profiles will generally be found within three, or possibly four, feet of the surface and in places within one or two feet. By contrast, the material in the substrata may extend to great depths, as for example valley alluvium. It is sufficient to expose only enough of this layer to determine its characteristics. Because many of the range soils are stony, a word of caution should be added: large stones can easily be misinterpreted as bedrock, so enough soil should be removed to make certain of the finding.

Summary

A range manager in the Intermountain West can more accurately apply the information obtained from enclosures, if he will consider three relatively simple characteristics of a soil profile—color, texture, and depth. Even when individual study plots are lacking, a range manager can make useful judgments of site potential if he understands these three simple characteristics. Moreover, once he begins to gain a field knowledge of soils, new applications for the information will continually appear. Selecting sites for reseeding, predicting forage yields, and appraising the on-site effects of accelerated erosion are some of the phases of range management that can be accomplished with greater assurance of success when soils and the soil profile are more fully understood.

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Range Condition in Eastern Washington Fifty Years Ago and Now

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MOST of the stories we read and hear about range condition today, as compared to say 50 to 75 years ago, leave us with the impression that range condition today is much lower than it was when early-day stockmen grazed their livestock. Much of the comparative information on the subject comes from pioneer stockmen whom we've taken to calling "old timers." These time-mellowed men deserve the respect we pay to all pioneers certainly, but the prestige of having seen more sunrises and sunsets than most people, has, in the words of a radio commentator, caused some of them to use the English language in a careless and exaggerated fashion.

At the turn of the century two reports on range conditions in eastern Washington furnish us with a fairly accurate picture of what things were like then. "Forage Conditions and Problems in Eastern Washington, Eastern Oregon, Northeastern California, and Northwestern Nevada" by Dr. David Griffiths was published in 1903. "A Report on the Range Conditions of Central Washington" by J. S. Cotton was published in 1904. These two men seemed to be endowed with enough scientific objectiveness to make their reports and observations credible and valid. It is interesting to note in passing that some of their recommendations for solving range problems that prevailed in their time are just as good today, and are being used by present day stockmen.

If Griffiths' and Cotton's observations and conclusions are valid, and there is no reason to dispute them, there is good evidence that range condition in eastern Washington has improved since they made their studies and published their reports some 50 years ago.

Griffiths' report covers more territory, geographically, than Cotton's. Cotton was with Griffiths when he (Griffiths) visited the Okanogan country. However, there's no evidence of further collaboration. Their analyses of what they observed either jointly or independently are in close agreement. Cotton's studies and report, however, dealt with range conditions in Washington exclusively, so in this paper quotations are confined to his report.

In discussing range condition Cotton divided eastern Washington into three regions, (1) The Okanogan Country, (2) The Eastern Cascade Watershed, and (3) The Columbia River Basin; as outlined in Figure 1.

The Okanogan Country

Cotton observed, "As yet, the range of the Okanogan country has not been so badly depleted as that to the south. There is still plenty of good bunchgrass upon the foothills back from the streams which, with moderate use, ought to last indefinitely. However, greater demands are being made upon it each year, and in the course of a few years all of it that is not settled up will be as badly devastated as the range in the rest of the State."

Cotton's prediction and fears about the Okanogan country did not entirely come true. There are exceptions, of course, but

as a whole the Okanogan country still ranks as some of the best bunchgrass range country in the State. On a survey

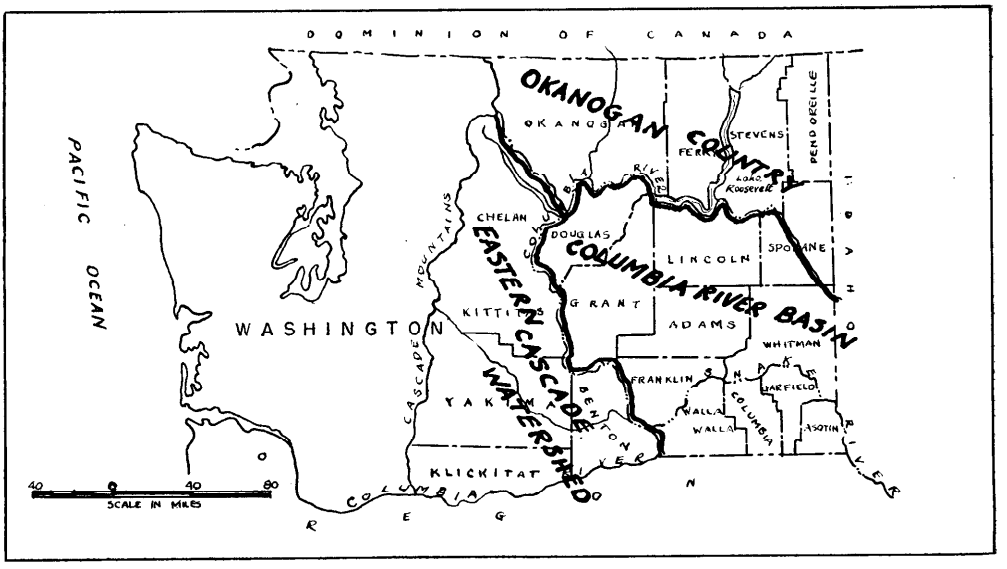

FIGURE 1. MAJOR RANGE REGIONS OF EASTERN WASHINGTON

of 165,000 acres of range in central Okanogan County, the SCS found that 28 percent of the range was in good and excellent condition, 45 percent in fair condition, and the remainder, 27 percent, was in poor condition. This area is in the heart of Okanogan country and seems representative of the rest of the privately owned range land in this section of the state. Incidentally, the Okanogan country is where Loy McDaniels, "The Washington Cattleman of 1950" has been operating for the past 25 years (J. R.M. 4: 122, March 1951).

THE EASTERN CASCADE WATERSHED

Cotton's discussion of range condition in this grazing region was confined to the low lying winter range and the mountain or summer ranges.

Winter Range

"The winter range," wrote Cotton, "is at the present time in a very bad state of depletion. Nearly all of the better portions are now under fence and being cultivated, while the poorer parts have been grazed to a point where it is almost impossible for cattle to make a living, and sheep can find but a few weeks of good grazing."

Cotton then listed the common and scientific names of the more prominent plants growing on the "badly depleted" range. These same species are still present in these winter ranges, but apparently are not as abundant today as they were 50 years ago. For example, on the Anderson Brothers' ranch north of Prosser, Washington, the SCS found that 5 percent of their 23,000 acres was in excellent condition, 40 percent in good condition, 25 percent in fair condition, and 30 percent in poor condition. This ranch located in the Rattlesnake hills is a good example of the range condition that prevails in the winter range area that Cotton described. Close by on the 125,000 acre artillery range now used by the U. S. Army, the percentages ran 19 percent excellent, 45 percent good, 26 percent fair, and 10 percent poor.

On the 85,000 acre High Valley ranch near Ellensburg, Washington, right in the heart of the Cascade area, were found the following conditions: 12 percent excellent, 38 percent good, 36 percent fair, and 14 percent poor.

Summer Range

"This summer range," Cotton observed, "is also suffering severely from overstocking. At the present time a large portion of it is included in the Mount Ranier and Washington Forest Reserves (now the Snoqualmie and Wenatchee National Forests). In these the stock is greatly restricted as compared with the open range, although it is perhaps a question if they are not still overgrazed."

Permittee ranchers and the Forest Service are both constantly trying to improve the condition of these ranges by improved management practices and reseeding.

The Klickitat Drainage District

This particular area of range in the Eastern Cascade watershed, Cotton singled out for special mention. It is a timbered range area, mainly western yellow pine. "This entire country," Cotton observed, "has been badly overgrazed, and at the present time the greater part of the free range is so destitute of food that cattle can hardly make a living on it. In the vicinity of Glenwood the range problem is very serious, all the free range in that neighborhood has been so severely overgrazed by numerous bands of sheep on their way to the forest reserve that the cattle belonging there can hardly get any grazing."

Because of economic and other conditions the bands of sheep that pass through the Glenwood country today on their way to summer ranges can be counted on the fingers of one hand. This has made it possible for cattlemen to fence and manage their land and do something constructive about its improvement. True, there are still areas in the Klickitat drainage area around Glenwood that have never recovered their power to produce the forage they once did. There are, however, other areas where conditions are better than those that prevailed in Cotton's time. This is true on the J. Neils Lumber Company holdings, on the portion of the Yakima Indian Reservation in the Klickitat drainage, and on stock ranches that have been fenced and managed. On an area of nearly 200,000 acres in the locations mentioned above, definite improvement in range condition has been evident over the past 12 years—improvement brought about by forage management practices alone.

THE COLUMBIA RIVER BASIN

"In this region," Cotton observed, "the range is already confined to the arid lands that are too dry for wheat raising and to the broken lands in and adjoining the coulees. While there is considerable grass in those areas that are too far from water for the stock to frequent much, all the land not fenced or otherwise controlled shows the same overgrazed condition as in the depleted range areas in the state. The country directly south of Ephrata is especially destitute of forage."

By present day standards of classifying range condition one can feel reasonably sure that Cotton would have graded a good share of the range land in the area he writes about in poor condition. In 1949 a reconnaissance classification was made of range condition in Grant County (in the heart of the Columbia River Basin). Extensive areas of the range were classified in fair condition. A small part of it was classified as good and excellent condition. The heartening thing was the evidence that this range was continuing to improve.

One specific instance of range improvement can be cited on the 23,000 acre ranch belonging to George and Clarence Rosenburg of Wilson Creek, Washington. A 1939 survey showed that 5 percent of their range was classified in good and excellent condition, 30 percent in fair condition, and 55 percent in poor condition. A 1950 condition classification of this same area showed that 32 percent of it was in good and excellent condition, 45 percent in fair condition, and 23 percent in poor condition. This improvement, again, was brought about by careful grass management on the part of the Rosenburgs who, in 1944, switched from a sheep to a cattle operation.

Grazing Lands of the Palouse Region

"At one time all this land was badly overgrazed," Cotton wrote. "In recent years," he continues, "the greater part of it has been fenced up, and at the present time there are a number of prosperous stock ranches scattered through the region."

Since Cotton did not single out these prosperous stock ranches by name we have no way of pinpointing their location. However, there are still many prosperous stock ranches in the region. This in itself is no criterion of range condition, but usually the condition on prosperous ranches is much better than those that are not being properly managed. The area in question lies in eastern Adams and Lincoln County and western Spokane County. On the Joe T. Smith ranch near Sprague, the Albert Owes ranch near Cheney, and the Harder Brothers ranch near Ritzville, range land totals nearly 125,000 acres. A high percentage of the range on these and other neighboring ranches will grade fair and good condition.

Cow Creek Country

This country begins a few miles east of Ritzville and extends south to the Palouse River. "In the early 90's," writes Cotton, "this country was so badly overgrazed by sheep that some of the settlers, finding they would soon be forced to leave unless something could be done to improve the range conditions, called upon the Northern Pacific Railroad for relief. As a remedy, the railroad company suggested that all those who were grazing stock upon land belonging to the railroad be compelled to lease that land (as a means of reducing trespass). This system of leasing the land has been a great help to the stockmen, as it has given them a chance to control, to a great extent, their range."

To get an idea of the present day condition of the Cow Creek Country, all you need do is visit a few of the ranches in the area. Take, for example, the range on the McGregor Land and Livestock Company. This outfit was one of the first in Washington to begin revising their management system. Through fencing and water developments, they have made better and more efficient use of their range feed. By range reseeding and conversion seedings to alfalfa and grass on their wheat land, they and many of their neighbors have improved the condition of their grazing land and at the same time increased their per-acre meat yields. The 1938 range survey of the McGregor ranch showed that 18 percent was in good and excellent condition, 25 percent in fair condition and 57 percent in poor condition. A 1948 survey showed 26 percent in good and excellent condition, 36 percent in fair condition, and 38 percent in poor condition.

It is regrettable that Griffiths and Cotton did not set down a more clear cut definition of what they meant by range

condition, but then we didn't get around to that problem ourselves until just a few years ago.

Reasons for Improvement in Range Condition

The improvement in range condition has been brought about by many factors. The three most important reasons are (1) ownership and control of the range through fencing, (2) mechanized farming, and (3) the actions resulting from the growing conservation consciousness on the part of stockmen developed through the formation of livestock associations, participation in Forest Service advisory boards, and the formation of local soil conservation districts.

Ownership and Control of the Range Through Fencing

It was quite obvious even fifty years ago that control of the range through fencing was a prerequisite to management and improvement. Cotton observed that whenever the range is fenced and controlled by some individual stockman or company, the condition is immediately changed. This is a sweeping statement, but Cotton later tempered it with the observation that "fencing is not always sufficient." At any rate, Washington stockmen discovered that their range resources were not inexhaustible and that "getting there fustest with the mostest" was detrimental to their ranges and their pocketbooks. And when they also saw that a positive and constructive improvement program was necessary, range condition in Washington took a turn for the better.

Mechanized Farming

When tractor farming replaced horse power on the large wheat ranches adjacent to the ranges, a sizeable portion of the grazing pressure from horses on Washington ranges was relieved. The state of Washington is a big wheat-producing state and in the days when all the farming work was done by horses the range on the fringes of the famous Palouse and Big Bend wheat country supported the horses in the months they weren't being worked. In many cases when these wheat farmers started buying tractors to do their work, a good many of them didn't immediately get rid of their horses but pensioned them off on grass. These broom tails along with the roaming "cayuse" constituted as big a range scourge as ever visited Washington range lands. As late as the early thirties, these worthless grass burners had eaten themselves into a dustbowl existence in the Horse Heaven country near Prosser. On a 200,000 acre block of range where Archie Prior, Stanley Coffin, and Frank Lenzie operate stock ranches, half, or 100,000 acres, would have formerly graded poor condition according to Frank Lenzie, a former range administrator for the Indian Service. That same 100,000 acres was classified in good condition in 1949 and 1950. The factor most responsible for this improvement was the shift from year-long use by countless wild horses and domestic livestock to carefully managed winter grazing. Today year-long use again prevails in the case of cattle, but it is done by moderate use and deferred and rotation grazing.

Conservation Consciousness

I like to interpret this as "grass consciousness" on the part of stockmen, although I realize that such a statement smacks as an insult to the rancher's intelligence. It is not intended as such, for this reason. Out of research and from experiences of practical stockmen has grown a vast body of information regarding range management and improve-

ment techniques. This information has been reaching stockmen through the many channels of communication and education available to them. The most important of these communications and educational mediums have been the effective and organized livestock operator groups such as county and state livestock associations and the groups formed under range improvement programs of the U. S. Department of Agriculture. Stockmen in the state of Washington have recognized the need for a complete program of range maintenance and improvement.

The statement has been made that more has been done to manage and improve the condition of western grazing land in the last 15 or 20 years than at any time before. The statement is verified by the incontestable evidence furnished by an increasingly larger number of stockmen not only in Washington, but in other states as well.

Summary and Conclusions

There is good evidence that some important grazing areas in Washington are in better condition today than they were reported to be in at the turn of the century. Washington ranges have improved because (1) the range has been brought under control through extension of private ownership and fencing, (2) the homeless horse has become a rare sight on Washington ranges, and (3) the conviction on the part of stockmen that the responsibility for the proper use of land under their control rests in their hands, and that better management pays off.

Great progress has been made toward the improvement of range condition. Even though present day range condition is superior to what it was 50 years ago, there is still much to be done before all the range lands in Washington are producing the kind of forage—ultimately meat—they ought to produce.

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Better Management on Longleaf Pine Forest Ranges

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(*Paper presented at a meeting of the Division of Range Management, Society of American Foresters, Biloxi, Miss., Dec. 14, 1951.*)

LIVESTOCK operations vary greatly in the cutover longleaf pine belt of southwestern Louisiana. The land cover ranges from open grassland to nearly fully stocked, second growth, longleaf pine stands. The ownership pattern varies from small farms of twenty acres to large tracts of many thousand acres. The range is still predominantly "open" or "free range", but many units, privately owned, are being put under fence. It is on the larger fenced, individually operated units that the greatest progress is being made in applying better management practices.

Soil Conservation Service assistance is made available through local, farmer controlled soil conservation districts. Several of these districts have recognized the need for better grazing management of the cutover lands to properly utilize the range forage and to coordinate such practices as improved pasture development and woodland management. As a result, the Soil Conservation Service is assisting landowners to develop a program of forest range improvement. Available research information plus information from landowners who are obtaining desired results is being used. This program is revised periodically to conform to known research results and to farmer tested practices.

Recognizing that the cutover lands can eventually bring the landowner more return from woodland products than from native forage, the open grassland stage is then the starting point in an overall management plan and the fully stocked, carefully managed pine stand becomes the management goal, with livestock in a secondary role.

The practices which each landowner or stockman should carry out in his range conservation program then, should be designed not only to restore or maintain the herbaceous cover of highest forage value but also to facilitate the establishment, proper growth, and maintenance of appropriate pine species.

These general provisions are in keeping with the ecological sequence of plant development in the area and with land capabilities. Also they meet the basic principle of the United States Department of Agriculture to use all land according to its capabilities and to treat each acre according to its needs.

While a livestock operation may be the main source of income to start with, under good management practices, woodland products may eventually become paramount. Many of the increasing numbers of cattle in the area must eventually be cared for on tame pastures.

Forest Range Planning

When a landowner requests assistance from his soil conservation district to develop and carry out conservation practices on forest range, the Soil Con-

servation Service technician goes over his land with him and makes a basic forest range condition inventory.

Ranges are classified into excellent, good, fair, and poor conditions according to the kinds of plants that are present (Allred, 1950).

The herbaceous plants which make up most of the plant cover when the range is in its top or excellent condition (Fig. 1A) and which decrease under overgrazing are pinehill bluestem (*Andropogon divergens*), big bluestem (*A. furcatus*), switchgrass (*Panicum virgatum*), Indian-grass (*Sorghastrum nutans*), and swamp sunflower (*Helianthus angustifolius*).

Plants which make up a small percent of the total cover when the range is in

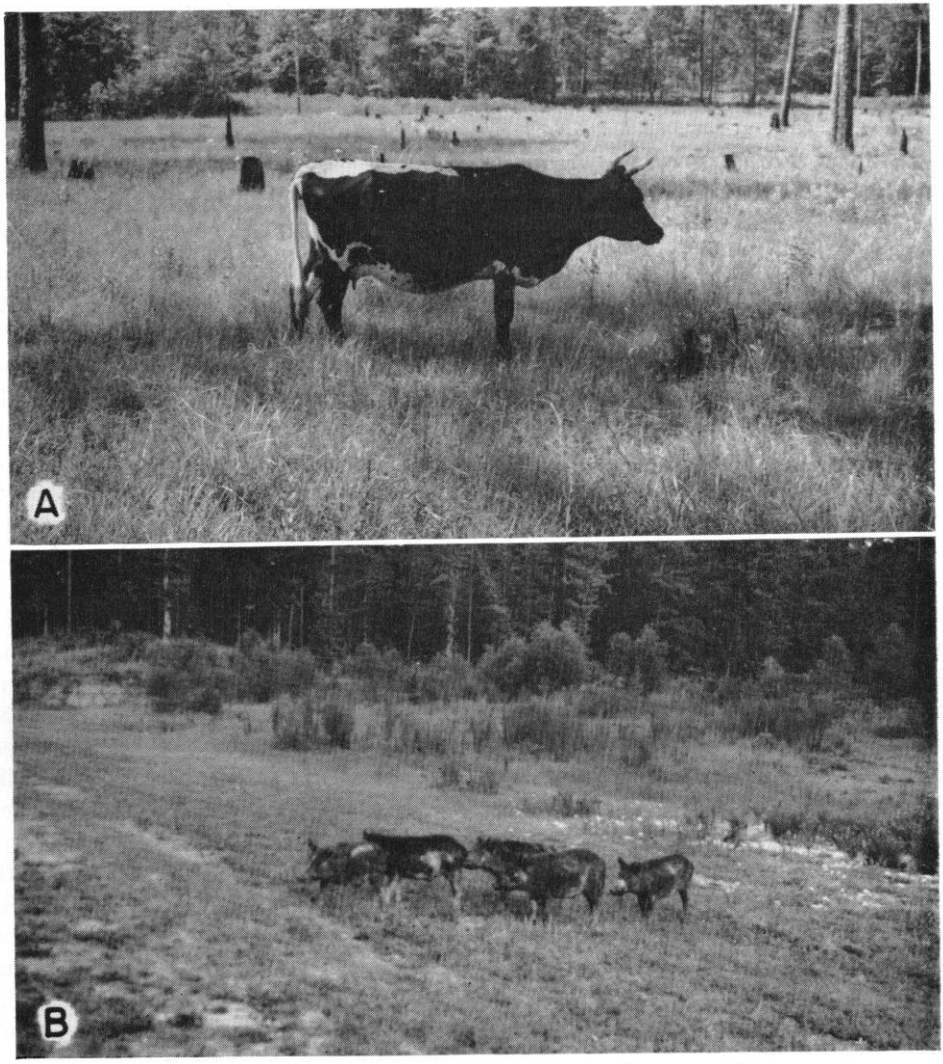

FIGURE 1. CUTOVER LONGLEAF PINE AREAS IN SOUTHERN LOUISIANA

A. Blue-stem range in *excellent condition*. B. Under poor management this range has deteriorated to *poor condition* with a cover of yankeeweed, eastern bitterweed, and low value grasses.

excellent condition but which increase under the first stages of over grazing are low panicums (*P.* spp.), cutover muhly (*Muhlenbergia expansa*), and slender bluestem (*A. tener*).

Plants which invade the range under severe overgrazing and are indicators of low range conditions (Fig. 1B) are broomsedge bluestem (*A. virginicus*), yankeeweed (*Eupatorium compositifolium*), eastern bitterweed (*Helenium tenuifolium*), and three-awns (*Aristida* spp.).

On heavier soils, carpetgrass (*Axonopus affinis*), acts as an invader along with the undesirable weeds mentioned above. On areas that can be mowed and fertilized, carpetgrass has proved valuable as tame pasture.

Range conditions show how far the range has deteriorated below its potential producing capacity and are a guide in selecting practices which will maintain excellent and good conditions or improve fair and poor conditions.

About ten acres of open grassland in excellent range condition are required to carry an animal unit yearlong with supplementary feed during the winter months (Table 1).

TABLE 1

Acres required per animal unit year long by range conditions

RANGE CONDITION	AREA PER ANIMAL UNIT	MOST DESIRABLE GRASSES
	Acres	*Percent*
Excellent	10	75–100
Good	15	50– 75
Fair	20	25– 50
Poor	30	0– 25

An increase in the acres per animal unit is made in accordance with the density of the timber stand. For example, if an excellent condition range had a fifty percent cover of grass and a fifty percent cover of trees, it would require twenty acres per animal unit.

Management practices which are worked into a conservation plan depending on the needs shown by the range condition survey are:

1. Regulate grazing as to proper class of stock, proper numbers of stock, and proper season of use to utilize approximately one-half of the growth of the better forage plants. This practice requires the exclusion of hogs and goats from the range. It also requires that cattle numbers be kept in balance with the range forage production. While research (Campbell and Cassady, 1951) and reports from stockmen point to a six-months grazing season from March 15 until September 15 as being the most desirable, yearlong grazing can be practiced under careful management with supplemental feeding during the winter months.

2. Maintain grazing distribution by rotating mineral, salt, and feeding locations, proper location of stock ponds or wells for stock water, adequate fences, and seeding and fertilizing strips (Silker *et al.*, 1950) in key range areas. Poor grazing distribution is one of the major problems on the forest range. The larger the fenced unit, the more severe the problem seems to be.

3. Supplement with minerals, feed, or pasture during periods when the range forage is deficient.

Additional phosphorus and calcium supplement on the range is a constant need (Campbell and Cassady, 1951). Good legume hay fed on the range for 120 to 130 days at the average rate of 8 pounds per day per animal unit seems to be one method of furnishing adequate protein supplement. The feeding period should start not later than November 15 and extend into March.

Alyceclover and lespedeza are grown locally by operators who have haying equipment of their own or where hay

can be put up on a contract basis. Alfalfa hay is trucked in from West Texas and used by a few of the larger stockmen. All of these hays compare closely in value. One-half ton of hay per animal unit is recommended as the minimum yearly winter protein supplement when hay alone is fed on the range.

Winter pastures of oats, ryegrass, and fescue are becoming more common. Several soil conservation districts own pasture seeding and renovating equipment which is made available to landowners at a small fee per acre.

Tall fescue, a relatively new pasture plant in Louisiana, is showing promise as a perennial winter pasture plant. Pastures now going into their fourth year are proving its value. This grass requires very heavy fertilization and careful management. District cooperators who have used it successfully say it is well worth the expense and care, but they admit there is much to be learned about growing it and getting the most out of it. Best results have been obtained from tall fescue pastures when a legume was used with the grass.

The feeding of cottonseed cake, meal, or range pellets is quite common, but the feeding of these concentrates is often delayed too late in the fall and then sufficient amounts are seldom fed. This results in loss of condition of the animals and may lead to pine damage from grazing.

4. Control of undesirable vegetation is often necessary. Perennial weeds and scrub hardwoods must be controlled by chemical treatment, cutting, or mowing. Control of scrub hardwoods for range improvement alone may prove too costly, except on special areas which are valuable because of their location or in connection with woodland improvement. Ammate is the most common chemical used for this purpose (Peevy, 1949).

Weed control on partially improved areas can be accomplished by mowing or by spraying with 2,4-D. Boom-type sprayers mounted on tractors can cover areas too rough for conventional mowers and can treat more acres per day. Spray control with chemicals must be carried on when damage to clovers and other legumes can be kept to a minimum.

Types of Livestock Operations

The types of livestock operators who use forest range and have been assisted in range conservation work are:

A. Small landowners who use open range.

B. Large operators who depend mainly on privately owned or leased range.

C. Livestock farmers who use range only to supplement their pastures.

D. Stockmen who use open range in conjunction with coastal marsh range on a seasonal basis.

A. Small landowners who use the open range. This type of operation is responsible for many of the problems in the longleaf belt. People who own as few as forty acres may run sizeable herds of cattle, sheep, or hogs on the adjacent open range. Their operation costs little, hence they are reluctant to invest anything for improvements. Soil Conservation Service technicians have been successful in getting a few of these people to use farming and livestock practices on their own land which results in better forest range conservation.

Usually assistance is first requested for a stock pond or a few terraces. While rendering such assistance the technician has an opportunity to suggest improved pasture practices or the planting of lespedeza or some other adapted legume for hay. He has an opportunity of pointing out the values and limitations of the different range plants. Each time he assists the landowner in applying a

conservation practice, he is in a position to carry the operator farther towards a complete conservation program. More progressive farmers are showing the slower ones that they can actually help themselves by doing a good conservation job. One such man in the Calcasieu Soil Conservation District has influenced several of his neighbors and many other people towards growing better pastures, producing more hay, eliminating range hogs and practicing better fire protection. When a small operator plants costly improved pastures, he usually wants to get rid of range hogs. Hogs can ruin an improved pasture as readily as they root out young pine trees.

B. Large operators who depend on fenced range, either operator-owned or leased, are not as numerous as the first type. Usually running a cow herd of several hundred head, they either own their land or have long term leases with the larger land or lumber companies. Owner-operator units usually produce their own hay and improved pastures. Lessee operators usually buy hay and concentrates for use during the winter months.

A few of the large land companies are actually carrying on livestock operations on their own land with their own cattle along with reforestation. Other companies have large units fenced hog proof, including plantations, and are giving grazing free or on a small fee basis to small stockmen in return for fence maintenance, fire protection, etc. They feel that the cost is justified by better relations which result in faster timber development.

The large owner-operator on fenced range units is often quick to accept and apply conservation practices. He is successful because he realizes the limitations as well as the values of forest range and applies practices to overcome these limitations. He knows that winter feed is essential, that the grass is deficient in phosphorus and calcium, and that wildfire burning often destroys feed. He is most apt to accept the best methods and apply them to his own operation.

Several are using fertilized and seeded strips for grazing and fire protection. Another, who uses plowed fire lanes, puts them on the approximate contour.

Perhaps the final test is that several have carried on successful livestock operations while developing a good stand of second-growth longleaf pine from natural reproduction.

C. Livestock operators who use the range to supplement their improved pastures often look at range forage in an uncomplimentary manner. They have operated beef or dairy herds on improved pastures, hay, and grain produced on the farm. Many others realize however, what good insurance the range forage was to them during the past severe winter and also the past summer which was so dry that many improved pastures made little growth. By coordinating the use of the range and their improved pastures, a more economical operation can be realized.

A few men in this group whose places are situated along the southern edge of the longleaf area near the rice section use rice stubble fields for fall grazing, pastures and hay for winter, and move to the range for the spring and summer months. Rice stubble will give approximately an animal month of grazing per acre when the rice is harvested in the early fall.

D. There are few stockmen who use the forest range in conjunction with the coastal marsh ranges on a seasonal basis. However, their operation is usually a large one and may run several hundred head of cattle making use of the cutover range in the spring and summer. These herds are trailed south in October a distance of approximately sixty miles to

the salt-marsh range along the coast. The drive requires about four days. The cattle swim the Intracoastal Canal, a sizeable waterway, but loss of even a single head is unusual.

The salt-marsh range is excellent winter range, and cattle go through until April 15 without additional feed of any kind. Many cows bring calves during this period. Due to the severe mosquito infestations in the summer months, and the decrease in forage value as the plants mature and become tough, cattle are moved back to the cutover ranges for spring and summer grazing. Range grasses on the forest range have had a month to make their early spring growth and are at the height of their value when the cattle arrive.

One such operator owns both of the ranges he uses and has them fenced. Some of the area in the cutover range has been further improved by fertilizing and overseeding lespedeza.

Summary

The Soil Conservation Service, working with soil conservation districts in Louisiana, is helping landowners to apply better management practices on their forest ranges. Good range management practices implement woodland development and permit more efficient use of improved pastures. Based on range-condition inventories, these practices include proper number and class of stock, right season of use, improved grazing distribution, provision for adequate supplements during periods when the range forage is deficient, and control of undesirable vegetation. Drawing from research results and stockmen-tested practices, this program is revised periodically as more information becomes available. While additional research is needed on all phases of the forest range, the need to apply proven practices is just as great. Progress is being made in getting these practices applied by stockmen with the assistance offered through their soil conservation districts.

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A Relic Area on the Wyoming Shortgrass Plains[1]

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THE NORTH end of the Fort Francis E. Warren Military reservation in the outskirts of the city of Cheyenne, Laramie County, Wyoming, has an area of approximately two square miles cut up around the edges by various military installations but, by and large, wholly undisturbed other than by the shrapnel, bullets, etc., lying on the ground. As nearly as can be determined, there has been no grazing since 1900 except for a few mules during the first World War. The distance of the area from a ready supply of water makes it seem certain that the area as a whole has never been heavily grazed.

Since the area is near the city of Cheyenne, surrounded by various wooden structures, and the site of an ammunition dump, it may be assumed that accidental fires have been rapidly extinguished. There is no history of controlled burning for the area. Rodents are present but not in unusual numbers. Geologically, the area is Pleistocene outwash fan underlain by gravel and a lime horizon. The surface soil is a brown, fine, sandy loam. There are no game animals on the area. All types of topography and several soils types are represented.

The information in Table 1 was gathered on the relic area. Since the generalized terms excellent, good, fair, and poor are commonly used to include conflicting evidence from more than one set of condition classes, it has been proposed (Wyo. Agr. Expt. Sta. Cir. 37. 1950) that the stages of vegetation classes be named, from best to worst, as (1) natural stage, (2) increaser stage, (3) invader stage, and (4) weed stage. The usage will be followed here. Miscellaneous notes and observations based on the relic area:

1. The reduction in total ground cover observed to occur on different sites is due: (a) to poorness of site, cf. ordinary dry upland and north and south facing slope where the soil is shallow (at most an inch or two and gravel evident on the surface); (b) to accumulation of moisture and therefore soil, and mulch, cf. ordinary upland and either the south facing slope where the soil was deep or ordinary dry bottomland. On this site the soil profile is an average of six inches deep, a good soil cover for this area, and gravel is not evident on the surface.

2. Highest estimates of cover are correlated directly with the proportion of shortgrasses present—whether buffalograss or blue grama. Cover estimates were made by averaging at least ten (often 100) square foot samples, using "basal density" only.

3. Although blue grama is an increaser under most conditions, its presence as 70 percent of the cover on ordinary dry upland in the relic area indicates that under those conditions the grass is, practically speaking, a decreaser.

4. North facing slopes in the deeper soil areas (not represented in the sites analyzed) are very similar to ordinary dry bottomland.

5. Western wheatgrass is reduced along with other midgrasses during the early stages of grazing, but under heavier grazing returns in greater abundance and therefore exhibits a rare case of a plant which is alternately decreaser (natural

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class to increaser class), increaser (increaser class to invader class) and then decreaser (invader class to weed class).

(e.g. Albany County, Wyoming) its role of dominance in swales is taken over by western wheatgrass.

TABLE 1

Key to climax for range condition vegetation classes, ordinary upland, Laramie County, Wyoming*

INCREASERS†	SITE DESIGNATIONS					
	Swale	Ordinary dry bottom land	North facing slope (shallow)	Ordinary dry upland	South slope (shallow)	South slope (deep)
Normal relic area cover	60%	35%	25%	50%	35%	30%
Bouteloua gracilis	0	35.0	12.0	70.0	50.0	23.0
Buchloe dactyloides	75.0	0	0	0	0	0
Phlox glabrata	P	2.5	10.0	0.5	6.5	3.0
Artemisia frigida	1.0	P	3.0	1.5	2.0	0.5
Grindelia squarrosa	5.0	0.5	P	P	0	0
Cogswellia orientalis	0	0	0	0	5.0	T
Paronychia depressa	0	0	0	0	5.0	T
Arenaria hookeri	0	0	5.0	0	1.0	0
Agropyron smithii	5.0	25.0	30.0	2.0	7.0	5.2
Carex eleocharis	10.0	2.0	10.0	11.0	T	10.0
Helianthus sp.	0	0	0	0	5.0	1.0

* All figures are based on at least ten random samples; P denotes presence in the area but not appearing in any random sample; T indicates that although included in at least one random sample, the total presence was less than 1%.

† Decreasers, all sites: *Poa secunda, Koeleria cristata, Stipa comata, Carex filifolia, Agropyron trachycaulum.* Also all perennial forbs that are native but not listed as increasers or invaders.

Invaders, all sites: *Astragalus drumondii* (2), *Festuca octoflora* (2), *Plantago erecta* (2), *Blitum capitatum* (3), *Opuntia polyacantha* (3), *Eurotia lanata* (3), *Paronychia depressa* (3), *Bromus tectorum* (4), *Kochia scoparia* (4). (Stage at which plant may be recognized as an invader: 2-Increaser, 3-Invader, 4-Weed).

6. *Natural stage* is dominated by midgrasses under ordinary circumstances with shortgrasses occupying the extremes —blue grama on the dry upland, buffalograss on the swale bottoms. *Increaser and invader stages* are characterized by the reduction of midgrasses, the increase of both shortgrasses. Invaders typical of these classes include native annuals such as *Festuca octoflora* and *Plantago erecta. Weed stage* is characterized by introduced annual invaders such as fireweed (*Kochia scoparia*) and cheatgrass brome (*Bromus tectorum*) which are not present in any of the other condition classes.

7. In areas where buffalograss is absent

8. The reading of species "to the nearest 5 percent" probably would not be seriously questioned in the case of the swale where this type of reading would include 90 percent of the vegetation, and more than half the species. However, in describing ordinary upland climax, although 85 percent of the cover is included, only three of 22 species enter the list (increased study of the relic area would increase the 22, but not the three) and one wonders if something highly important concerning at least the aspect of the cover hasn't been omitted. The five percent method has the tendency to perpetuate the "key species" type of survey which

ignores and neglects many of the finer points in systematic botany and plant ecology. In four situations out of six, 15 percent of the vegetation is misrepresented under the present system. More extreme cases of heterogenous cover are not hard to imagine wherein the key or five percent would hardly consist of half the cover. Fringed sagebrush (*Artemisia frigida*) presents yet another problem. If counted only in the cases wherein at least five percent showed, then this species would not be considered a part of the climax, and therefore would not be eligible (by definition) to be listed with the invaders. In actuality, fringed sagebrush was present in small but characteristic appearance on five of the six sites, and has all the characteristics of an increaser. To force it into the invader class would be putting too much emphasis on the five percent.

9. Mulch on the Ft. Warren relic area, measured in grams per square foot, averaged as follows:

(1) South facing slope (deep soil)	15.43
(2) Ordinary dry bottomland	13.41
(3) North facing slope (shallow soil)	9.45
(4) Swale	7.50
(5) Ordinary dry upland	3.85

TOPSOIL AND SUBSOIL

We occasionally hear loose discussions of the practical possibilities of remaking topsoil from raw, erosion-exposed subsoil. In my opinion it cannot be done short of geologic time. Subsoil can, in many instances, be improved, of course, by growing grass and legumes, for example, and by adding manure, compost, lime, fertilizers, and so on. Sometimes following such treatment good crop yields are obtained; but this is a matter of *improving* the subsoil, not of making new topsoil. I have spent a lifetime, as a practicing soil scientist, studying the soils over much of the United States and in other parts of the world. These studies support but one conclusion—that topsoil is one thing and subsoil is another.

Dr. H. H. Bennett
in Scientific Monthly
October 1950

Reseeding, Fertilizing, and Renovating in an Ungrazed Mixed Prairie[1]

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IN THE western states studies of relic areas have yielded much information necessary in the management of range vegetation. Such an area of approximately 20 acres is present on the North Montana Branch of the Montana Agricultural Experiment Station near Havre, Montana.

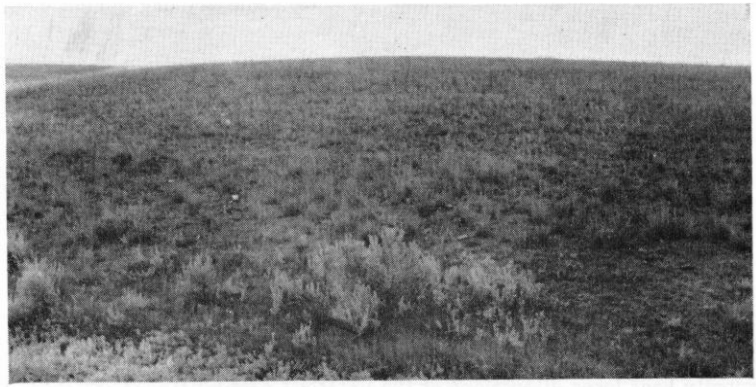

FIGURE 1. General view of relic area which shows the rolling topography, mixed prairie community in the background, and a small community of Palouse prairie in the foreground.

For 32 years prior to 1911 the area was a part of Fort Assinniboine and no doubt was grazed mostly by horses. Between 1911 when the Fort was abandoned and 1915 when the State of Montana gained control, records indicate that trespass livestock grazed the area. The relic area is located within a field fenced since 1915 for plots used in agronomic studies. However, the area has never been plowed because of poor soil and rough topography.

[1] The field work and compilation of data from annual reports of the North Montana Branch Station were completed in 1947 while the author was on the staff of the Department of Animal Industry and Range Management, Montana State College.

A prairie fire burned the dry grass in the early spring of 1925.

Annual rainfall averages 13.07 inches per year. The temperature range is extreme with a July average of 68.3 degrees F. and January average of 12.9 degrees. The topography is rolling (Fig. 1). The soil is a dark grayish brown sandy loam in the upper 10–15 inches, below which is glacial till of which the upper 8–13 inches has a high concentration of lime. The area was examined closely in the summer of 1947 to check three items: (1) the composition of vegetation after 32 years of protection; (2) a reseeding experiment started in 1936; and (3) a renovation and fertilization trial started in 1925.

NATURAL VEGETATION

The vegetation on the more level uplands was dominated by typically mixed prairie while the north facing slopes of the small drainages had small communi-

ties of Palouse prairie. In the former, needle-and-thread (*Stipa comata*), blue grama (*Bouteloua gracilis*), and June grass (*Koeleria cristata*) were the major dominants. This community was apparently similar to the Stipa-Bouteloua faciation described by Coupland (1950) for the part of southeastern Alberta, Canada, nearest to the relic area. In the Palouse prairie community bluebunch wheatgrass (*Agropyron spicatum*) and the first two species mentioned above were most important in the percentage composition. Several other species of grasses were present, but at the time of the survey they were relatively unimportant (Table 1).

TABLE 1

Average percentage composition and basal area of plants in eight square-meter plots in each community, 1947

SPECIES	MIXED PRAIRIE COMMUNITY	PALOUSE PRAIRIE COMMUNITY
Needle-and-thread	72.02	5.43
Blue grama	13.84	6.00
June grass	5.08	1.14
Thread leaf sedge	2.23	3.72
Western wheatgrass	2.06	
Sandberg bluegrass	1.99	T
Bluebunch wheatgrass		81.71
Green needlegrass		T
Mountain muhly		0.86
Pussytoes	2.78	1.14
Total	100.00	100.00
Basal area in percent	3.36	7.00
Selaginella, basal area in percent	28.47	28.68

However, vegetation is dynamic and the relative rank of the grasses and other plants has no doubt changed through the years. Even though no records are available, observations by staff personnel at the North Montana Branch Station indicated that many plants of the dominant species died during the severe drought of 1934–37 and they did not again become abundant until 1940 or later. Workers in the Northern Plains during 1934 to 1940 have found that many annual plants and Sandberg bluegrass (*Poa secunda*) increased, and total density of plants greatly decreased during the drought (Lommasson, 1939; Woolfolk, 1949).

Shrubs and herbs were not present in large numbers nor were they conspicuous in the aspect during July. Earlier in the year and in the fall a few flowers were present which broke the monotony of the grassland by their color. Such species as Hoods phlox (*Phlox hoodi*), cudweed sage (*Artemisia gnaphalodes*), scurfpea (*Psoralea tenuiflora*), Arkansas rose (*Rosa arkansana*), hairy goldaster (*Chrysopsis villosa*), and purple prairieclover (*Petalostemon purpureus*) were the most conspicuous. The shrubs and herbs, in total, accounted for less than five percent of the vegetation, either on a basis of basal area or estimated ground cover.

The percent of the ground surface occupied by seed plants was low, 3.36 percent in the mixed prairie and 7.00 percent in the Palouse prairie. The latter was the greater because the individual bunch of bluebunch wheatgrass occupied much more area than the small plants of needle-and-thread.

One cannot examine the relic without noticing the large amounts of selaginella (*Selaginella densa*). Mats of this species covered approximately 28 percent of the ground. This small clubmoss-like plant is very short but it grows in dense mats that completely cover the ground. It is drought resistant but, like the mosses, it grows with light rains. Apparently, in locations where the ground is made bare by continued and excessive use by livestock or by severe drought selaginella frequently increases in the vicinity of Havre to the extent that it restricts establishment of grasses, either native or reseeded. However, in grazing trials from

1932 to 1938 at Manyberries, Alberta, Canada, Clarke, Tisdale and Skoglund (1943) found that selaginella made the greatest increase with light grazing. Coupland (1950) observed in the plains section of Canada that it increased under protection and decreased with the trampling of livestock. The exact relationships of selaginella in the management of range lands in the Northern Plains are yet to be determined.

Seeding Crested Wheatgrass into Native Grass

Crested wheatgrass (*Agropyron cristatum*) is an important introduced plant used for early spring forage throughout the northern Great Plains. Often one hears the question: "If it is so good, why shouldn't the whole ranch be seeded?" One reason is that it is best for early spring forage while other species are better during the summer, fall, and winter. Still another reason is that the native sod will have to be broken before crested wheatgrass will become established. A series of seedings along the south side of the relic area demonstrates this point very clearly.

In the fall of 1936 one drill width of crested wheatgrass was seeded at the rate of five pounds per acre. Similar plantings were made in the falls of 1937, 1938, 1940, and 1941. In July 1947 when the percentage composition of plants in each planting was determined, the differences between years were striking. In the 1936 and 1937 plantings crested wheatgrass composed 84 and 94 percent of the stand, but in the 1941 seeding less than one percent. On the other hand there was less than one percent of needle-and-thread in the 1936 seeding, and over 70 percent in both the 1941 seeding and unseeded adjacent area (Table 2 and Fig. 2). The decrease in establishment of crested wheatgrass with the later years of seeding was gradual as was the increase of needle-and-thread. Except for the 1937 seeding, the percentage of the other grasses remained about the same. Percent of basal area occupied by grass decreased as crested wheatgrass decreased. These individual plants were larger than the native grasses.

The only information available which explains these differences comes from statements in the annual reports from

TABLE 2

Average percentage composition and basal area of plants in 1947 in plots seeded to crested wheatgrass from 1936 to 1941

Species	Year of seeding to crested wheatgrass					Control (no seeding)
	1936	1937	1938	1940	1941	
1. Crested wheatgrass	84.05	94.22	51.27	35.77	0.95	0
2. Needle-and-thread	0.97	1.48	28.72	39.95	72.03	85.46
3. Blue grama	13.39	1.59	13.14	8.60	16.61	4.68
4. June grass	1.07	2.71	2.24	11.69	5.05	5.49
5. Thread leaf sedge	0.38	T	3.09	0.18	1.02	0.72
6. Western wheatgrass	0.04	T	1.17	3.16	1.49	1.67
7. Sandberg bluegrass	0.10	0	0.37	0.65	2.85	1.98
Percent grasses except 1	15.95	5.78	48.73	64.23	99.05	100.0
Percent grasses except 1 and 2	14.98	4.30	20.01	24.28	27.02	14.54
Basal area grasses (percent)	6.84	7.12	6.24	3.99	4.21	4.19
Basal area selaginella (percent)	2.74	0.50	2.15	16.41	31.87	16.36
Total basal area (percent)	9.58	7.62	8.39	20.40	36.08	20.55

the North Montana Branch Station. The years 1936 and 1937 were near the end of the drought. The density of native vegetation was low and the few plants offered little competition to seedlings of crested wheatgrass. In 1940 and especially 1941 the native stand had thickened and prevented the establishment of the seeded grass. This trial and experience throughout the West indicates that reseeding should not be attempted in closed stands of other plants unless that cover is at least partially destroyed in the planting

Effects of Manuring and Renovation

In 1925 sixteen plots one-third acre in size and measuring 66 feet by 200 feet were established near the north side of the relic area. These were treated between the years 1925 and 1935 according to the schedule shown in Table 3. Manuring, renovation, and seeding were done about the first of April each year. The application of manure was at the rate of 10 tons per acre. Disking was considered a light renovation and disking plus spring toothing a heavy renovation. Seeding of sweet-

Figure 2. Mixed Prairie Seeded to Crested Wheatgrass

A. Good stand of crested wheatgrass resulting from the 1937 reseeding. B. A relatively poor stand from the 1940 seeding. C. No stand from the 1941 seeding, where needle-and-thread (light colored) comprises more than 72 per cent of the grasses. Photos, July 1947.

operation. Similar statements have been made for crested wheatgrass in the northern Great Plains (Allred, 1940) and for five promising grasses seeded into closed communities of cheatgrass (*Bromus tectorum*) and big sagebrush (*Artemisia tridentata*) in Utah, Nevada, and southern Idaho (Robertson and Pearse, 1945).

Not only did crested wheatgrass occupy the community to the exclusion of most plants of needle-and-thread but also selaginella was less prevalent than in the native stands. This is shown by measurements of basal area (Table 2).

clover and crested wheatgrass were also in April and at the recommended rates for the area. However, in neither case was a stand obtained. After the forage had completed its growth hay yields were obtained by harvesting and weighing the forage from the entire plot with the usual haying equipment.

Yields were not taken in 1925, 1926, 1928, 1931, 1934 and 1936, because drought prevented the growth of a harvestable crop or because of unknown reasons. In 1934 hail on June 26 greatly reduced all the yields.

Descriptions in the annual reports of the North Montana Branch Station indicated that in 1925 blue grama, western wheatgrass (*Agropyron smithii*), June grass and needle-and-thread were the major species. A considerable amount of selaginella was present at that time. ovation destroyed part of the selaginella and damaged some of the blue grama. Western wheatgrass increased with renovation and especially so if early rainfall occurred. Reseeding well-established native sod with sweetclover or crested wheatgrass was to no avail.

TABLE 3

Yield of hay in pounds per acre from one-third acre plots of native unused mixed prairie treated variously by renovation and with applications of barnyard fertilizer, 1927–1947

PLOT NO.	MANURED AT 10 TONS PER ACRE IN APRIL IN YEARS OF:	RENOVATION IN APRIL IN YEARS OF:	YIELD IN POUNDS PER ACRE						
			1927	1929	1932	1933	1935	1947	Avg.
IIa	1925, 28, 31, 34	None	760*	162	525	264	327	486	421
IIb	1925	None	760	99	119	73	125	360	256
IIIa	1925–26, 28–29, 31–32, 34–35	None	1550	614	686	409	185	870	719
IIIb	1925–26	None	1550	310	152	109	50	336	418
IVa	1925–34	None	2540	1023	1538	620	228	1092	1174
IVb	1925–27	None	2540	1069	832	429	136	996	1000
Va	1925, 28, 31, 34	Disked 1925, 28, 31, 34	2230	1010	1241	495	108	870	992
Vb	1925	Disked 1925	2230	430	323	178	42	396	600
VIa	None	Disked 1925, 28, 31	620	158	449	188	44	540	333
VIb	None	Disked 1925	620	83	158	66	33	300	210
VIIa	None	Disked & springtooth 1925, 28, 31	940	356	739	350	61	588	506
VIIb	None	Disked & springtooth 1925	940	248	383	132	64	312	347
VIIIa	None	Disked-sown to sweet clover 1925, 28	740	182	541	238	69	456	371
VIIIb	None	None	395	23	69	26	47	564	187
IXa	None	Disked-sown to crested wheatgrass 1925, 28	295	92	383	337	110	429	285
IXb	None	None	180	23	59	23	30	168	81

* Yields not separated for the plots with Roman numeral series II–VII inclusive, in 1927.

Within two years it was evident that both manuring and renovation promoted increase in the grasses and decrease of selaginella.

Yields of hay and general observations before 1936 indicated that manuring improved yields more than did renovation, that the grass stand was improved with manuring (Table 3). Severe cultural ren-

Hay yields for 1947 were generally in line with the above conclusions even though 12 years had passed since any treatment had occurred. However, the composition of the stand had changed. Needle-and-thread was the most important grass and small amounts of several other grasses were present. The appearance for all plots was much like that de-

scribed earlier for the untreated portion of the relic area, and the percentage composition of vegetation in the plots indicated little difference between them that could be attributed to the treatments. Selaginella was prevalent in all plots. Evidently the natural changes in the composition since 1935 were more controlled by weather than by previous treatment. The yields of plots VIII b, IX a, and IX b were low for the entire trial due to shallower soil than in the other plots.

Differences in height of needle-and-thread were apparent between some of the treatments. Height measurements of 50 randomly selected plants in each treatment showed that the effects of more than four applications of manure were still present in 1947. No significant differences were found in treatments with less than three applications.

ACKNOWLEDGMENTS

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Pine Needle Abortion in Range Beef Cattle

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FOR a number of years ranchers in range areas of the Province of British Columbia and the States of Washington, Idaho and Oregon have claimed that pine needles and pine buds were causing nutritional or mechanical abortion in range beef cattle. In British Columbia most claims centered in savannah-like range areas (Fig. 1) where the dominant pine is western yellow pine (*Pinus ponderosa* Laws). Such claims of pine needle abortion have been generally discounted since instances of brucellosis, phosphorous deficiency and vitamin A deficiency, each a cause of abortion are not unknown in these areas. In 1950 the B. C. Beef Growers Association requested that the Canada Range Experiment Station, Kamloops, B. C. undertake a study or series of studies to determine whether pine needles do or do not cause abortion in range beef cattle.

Review of Literature

Virtually no experimental work with pine needle abortion of beef cattle has been reported. Gunn, (1948) in writing on this problem in range herds stated, "Non-infectious abortion is not new to these areas and its possible cause is yet unknown. The best lead at present indicates that it rotates around errors in nutrition.—We are not prepared to admit that pine needles may play a part."

Figure 1. Pine Tree Reproduction Grazed by Range Beef Cattle

Muencher (1945) stated that a number of coniferous trees including pines may prove to be harmful when the leaves are browsed in large quantities or when they form an exclusive diet of stock. However, because of the resinous taste, animals seldom eat these plants unless they are driven to do so by lack of other forage. However Bruce (1927) reported that upon several occasions and from widely scattered sources he had been advised by responsible stockmen that cattle feed-

ing on needles of freshly fallen pine will abort.

Description of Plant

Western yellow pine, locally called bull pine, yellow pine, British Columbia pine or jack pine, grows to heights of 160 to 170 feet or more under favourable conditions. Ordinarily under range conditions it attains a height of 70 to 80 feet, branches are usually fairly short, stiff, and upturned. Western yellow pine is peculiar in having its needle-like leaves in bundles of 2 to 5, 3 being the more common. These needles are from 7 to 11 inches long and dark yellow-green in colour (Henry, 1915).

In Canada this tree is confined to the drier portions of the southern interior of British Columbia (Fig. 2), extending as far north as Vavenby on the North Thompson River (Canada 1950), Clinton and the Caribou Road, and eastward from the Cascade mountains (Henry, 1915).

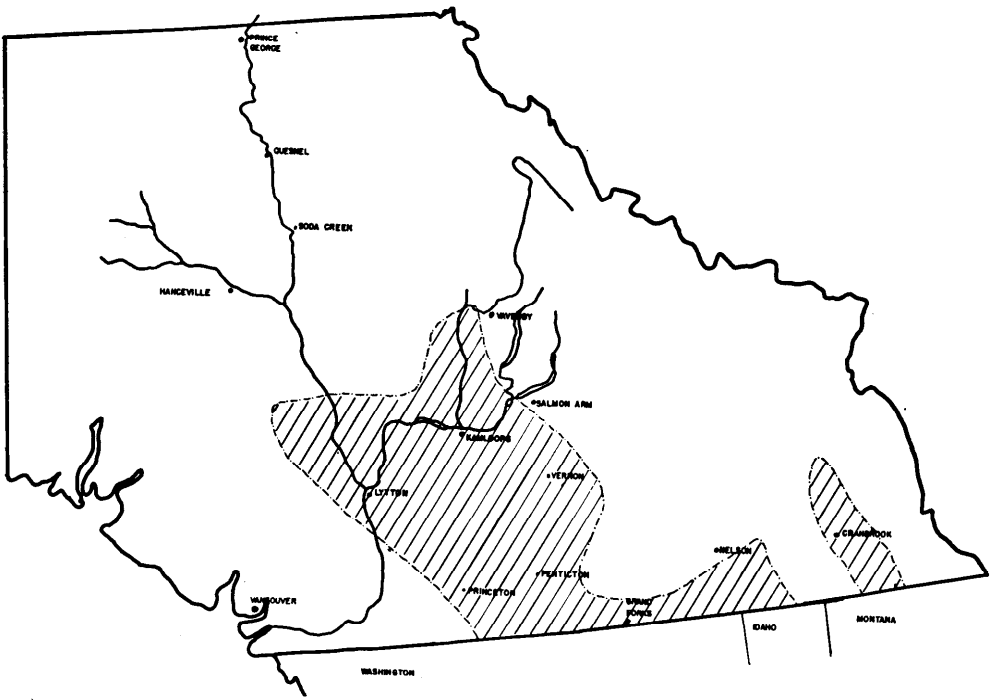

Figure 2. Distribution of Western Yellow Pine in British Columbia

Experimental Procedure

During the 1950 fall round-up 18 Bang's disease free pregnant range cows of Hereford breeding were selected, weighed and divided into three comparable groups. The animals were housed in groups in an open faced stock shed. Shavings were used for bedding and provided as required. Care was taken in arranging the pens and exercise yards to eliminate factors capable of producing mechanical abortion. Unheated water was available in troughs approximately 800 feet away from the feed racks and mineral boxes.

Each group was fed once daily. Hay was fed in racks; the pine needles and oilcake meal were fed in grain troughs. Pine needles and buds were collected fresh daily by stripping them from standing living pine trees.

In group I pine needles and buds were fed at a rate of 5 pounds per head per day and gradually increased until at the completion of the trial animals were receiving 8 pounds. The proportion of crested wheatgrass hay was reduced from 15 pounds per head per day according to the weight increase in pine needles fed over 5 pounds. In group II animals were allowed free access to pine needles with no compensatory reduction in cultivated roughage. These fresh needles were placed in the trough daily. Group III animals were refused pine needles. After the 42nd day 5 pounds of alfalfa hay was fed in replacement for an equal weight of crested wheatgrass hay in all groups. A mineral mixture was available to each group at all times. It was made up of ingredients in the following proportions: bonemeal, 50 pounds; salt, 50 pounds; iron sulphate, 4 ounces; cobalt sulphate, 0.8 ounce; manganese sulphate, 0.5 ounce; copper sulphate 0.3 ounce; potassium iodide 0.3 ounce.

A vitamin A supplement in the form of pitchardine oil, was provided daily to all animals at the rate of 3000 I.U. per 100 pounds live weight. This was mixed with the oilcake meal and fed immediately.

Hay and concentrate samples were taken for chemical analysis immediately prior to the commencement of the trial and at the approximate mid point of the wintering period. Pine needles and bud samples were analyzed immediately prior to the commencement of the trial and at six week intervals throughout the experimental period. The samples were analyzed at the Nutrition Laboratory, Canada Experimental Station, Lethbridge, Alberta for the following constituents: Crude protein, Ether extract; Crude fibre, Ash, Moisture, Nitrogen-free extract, and Carotene.

Each animal was weighed individually after being on trial 28 days. Being range cows, it was very difficult to weigh without exciting them. Weighings were discontinued at this point to eliminate the possibility of mechanical abortions induced during weighing operations.

Daily feed records were kept and the conditions of the animals noted. Mineral consumption was computed every 14 days. The conditions, number and weight of calves born normally or aborted was carefully noted.

Results and Discussion

In weighing the experimental cows after the first 28 day wintering period it was noted that each group recorded gains in weight as did each animal within the groups. Cows in group I started the trial with an initial average weight of 947 pounds and recorded a gain of 65 pounds per head at the completion of the first 28 day feeding period. Cows in group II started at 937 pounds and gained on the average 133 pounds while during the same 28 day period. Group III cows averaged 46 pounds gain from an initial weight of 937 pounds. While no further weights were recorded because of the temperament of the range cows, ocular appraisals indicated that the cows continued to rise in conditions and general appearance until parturition. A summary of the rations fed by groups is given in Table 1.

In comparing this ration (assuming 50 percent digestibility) with allowances recommended by Morrison (1945, Table III, p. 1006), and the National Research Council (Guilbert, *et al*, 1945), we find that it is adequate according to Morrison's standard but fails to reach the standard recommended by the Research Council. However, judging from the gains in weight and conditions shown by the animals during the trial it is assumed that an adequate ration was supplied.

One cow in the control group appeared

listless and a poor feeder: After one month on trial she was culled from the experiment and returned to the general herd. Within the herd she calved normally at the proper time.

All cows were bred to commence calving on March 15th, which is the general practice in the Kamloops district. With the exception of the first 3 cows general symptoms of parturition were evident for a normal period of time. Calving commenced on February 6 and continued until May 17 when the last cow in group I calved. The experiment was discontinued on May 7 in order that the experimental animals could be returned to the main herd. The results by groups are given in Table 2.

In summary, group I cows produced 3 calves born dead, 1 calf born alive and died later, 1 calf born alive but weak and small, and 2 normal calves (1 after turnout). Group II cows produced 1 calf born dead, 4 calves born alive and died later and 1 normal calf. Group III cows produced 5 normal calves. It is interesting to note that 7 cows calved before the first control calf was dropped.

TABLE 1
Nutrients fed per head per day

FEEDSTUFF	AMOUNT	POUNDS OF NUTRIENTS CONSUMED				
		Crude protein*	Ether extract	Crude fibre	N.F.E.	T.D.N.†
Group I. Pine Needles						
	lbs.					
Pine needles	6.40	0.393	0.536	1.470	1.459	2.088
Crested wheat-grass hay	10.50	0.641	0.251	3.509	4.584	4.504
Alfalfa hay	3.10	0.376	0.063	1.162	0.894	1.296
Oilcake meal	0.50	0.167	0.030	0.045	0.198	0.254
Total	20.50	1.577	0.880	6.186	7.135	8.142
Group II. Free Access						
Pine needles	4.99	0.302	0.409	1.114	1.259	1.690
Crested wheat-grass hay	16.87	1.048	0.390	5.548	7.120	7.301
Alfalfa hay	3.13	0.376	0.063	1.162	0.894	1.296
Oilcake meal	0.50	0.167	0.030	0.045	0.198	0.254
Total	25.49	1.893	0.892	7.869	9.471	10.541
Group III. Control						
Pine needles	0.00	0.000	0.000	0.000	0.000	0.000
Crested wheat-grass hay	16.87	1.048	0.390	5.548	7.120	7.301
Alfalfa hay	3.13	0.376	0.063	1.162	0.894	1.296
Oilcake meal	0.50	0.167	0.030	0.045	0.198	0.254
Total	20.50	1.591	0.483	6.755	8.212	8.851

* Crude Protein = Nitrogen × 6.25 (Jones, 1931).
† T.D.N.—computed assuming 50% digestibility.

While the experimental numbers are small an analysis of these data indicate statistically significant increase in frequency of abortions and stillbirths due to the effect of eating pine needles and buds and it is concluded that they are agents causing abortion in range beef cattle. This finding is confirmation of the opinions and beliefs of many stockmen throughout the range areas of British Columbia and adjoining states to the south.

In view of this information it is suggested that the bred cow herd be wintered on areas free of western yellow pine. If this is impossible the lower branches of these trees should be pruned. Logging operations should be discontinued in the presence of bred cows since cows will nibble on the slash even though adequately fed.

Conclusion

1. Pine needles and buds are a causative agent of abortion and the birth of weak calves.

2. Pregnant range cows will consume quantities of needles and buds even though adequately fed.

3. Pine needles and buds are palatable to wintering stock.

4. Bred range cows should be wintered in areas where such feed is inaccessible.

5. Forestry operations to cut western yellow pine should be suspended during times when bred cows are present.

TABLE 2

Calving record of experimental animals

DATES	GROUP			COMMENTS
	I Pine needles	II Free access	III Control	
February				
6	Bull			Born premature and dead
8		Heifer		Born premature and dead
March				
1	Twins, Bull & Heifer			Born premature and dead
2		Bull		Born premature & alive—died March 4
6		Heifer		Born premature & alive—died March 7
12	Bull			Born alive, died shortly after birth
17		Heifer		Born alive, weak, died in 36 hours
21			Heifer	Born alive, normal, weight 70 pounds
27			Heifer	Born alive, normal, weight 70 pounds
27	Heifer			Born alive, normal, weight 65 pounds
28		Heifer		Born alive, appeared normal, died in 18 hrs.
April				
7			Bull	Born alive, normal, weight 75 pounds
24	Heifer			Born alive, weak, weight 45 pounds
25		Bull		Born alive, normal, weight 60 pounds
27			Bull	Born alive, normal, weight 78 pounds
28			Bull	Born alive, normal, weight 70 pounds
May				
7				Cattle turned out
17	Heifer			Born alive, normal—after turn out.

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THE PUBLICATION OF RESEARCH—3

A publication is not judged by its length but by the message it carries. . . . Verbosity and diffuseness suggest a possible lack of really important matter to fill out the space, or at least that the writer has not digested what he has to say.—*E. W. Allen.*

A good rule is never to use two pages for a subject that can be compressed by a little thinking into one.—*E. F. Smith.*

Winston Churchill in demanding that his cabinet ministers confine their reports on the most momentous matters to a single page, said: "It is sheer laziness not compressing thought into a reasonable space."

Sheep Ranching Roadblock in 1949

JAMES R. GRAY

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THE 1940's generally have been considered a period of favorable years by range operators. Not only have prices of agricultural products been high, but in most of the semiarid western range area precipitation has been above the long-time average, making for abundant growth of range forages. In the Northern Great Plains, 1949 was an outstanding exception to this series of favorable years.

How did sheep ranchers on the Northern Great Plains fare during the hard winter of 1948–49 and the drought that followed it? First reports indicated a big winter kill such as would rival losses of cattle in 1886–87. The Wyoming Crop and Livestock Reporting Service in its February 1949 report stated, "Approximately 81,000 cattle and calves and 97,000 sheep and lambs had perished up to February 1 as a result of severe snowstorms and blizzards in affected areas of four states—South Dakota, Nebraska, Wyoming, and Colorado." As if this were not enough, lower lamb prices, poor range growth, and very high prices for hay and concentrates in 1949 combined to make the outlook black for the sheep industry of the Northern Great Plains. However, 1950 was a good production year: wool prices skyrocketed and lamb prices recovered to the 1948 level.

On the third anniversary of the first big storm in 1949 it was possible to examine the record before, during, and after this unfavorable year. For the last 4 years a study has been in progress which examines the organization, costs, and returns of family-operated sheep ranches in the Northern Great Plains over a 22-year period. Results of the sheep phase of the study have been published by the Montana Agricultural Experiment Station in Bulletin 478 entitled, "Commercial Family-Operated Sheep Ranches, Range Livestock Area, Northern Great Plains, 1930–50, Organization, Production Practices, Costs, and Returns". As a part of the over-all study, which also included cattle ranches, a survey was made in the spring of 1950 partly to assess the damage caused by the climatic extremes of 1949.

The family-operated ranch with which this report deals is an average of all family-operated ranches in the area which have been determined as being bona fide range sheep operations. In general, ranches ranged from 300 to 3,100 head of sheep in the breeding band, with the average falling at about 1,000 head.

The average ranch started the year 1949 with 1,100 head of sheep, of which about 950 head were breeding ewes, 33 were bucks, and the remainder replacement lambs. After the productive year of 1948, feed supplies were considered ample. Although the hay inventory indicated about 129 tons of hay on the ranch, which was 8 tons less than in 1948, grain supplies were at an all-time peak of about 25 tons. These amounts were well above the maximums of 100 tons of hay and 23 tons of grain on ranches during the period 1933–44. Sheep entered the year 1949 with a rating which, in the opinions of growers, was 99 percent of the January 1 conditions reported from 1939–49. All the prospects were for another good year such as had been experienced during the previous 10.

Perhaps the greatest problem following the heavy snowfall and high winds on January 2–5, 1949 was mobility. Sheep had not been fed extensively and were grazing on winter range. After the snow fell it was possible neither to move sheep to the stacks nor stacks to the sheep. The first priority on road equipment was the opening of main highways and the rescue of snow-bound residents. The "hay lift", which received wide publicity, reached only some of the more critical cases.

The 1949 drought in the Northern Great Plains which followed the hard winter of 1948–49 was not as widespread or severe as those occurring in 1893, 1903, 1931, 1934, or 1936. The center of the drought area was in eastern Montana. Miles City, Montana, which in the 1940's averaged more than 14 inches of precipitation per crop year (October–September), experienced a fall of less than 7 inches. Even more striking is a comparison of growing season precipitation totals, April to September. Again at Miles City, during the 1940's the average April to September fall was 11 inches. In 1949 only 4 inches occurred during these months.

In September 1949, range feed conditions in Montana were rated by growers as being 77 percent of the average of the previous 10 years. Western South Dakota ranges were rated 92 percent of this average and Wyoming ranges were rated at 96 percent of this average. Eastward and southward the drought was not severe. It must be pointed out, however, that these percentages are state-wide averages. In southeastern Montana the range in September 1949 was rated at only 79 percent of the state-wide average reported for this month. Both South Dakota and Wyoming reported severe conditions in their respective areas which were adjacent to Montana.

In addition to blizzards and drought, 1949 was also a bad grasshopper year. The Montana Crop and Livestock Reporting Service summed up its September report with the following: "Winter range in the drier areas [plains portion] is largely composed of old grass, as no appreciable forage was produced under this year's drought. Grasshoppers devoured much of this year's growth in the extreme drought areas."

How did the severe winter and the drought that followed it affect the average ranch? On the surface very little change was noted. The average band ended up the year with only about 20 fewer sheep. Ranchers were able to pay their taxes and interest on mortgages, make a moderate number of additions to their machinery, and buy enough feed in the fall of 1949 to make up for the poor crop year. However, feed supplies, particularly hay that had been accumulating over the last 4 years, were very low. A greatly extended feeding period in the spring of 1949 caused this reduction.

Several of the losses sustained by range operators cannot be measured, particularly the deterioration of certain physical assets. Probably first in the minds of most of us would be losses in range vigor, or the ability of ranges to withstand abuse. In 1949, range plants, particularly in the drier portions of eastern Montana, failed to make appreciable growth. The lack of new growth and further reduction of the portions left after the grazing season in 1948 undoubtedly reduced plant vigor. The grazing load in 1949 was more concentrated as many watering places with their surrounding range areas were unusable because of drought. These changes are difficult to measure and almost impossible to express in dollar terms.

Equally important as range forage conditions, especially to producers, are the long-term effects of these severe con-

ditions on their bands. Indications are that pregnant ewes going through a period of two weeks to a month with little or no feed, followed by several months of limited rations, if they survive, may well be permanently affected by this lack of even a maintenance ration. This is particularly true of very young and very old ewes, which have higher requirements for either growth or maintenance than animals in the prime of life. Plans to improve bands through selection of ewes are disrupted because of (1) high losses during the severe winter, particularly of young ewes carrying their first lambs, (2) a poorer quality lamb crop in the following spring, and (3) in some cases forced liquidation of a portion of the breeding band during the summer drought.

When production rates were examined the effects of this severe period were apparent. Death losses on the average ranch in 1949 jumped to 10 percent, the highest experienced by sheep ranchers since the droughts of 1934 and 1936. In 1948 and 1950 these losses were only 7 percent. Lamb crop percentages dropped sharply, from 84 percent in 1948 to 75 percent in 1949. Poor range and sheep conditions during the breeding season of this year further reduced the lamb crops to 73 percent in 1950, the lowest point reached since 1937. These percentages can be interpreted in terms of pounds of meat turned off per breeding sheep on the ranch. Since 1938 ranchers had consistently turned off more than 45 pounds of meat per head of sheep in the breeding herd. Since 1941 they had exceeded 50 pounds per head. But in 1949 the turnoff was only 41 pounds per head.

How are these figures interpreted in terms of the pocketbook? Adding to the troubles of sheepmen in 1949 was the squeeze between lower prices received for mutton and lamb and higher prices paid for many of the items used in production. Although total cash expenses in 1949 were the same as in 1948, feed and seed costs more than doubled. Sheepmen cut expenditures by trimming livestock expenses (mostly replacement purchases) and deferring much needed land and building improvements. During the 1930's income was so low that few improvements were made. Higher income in the early 1940's put ranchers in a good financial positon but war scarcities once more forced curtailment of much needed improvements. Starting in 1947 sheep ranchers increased the values of their investments in ranch improvements, equipment, and supplies by $2,500–$3,000 per ranch per year. A large part of this inventory addition was new and more machinery, fences, and buildings, and larger feed reserves. The forced economies in 1949 caused average ranch inventory values to drop by about $2,500.

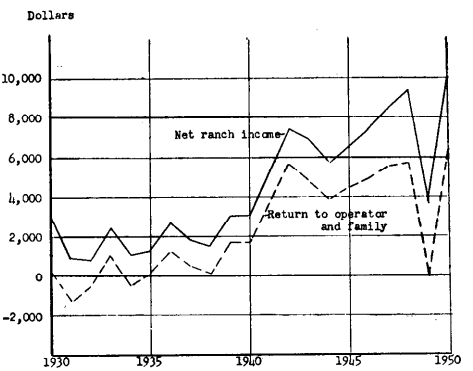

FIGURE 1. NET RANCH INCOME AND RETURN TO OPERATOR AND FAMILY FOR THEIR LABOR AND MANAGEMENT

Despite the lower production in 1949 cash receipts were only slightly below those of 1948. Higher receipts from wool offset lower receipts from meat and crop sales. Superficially, sheepmen had a fair year financially in 1949. Net cash ranch income in 1949 was substantially the

same as in 1948. It was, however, only two-thirds as great as that received in 1950!

Net ranch income—net cash income plus inventory change and the value of products used in home consumption—rather than ranging in the $6,000 to $9,000 class as in most years of the prosperous 1940's, in 1949, because of the large inventory loss, dropped to $3,800 (Fig. 1). This amount was not sufficient to meet the capital charge—the return to the investment in the ranch. The operator and his family received nothing for their labor and management; in fact, they sustained a loss. This amount, in comparison with the $5,750 return in 1948 and the $6,441 return in 1950, indicated that sheepmen of the Northern Great Plains experienced a considerable loss in 1949.

Ranchers of the Northern Great Plains have modified their operations in several ways as a result of the lessons learned in 1949. Chief of these changes has been the relocating of feed reserves. Rather than stacking the entire hay crop where it was most convenient to hay fields or feed yards, at least emergency reserves are now stacked near access roads or strategically located on winter ranges. Many sheepmen now keep a closer check on weather reports, and move their sheep into protected or accessible areas before storms make movements of bands difficult.

Sheepmen who weathered the severe winter and drought of 1949, despite the favorable year that followed, have become more conservative, particularly in respect to large cash outlays for machinery, herd replacements, and extensive building and fence constructions. Also, ranch organization has become less complex. Sheepmen for many years have tended toward larger minor enterprises of beef cattle and cash wheat. Apparently there has been a change toward less wheat and more feed grains, and fewer cattle and pigs. This shift adds up to a more concentrated effort to produce sheep. The effect has been to put the sheep industry of the Northern Great Plains on a more solid foundation.

BOOK REVIEWS

HISTORIC SKETCHES OF THE CATTLE TRADE OF THE WEST AND SOUTHWEST
By JOSEPH G. McCOY. 427 pp., illus. Originally published by Ramsey, Millett and Hudson, Kansas City, Mo., 1874. Reissued by Long's College Book Company, Columbus, Ohio, 1951. $8.50.

The two decades following the Civil War witnessed a phenomenal expansion of what Joseph McCoy calls the "Cattle Trade." Originally this cattle trade was limited mainly to a hide-and-tallow business concentrated along the Gulf Coast. The tough little Texas longhorns and their equally tough owners fought a war of extermination with the buffalo and the Indians, and conquered half a continent. As in all wars, rich prizes were won, but losses were heavy, waste was enormous, and ethical principles often disappeared completely.

Writers by the hundred have since used this period as the basis for their novels, small boys by the million have refought every battle and relived every adventure. Tourists cross and recross the trails ridden by Charles Goodnight, Shanghai Pierce, George Grant, and McCoy himself. Yet the average American, two generations later, has no real understanding of the events which transpired. The period produced several great artists, but practically no historians.

McCoy's book is not recommended for light or casual reading. It's stilted style and occasional grammatical errors reflect the author's admission that he is a doer and not a writer, although it does contain flashes of real humor and philosophy. In a sense, it is largely the autobiography of a man somewhat embittered by personal experience and bad judgment. Even if "the Illinoisan" had been fairly treated by the railroads, the unfortunate experiment at Abilene could have lasted only a few years. McCoy's opinion of Texans is not altogether flattering, and the reader will probably note that many compliments are paid to advertisers in the back of the book. Conversely, the men who interfered with "the Illinoisan's" project are all skunks, but after all, an author has a right to his opinions.

And, in many respects, McCoy was only ahead of his time. He advocated better marketing facilities, better cattle, better feeding and handling, the organization of a Stockman's Association, and many other things which are now taken for granted. His judgment of the cause of "Spanish Fever" was better than that of most of his contemporaries, and the modern Range Management specialist will find surprisingly little to criticize in his appraisal of grasses and ranges.

The casual urban reader whose conception of ranching is a composite of movies, "Western" novels, and the rodeo, will probably not last through two chapters of McCoy's Sketches, but the present day rancher might profit by the narratives of his predecessors' careers, which are being reproduced all over the West today. Trucks and tractors have replaced the ox teams, the whiskers and the long horns have disappeared, but the men and the horses, the cattle and the grass, the weather and the market, still combine to make ranching and trading the same fascinating vocations which together populated the West with Texas cattle.

The reader who understands and appreciates the livestock industry, and who knows something of the history of the West, will recognize many present day

counterparts of McCoy's characters, and will learn that the "Cattle Trade" is fundamentally the same as in those turbulent and exciting days. The publishers have performed a distinct service in reissuing this authentic account—complete to the last typographical error. —*A. P. Atkins*, Rancher, Guymon, Okla.

The Jawbone Deer Herd

By A. Starker Leopold, R. McCain, and L. Tevis, Jr. 139 pp. Illus. California Dept. of Natural Resources, Game Bul. No. 4. 1951.

This intensive study of a migratory deer (*Odocoileus hemionus californicus*) herd of about 5,000 animals (known as the Jawbone Herd) inhabiting the west slope of the Sierra Nevadas in Tuolumne County, California, will interest all range men concerned with domestic livestock-deer interrelations. The broad objective of this 3-year Pittman-Robertson project, initiated in the summer of 1947, was to investigate the ecology and natural history of mule deer on an average range as a basis for future management.

Deer were believed to be moderately abundant prior to settlement of California. They were severely decimated during the 70 years following the Gold Rush by persistent hunting, overgrazing, and severe winters. Favored by the initiation of law enforcement in 1915 and an increased forage supply resulting from logging operations and fires, the herd has now increased to numbers in excess of original stocking. Hence, the main current problem is that of balancing animal numbers with forage supply.

On their summer range, at about 6,000 to 7,500 feet, these deer graze mountain meadows in common with cattle. Consumption of grass by deer is limited to the early spring, although forbs may be taken throughout the summer. Meadows on this range which have been heavily grazed by cattle have deteriorated from perennial grasses to such plants as lupines, corn-lilies, and mules' ears. This initial alteration of vegetational cover is not deleterious to deer inasmuch as they prefer forbs to grass. Continued deterioration, however, destroys the meadows as important fawning grounds. Competition between cattle and deer for the general browse supply on the summer range is not severe. Severe competition sometimes exists for willow, aspen, and bitter cherry, which serve special reproductive functions for female deer. In general, livestock grazing as presently practiced on the summer range of the Jawbone herd is not believed to be a serious factor limiting deer populations.

The Jawbone deer herd migrates to elevations below 4,000 feet and is restricted to 12 percent of its total range during the winter. There is no serious competition with domestic livestock on the winter range inasmuch as the Forest Service has reduced livestock allotments for the specific purpose of protecting deer range. Limited summer grazing by cattle at this lower elevation is concentrated on grass and does not seriously affect the browse supply used by deer during the winter. Such fortunate circumstances are not characteristic of many deer-livestock ranges in other parts of California.

The Jawbone deer herd reproduces at an average rate of about 32 percent annually. Greatest losses result from winter starvation caused by heavy snows, reluctance of deer to leave a home range, and inadequate supply of high protein forage. During the 3 years of the study, losses amounted to 5, 20, and 33 percent

per year. Average losses during the entire period of study were divided among: hunting, 7 to 8 percent; winter losses, 23 percent; and summer deaths, 2 percent. Predation (including poaching by man) was considered a negligible loss.

The size of the Jawbone deer herd is determined largely by quantity, quality, and availability of winter forage. The latter is dependent upon the status of plant succession, soil fertility, and history of range use. The inherent productivity of the herd appears to compensate for annual losses owing to hunting, old age, predators, parasites, and disease.

Conclusions include the statement that average annual hunting kill of the Jawbone herd could be tripled without reducing the average size of the population. Removal of more bucks and "antlerless" animals would tend to keep the herd in approximate balance with the winter forage supply. This would reduce periodic starvation losses and protect the winter range against overbrowsing. The production of more high protein winter browse is recommended by such means as controlled burning or other devices which would provide browse of a younger age class. Grazing capacity could be raised materially by intensive range management on less than 2 percent of the Jawbone range.

This paper deserves careful reading by all range and game personnel concerned with grazing land management. This is as intensive and as thorough a study of a deer herd as has been made in the West, and some of the principles derived may apply universally to mule deer. The paper is well organized. Data and conclusions are clearly presented. Individuals concerned both with grazing land management research and administration will find much useful information easily available.—*Hudson G. Reynolds*, Southwestern Forest and Range Experiment Station, U. S. Forest Service, Tucson, Arizona.

Principles of Weed Control

By Gilbert H. Ahlgren, Glenn C. Klingman, and Dale E. Wolf. 368 pp., 109 figs., 25 tables. John Wiley and Sons, Inc., New York, N. Y., 1951. $5.50.

The authors have brought together information on the mechanical and chemical control of weeds for most types of agriculture. Although written primarily for classroom instruction, the chapters on chemicals used in weed control, physiological effects of herbicides, grasslands, brush and undesirable trees, and poisonous weeds, should be helpful for researchers and planners of range management. There is little specific material on range problems. However, this book will aid individuals having a limited knowledge of chemistry and plant physiology in the use of the new selective and non-selective chemicals for weed control. The material was written mainly from a review of literature and the authors observation of many field studies throughout various parts of the United States. The references cited are quite complete.

Various sections of the book have apparently been reviewed by some of the outstanding weed control specialists in the United States. This was especially true of investigators of selective and non-selective herbicides.

Investigators and individuals attempting to eliminate undesirable plants would no doubt receive considerable help from chapters 3 and 4. In these chapters a

brief discussion is given of the development of the growth regulating compounds for herbicidal chemicals. The formulas for many of the compounds are diagramed. The structure and method of synthesis of the organic herbicides are given, also the characteristics of the compounds. Formulations of the selective types are also discussed.

Considerable information is presented for the non-selective weed killers. The general oils used for weed control are described along with a discussion of their characteristics. Some of the spray adjuvants are also discussed.

The presentation of the physiological effects of herbicides should be helpful. Many of the factors influencing the reaction of the weed and brush killing chemicals are explained. Some of the morphological effects are presented by both illustration and description. There are also numerous diagramed chemicals and an appendix containing a listing of plant susceptibility to 2,4-D and other information for using chemicals for weed control.

There are many helpful suggestions for applying chemicals or oils to control weeds or grass in various types of growing crops. A description is given of some of the spraying equipment available.

The authors are to be commended for their efforts in bringing together this information on weed control. They have also presented a most technical subject in a very understandable form.—*Harry M. Elwell*, Soil Conservationist, Red Plains Conservation Experiment Station, U. S. Soil Conservation Service, Guthrie, Oklahoma.

Grass Beyond the Mountains

By Richmond P. Hobson. 256 pp., map endsheets. J. B. Lippincott Co., New York, 1951. $3.75.

This is a book that every member of the American Society of Range Management should read—and own. It is the true story of a couple of Wyoming cowhands who found, in British Columbia, the last great cattle range on this continent. Rich Hobson writes not of the long ago, but of the nineteen-thirties. His narrative is just as thrilling as any of those set down in recent years by the oldtimers about the days of their youth, "when the West was still wild." It is free of the faults that result from time-dimmed memory and the combining of truth with campfire tales and folk legends common in the writings of the "oldsters."

This is a book of men, horses, and cattle, battling the arctic blizzards, high mountain passes heavy with snow, and the treacherous muskeg, to win through to a grand new range country. This is a book of adventure with moose, grizzlies, and timber wolves. This is a book of the frontier folks and their way of life on what was believed to be the northern fringe of the cattle country. And it is the book of daring to push beyond that frontier into the unknown north to establish a fabulous new four-million-acre ranch.

The partners endured much but this is not a grim book. The author is a natural-born storyteller with the light touch in dealing with extraordinary accomplishments and the matter-of-fact heroism of his friends. Without even pretending to write about range management, the author sets forth essential principles for the conservation and utilization of the vast new country. It took Mr. Hobson four years to write the book and while

it by no means completes the story, it is a thrilling beginning and maybe one of these days we can persuade him to finish the saga. It is the best personal narrative in a dozen years and the best bit of Western Americana in a long, long time.—*J. C. Dykes*, U. S. Soil Conservation Service, Washington, D. C.

American Wildlife and Plants

By Alexander C. Martin, Herbert S. Zim, and Arnold L. Nelson. 500 pp., illus. McGraw-Hill Book Co., Inc., New York, N. Y., 1951. $7.50.

The aim of this book is to make the present information on wildlife and the vegetation on which it depends available for wide use by diverse groups, whether directly or indirectly interested in wildlife. The authors have thus shouldered a heavy burden and have carried it far and well.

Part I gives, in simple language, a brief ecological background of wildlife-plant relationship. It also gives a brief account of food habit studies and preliminary explanations necessary to interpret data contained in parts II and III.

Part II presents the animals within nine groups, based on their habitat or value. Plant foods are classified as to genera, relative importance, and season of use. Charts give the areal extent and animal-plant food ratios of the important species. It appears that careful selection has been made. Surprisingly few of my familiar bird and mammal aquaintances of marsh, prairie, hardwood and softwood forests, and desert are missing.

Part III treats of plants useful to wildlife. A star system of rating denotes use by various species of wildlife and a "star-user rating" is given to indicate the relative use and number of times the plant is used by wildlife. Habitat and special value to wildlife are briefly discussed. A final chapter gives national and regional lists of plants ranked according to their value to wildlife.

An important point to remember is that the summarized information is general and except when specific studies are cited should be used as such. Application of this general information to specific localities might prove disappointing. For example, this reviewer grew up in south central Utah where ruffed grouse, sage grouse, and the Canada goose were not uncommon, yet their range is shown to extend only to the extreme northern tip of Utah. Kortright (Ducks, Geese, and Swans of North America) also shows Utah as within the range of the Canada goose yearlong.

The rating of food plants may be misleading in that it does not necessarily indicate preferences or importance in wildlife management. For example, pine is listed as one of the important foods of deer and elk in the mountain-desert region and in the regional list it ranks first as food for browsers. Actually these animals use pine chiefly when forced to by hunger. Such a rating could therefore only be based on overstocked ranges. The authors make it appear that for elk, grasses are secondary to browse and, for both deer and elk, forbs are practically unmentioned. Numerous other references list grass as a primary elk forage and forbs as important to both deer and elk. Range men will take exception to the statement that big sagebrush grows on alkaline soils where few other plants can compete for existence and that cattle make good

use of it for forage. This book could have been strengthened by wider use of outside references.

The authors make clear that the data presented are not complete and plead for the wise use of the present information in the interest of wildlife. When used thus, as intended, "American Wildlife and Plants" makes available a wealth of information compiled from food habit studies made by the Fish and Wildlife Service since 1885. The excellent illustrations of both plants and animals add greatly to the interest of the book. It is written in clear, simple language and, in this reviewer's opinion, the authors have achieved their aim of presenting the information so it can be understood by a wide audience. This book is most certainly recommended reading to anyone interested in wildlife. Range managers will find it a valuable book for increasing their acquaintance with the many species of wildlife associated with the range and their everyday life.—*Odell Julander*, Intermountain Forest and Range Experiment Station, U. S. Forest Service, Ogden, Utah.

BRIEFS

It is much easier to be critical than correct.—*Disraeli*

A wise scepticism is the first attribute of a good critic.—*Lowell*

He has a right to criticize who has a heart to help.—*Lincoln*

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Prepared by Robert R. Humphrey, Department of Botany and Range Ecology, University of Arizona, Tucson, Arizona.

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NEWS AND NOTES

Pasture and Range Research Techniques

A report on this subject has been completed by a joint committee of the American Society of Agronomy, the American Society of Animal Production, the American Dairy Science Association, and the American Society of Range Management. The report was published in Agronomy Journal 44: 39–50, January 1952. Reprints may be obtained upon request from The National Fertilizer Association, 616 Investment Building, Washington 5, D. C.

Sixth International Grassland Congress

Plans are rapidly shaping up for the Sixth International Grassland Congress to be held at Pennsylvania State College, August 17–23, 1952. The Organizing Committee expects attendance of 2,000 to 2,500 specialists from 65 nations.

Arrangements are being made for tours to typical grassland areas in the Northeast and Midwest, South and West. These will probably be held for a two-weeks period following the Congress.

It is the first meeting of the Congress in the United States. The First was in Germany in 1927, the Second in Sweden and Denmark in 1930, the Third in Switzerland in 1934, the Fourth in Great Britain in 1937, and the Fifth in the Netherlands in 1949. The United States was represented for the first time at the 1937 Congress and again sent representatives to the Fifth Congress in 1949.

All inquiries regarding the Congress should be addressed to Mr. W. R. Chapline, Executive Secretary, Organizing Committee, Sixth International Grassland Congress, Department of State, Room 1049, 1778 Pennsylvania Avenue, N. W., Washington 25, D. C.

Field Tests for Mesquite Control

Twenty-six ranches in Texas are being used for field tests to find a practical method of controlling mesquite. The off-station tests are being carried on by the ranchers under the direction of C. E. Fisher, Superintendent of the Spur Experiment Station, and Dale W. Young, Assistant Agronomist with the Bureau of Plant Industry, and with the assistance of local county agents and Production and Marketing Administration.

The ester of 2,4,5-T still appears to be the best chemical for the control of mesquite. Three-fourths pound acid of 2,4,5-T in three gallons of water and one gallon of diesel oil gave the most consistent and promising results in all the tests. Included were sprouts, seedlings, and small and large trees. Spraying was done by airplane during the spring of 1950. Results look promising though it is too soon to determine the final results according to A. H. Walker, range specialist for the Texas A. & M. Extension Service.

The immediate objective is to find a low cost method of control which stockmen can afford. For the method to be practical, the increased grazing capacity of the land plus the ease of handling livestock must pay the cost of applying the control. Application costs for the ester of 2,4,5-T run about $3.50 per acre for both material and flying.

Spraying with an airplane is the best method of applying the chemical mixture when there is no danger of damaging field

crops. Fisher and Young caution that airplane operators should be experienced in brush control spraying and have planes properly equipped. They warn against the danger of using 2,4,5-T where susceptible crops are grown since this compound has been known to drift as far as eight miles in a high wind. Apparently the coarser the droplet size of the chemical, the better the results; with the spray applied at tree-top height. It should be applied in the spring at full leaf stage, which will be six to eight weeks after the first leaves appear, and when ground moisture conditions are good.

Grass will not kill mesquite but giving grass a chance to seed out on sprayed areas will materially reduce the number of sprouts and seedlings. If an operator cannot rest the pasture the growing season following spraying, Walker advises to at least stock it lightly. Proper range management following mesquite spraying may double the length of time that the treatment is effective. This may be the difference between profit and loss on the operation. Texas Extension Leaflet 127 prepared by Walker gives directions for applying 2,4,5-T by airplane and to individual mesquite trees.—From Texas Livestock Journal. January, 1951.

It's Time to Change

F. G. Renner, in his editorial in the November 1951 issue of the Journal of Range Management made a significant statement that probably will go unnoticed. He said "We have all heard of 'sit-down strikes' that hamper production and avoid the real issues. Are not 'depletion,' 'erosion,' 'overgrazing,' and 'overstocking' equally descriptive of a 'sit-down' attitude? Isn't it high time we paid less attention to the ills and diseases of the range, and directed more of our energy toward measures to improve it. There is reason to believe that the possibilities for such improvement are enormous."

Have we been defeating our own efforts by the language we use in trying to sell grassland farming? In 1951, when the Land Grant Colleges and U. S. Department of Agriculture initiated the program on grassland farming, it certainly wasn't a new program—it was properly indicated as an emphasis program. My contacts in the field with county agents and farmers bear evidence that it has been favorably accepted. One county agent remarked that among his farmers and ranchers it was one of the most stimulating programs entered into for years past.

Grassland farming bears a significant meaning, growing grass, and we might well give careful consideration to using the term as a truer expression of the aims of those of us interested in our grazing resources.

Our schools of range management have, for a good many years, been turning out men well grounded in soil, plant and animal sciences and related subjects necessary for a well rounded education. They learn their subject matter through terminology both technical and non-technical in character. We fell into a pattern in the language we used as students. Such terms included "overgrazing," "reduction in numbers of livestock," "restricted use," "over utilization," "erosion," yes, even "conservation" and a host of others. They have significant meaning, but after all, we had in mind the production of grass and we spoke very little of it. The use of it. The use of these terms created an accusing, condemning attitude toward producers of grass. Certainly there has not been such intention but grassland farming has suffered as a result. We are still using these terms and I believe it is time to change.

We have shown a general lack of ability

to present our subject to the grass producer through in-service training and our direct contacts with him. It's one field where we receive little or no instruction and we have paid very little attention to its importance. Many have recognized the need for it but have gone no further.

In 1940 West Texas experienced one of their fifty to sixty year frequency freezes. The results evident on ranges where the grasses were fat and others where the grasses were starved, was a fine example of the importance of healthy plants. I took advantage of the opportunity to call it to the attention of some four or five range examiners and as many stockmen present. When I finished, the technicians remarked, "Have you ever written that up? Could we have copies of it?—that's what we need." Mind you, I hadn't spoken of anything that they didn't already know, it was in the manner of presenting the subject.

This didn't just happen. While teaching some years previous, I taught some popular courses open to any student in the University. This matter of presentation was forcibly brought to my attention and I continued to give it attention even in federal agency employment. I'm quite sure that it took five to ten years of irregular study before I felt that I was making some progress.

Agriculture today is scientific. Farmers never dreamed of delving into the technical phases of crop production that they now accept without much hesitancy. The sugar beet grower has been taught, by his county agent and sugar company technicians, the physiology of the growth and development of the sugar beet. This likewise applies to other major crops. Have we done much in teaching the grass producer the physiology of grass growth and development? Is it not just as important they have this information as it is for the sugar beet grower? Most range men have the basic knowledge, research data is available, our job is to develop a presentation that will encourage attention to and adoption of such knowledge.

Stockmen and animal husbandmen have often compared the grazing animal to a processing plant, where its raw material is grass. Grass can likewise be so compared, where water and minerals in solution are its raw materials. The machinery of the grass plant that determines the productive capacity is located in the top growth. If we maintain our plant in full production, *fat grass* results. If we reduce its production far enough we produce *starved* grass. The physiology of plant growth can be effectively explained in terms of its growth and development and the actions that are transpiring at different stages of development. Tie this in with the effect of cropping the plant and stubble heights to be maintained and it makes sense to a grass producer. Call your subject what you will, but omit using the trite words and terms that have not produced the results desired.

Will an approach mentioned here be any more effective? Well, in 1951 the writer presented the information on this basis at some thirty-five county meetings and two state meetings of farmers and ranchers. The presentation was built around photographs obtained from several sources and with charts. Comments from farmers and technicians in federal agencies indicate it has been effective. I believe we must use visual aids as widely as possible. Watch photographs, displays, and literature and you very often can locate something that perfectly illustrates a point or points you wish to bring out.

In a meeting of farmers, who were also permittees on a forest range, with the supervisor and a ranger present, the permittees attempted to place me in the middle of their arguments with the forest

administrators. I reviewed the subject briefly and then asked if they couldn't answer their own question. They smiled sheepishly and replied yes.

I'm reminded of a farmer who spoke about his interest in growing clover years ago and he called on the only man in the county who was growing it. When he asked the man what he thought of clover and would it do well, the man replied, "Why don't you grow it yourself and find out." If we all work on the presentation of how grass grows, our educational programs have a chance of succeeding.

I'm satisfied I am on the right track though the carrier is probably still very faulty. There is constant need for a change and there are probably hundreds of ways to reach the same destination. It's time to change, if grassland farming is to be widely adopted.—*Liter E. Spence*, Extension Conservationist, University of Idaho, Boise.

Society Members Working Abroad

Lincoln Ellison of the Intermountain Forest and Range Experiment Station, Ogden, Utah, is studying in Australia under a Fulbright Research Fellowship. In his problem he is testing the Intermountain concept of 'Balance in the complex' under subtropical conditions.

With his wife and four daughters he sailed from Vancouver harbor on August 2, 1951, arriving in Sydney, Australia, August 29. They plan to return to the States about June of this year.

In a letter home Linc said: "We're learning a good deal from the Australians and we hope they're getting some ideas from us. We like them. They think highly of Americans, partly because they are grateful for what the U. S. did for them in the war, partly because they have an outlook that is similar to Americans. The Ellisons are profiting from the bank account of good will that some of you helped build."

Dr. J. M. Aikman, professor of Botany at Iowa State College, Ames, arrived at Pichilingue, Ecuador, on December 11, 1951, to take charge of the experiment station there. He reports that the climate is excellent and the prospects promising for his work there. He hopes to have time for limited ecological investigation and plant collection. His address for personal mail, till September, 1953, is: % American Consulate General, Guayaquil, Ecuador, South America.

Kling L. Anderson, Professor of Agronomy at Kansas State College of Agriculture, Manhattan, Kansas, has received a Fulbright fellowship to do pasture research in New Zealand. He was to leave in April for a nine months period. We will look forward to his return with many ideas from a country famous for its fine grasslands.

Soil Science Society Publishes Quarterly

The Soil Science Society of America has announced that its Proceedings will hereafter be published in quarterly form. Volume 16 for this year will publish papers presented at the annual meeting of the Society and will also be open to other papers submitted by Society members.

Hurtt Starts Range Consulting Service

After more than 38 years with the Forest Service, primarily on range inspection, research, and administrative work, Leon C. Hurtt has initiated The Midland Range and Ranch Consulting Service,

in Missoula, Montana. Though he has retired from his official work he wishes to maintain contacts with range people and problems that have been his chief interest for nearly a lifetime.

Leon grew up on a livestock-grain farm in western Nebraska and since 1936 has owned and operated, with hired help, two Montana cattle ranches. In his official work he had experience on ranges of several western states. Besides his official publications he has had 30 or more articles published in livestock journals. Ranch organization and long-time plans, advice and counseling on range utilization and reseeding problems, or general range problems, are included in his project.

Promotions and Transfers

Clinton H. Wasser has been promoted to Dean of Forestry and Range Management at Colorado A & M. He succeeds Dr. J. Lee Deen who died in April 1951.

Philip L. Heaton, staff assistant on the Medicine Bow Forest, succeeds Roy L. Williams as Supervisor of the Bighorn Forest.

Fred H. Kennedy, who has been in charge of Region 6 (Portland), Division of Wildlife and Range Management, U. S. Forest Service, is transferring to Region 2 (Denver) to assume charge of the same division. Kennedy is being succeeded by Earl D. Sandvig, whose position he is taking.

North American Wildlife Conference

The 17th North American Wildlife Conference was held at Miami March 17–19. Every phase of restoration and management of natural resources was discussed, with the program of all sessions correlated under the general theme: Natural Resources—Your Security!

Antelope Do Not Eat Grass that Cattle Need

A year-round study of antelope diet by the California Fish and Game Department substantiates research made in other states which refutes the conclusion that antelope use forage that might be used to support more cows. The study showed that cattle and antelope can graze on the same land with practically no competition. Sixty precent of the pronghorn's diet was found to consist of sagebrush; 15 percent was phlox and various weeds; and bitterbrush made up an additional 10 percent. Only 2 percent of the year-round diet (of antelope) consisted of grasses. The rest of the plants found to be eaten regularly by antelope are not used by cattle when grass is available, or are considered low-grade cattle feed. This study was made by the California Departmental Laboratories for the Oregon State Game Commission. The stomach contents of 26 animals from the Hart Mountain herd were examined.—Outdoor News Bulletin. Vol. 6 No. 2.

Conference on Isotopes

Kansas State College, Argonne National Laboratory, and the Isotopes Division of the United States Atomic Energy Commission will sponsor a two-and-a-half-day conference on "The Use of Isotopes in Plant and Animal Research" June 12–14, 1952, at Kansas State College, Manhattan, Kansas. A detailed program, together with information on housing, can be obtained by writing Director R. I. Throckmorton, Kansas Agricultural Experiment Station, Manhattan, Kansas.

In Memoriam

Clarence D. Patterson, Work Unit Conservationist of the Central South Dakota Land Utilization Project, Fort Pierre, South Dakota, died at the University of Minnesota Hospital, November 6, 1951, from acute leukemia.

Pat was born in Sibley, Iowa, November 1, 1890, and was graduated from high school in Cloquet in 1910. Prior to attending the University of Minnesota in 1913, he worked on a timber cruise in northern Minnesota and helped clear mesquite on the King Ranch in Texas. He spent 12 years following graduation with the Minnesota Extension Service. In 1929, he took up farming at Dante, South Dakota, and in 1935 became field man for the Phoenix Life Insurance Company.

Pat became an employee of the Soil Conservation Service in 1946. He transferred his interests to range management when he went to the Land Utilization Project at Fort Pierre. He was a member of the American Society of Range Management and of the South Dakota Section.

George Strauss, young Custer, South Dakota rancher, died at the Royal C. Johnson Veterans Hospital, in Sioux Falls, South Dakota, November 27, 1951. His death was due to complications resulting from a back injury two years earlier, while working on his ranch.

George was born in Sioux City on February 24, 1924. He came with his parents to the ranch they purchased near Custer about 15 years ago. He has managed the ranch since the death of his father three years ago.

He served three years in World War II, of which two years were with the Air Force in the European Theater of Operations. George joined The American Society of Range Management and the South Dakota Section early in 1951.

POSITIONS IN CALIFORNIA DEPARTMENT OF FISH AND GAME

The California Department of Fish and Game is seeking five high calibre men in the conservation field to take charge of five regions created under the Department's new operational setup.

Qualified conservationists should apply now since the final date for filing applications is May 17. The written examination will be held June 7. High calibre men with the ability to plan, organize, and direct a diversified conservation program are desired.

Application should be made to the California State Personnel Board, 1015 L Street, Sacramento.

WITH THE SECTIONS

SECTION OFFICERS

Section	*Chairman*	*Vice-Chairman*	*Secretary*
Arizona	Matt Culley Box 56B Sahuarita	John D. Freeman Soil Conserv. Serv. Prescott	Ben Nelson Forest Service Phoenix
California	Donald R. Cornelius Calif.F. & R. Expt. Sta. Berkeley	Alfred H. Murphy U. C. Range Field Sta. Hopland	Arnold Schultz Univ. of Calif. Berkeley
Colorado	C. H. Wasser Colorado A & M Col. Ft. Collins	Worthington Karn Soil Conserv. Serv. Timpas	Robert R. Elliott 808 S. College Ave. Ft. Collins
Kansas-Oklahoma	Lester R. Branson Prod. Mktg. Adm. Manhattan, Kans.		Robert C. Pickett Kansas State Col. Manhattan
Idaho	Liter E. Spence Univ. Ext. Serv. Boise	Jerome Evans 1515 N. 11th Boise	Robert Officer 2805 Palouse Boise
Nevada	E. R. Greenslet P. O. Bldg. Reno	Joseph H. Robertson Univ. of Nevada Reno	John M. Fenley Box 111 Paradise Valley
New Mexico	Francis A. Riordan Box 1695 Albuquerque	Arnold Heerwagen Box 29 Raton	F. M. Hodgin Box 1310 Albuquerque
Northern Great Plains	Bruce Orcutt Beaverslide Ranch Miles City, Mont.	E. J. Woolfolk Forest Service Missoula, Mont.	F. A. Branson Mont. State College Bozeman, Mont.
Northern International Mountain	W. R. Hanson Calgary, Alberta, Canada	A. C. Grande Lennep, Mont.	Ed Burles Calgary, Alberta, Canada
Pacific Northwest	Floyd Iverson Forest Service Portland, Oreg.		Joe T. Fallini 5135 N.E. Ainsworth Portland, Oreg.
South Dakota	Carl Ham Caputa	Francis E. Murphy Flying V Ranch Hermosa	Henry Holzman Extension Serv. Rapid City
Southern	John T. Cassady P. O. Box 1192 Alexandria, La.	W. G. Kirk Range Cattle Expt. Sta. Ona, Florida	R. E. Williams 623 W. 11th St. Crowley, La.
Texas	H. L. Leithead Box 1112 Marfa	Roger Q. Landers Menard	Leo B. Merrill Texas Expt. Sta. Sonora
Utah	Albert Albertson Forest Service Cedar City	A. Perry Plummer Int. F. & R. Expt. Sta. Ephraim	Max Robinson Branch Agr. Col. Cedar City
Wyoming	Don Wilbert Soil Conserv. Serv. Riverton		L. H. Rasmussen Box 92 Tensleep

Arizona

Irrigated pastures are the bright hope of the cattle industry in Arizona. Their further development, along with improved management methods, are likely to be a major factor in holding the industry at its present level in spite of continuing drought, or possibly in making some expansion of animal numbers.

That is the conclusion drawn from the winter meeting of the Arizona Section, American Range Management Society in Phoenix, Dec. 14–15. The program of speakers and field trips was limited to pasture problems and cattle management, and it attracted livestock producers from Oklahoma and California, as well as from Arizona.

E. B. Stanley, U. of A. animal husbandry department head, discussed carrying capacities and forage yields of various types of pastures included in University tests.

In the afternoon, Kenneth McMicken, General Manager of the Goodyear Farms at Lichfield, gave a talk on chopped forage feeding. A field trip was made over the Goodyear Farms, during which this system and the cattle were inspected first hand (Fig. 1).

On the second day, O. F. Pahnish, assistant U. of A. animal husbandman, reported on the introduction of new feeds in Arizona fattening rations. The potential values of grapefruit pulp, cantaloup, safflower meal and wood molasses were discussed.

Pastures in Yavapai County were the subject of a comprehensive review by Dan Freeman, soil conservationist in that area. Freeman repeated the irrigated pasture experiences of 12 operators, some of whose pastures are eight years old.

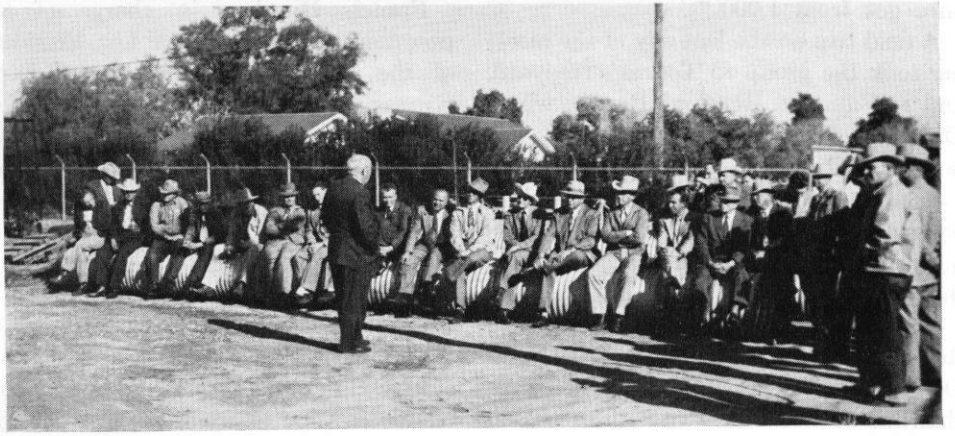

Figure 1. Winter meeting field trip of Arizona Section to Goodyear Farms, Lichfield Park, Dec. 14, 1951. *Photo by Rich Johnson, the Arizona Farmer.*

Permanent pasture seed varieties were discussed by Louis Hamilton, head of the Soil Conservation Service nursery at Tucson. Color slides illustrated the most promising varieties for Arizona, including some new ones, such as buffel grass, being grown experimentally at the nursery.

Cattle came in for some attention at the meeting too. Dr. George B. McLeroy, Arizona State College at Tempe, emphasized the importance of range management, but added ". . . The beef industry which has its heart in the range operator should produce pounds of good beef from forage and only a limited amount of concentrates."

Speaking as a commercial beef producer

who is developing a type of cattle specifically adapted to desert range, E. S. Humphrey of the Bard Ranch, pointed out that an operator in the desert area can do a great deal about the capacity of his cows to get along with what they have. He reported that the Bard Ranch calf crop has been increased 25 per cent through careful cross-breeding. "We now get as many calves from 750 cows as we used to get from 1,000," he said, "and the weight of our weaner calves is 12 percent higher, so that we get the same weight of calves from 615 cows as we once got from 1,000."

A field trip on the last day of the meeting took the group to Tovrea's feedyard, and to Suncrest Hereford Ranch, where Dr. E. L. Scott showed his recently imported bull, Freetown Contrite.

A short business meeting resulted in passage of a resolution concerning acquisition of an experimental ranch for the University.

Election of officers put Matt Culley in the chairmanship replacing Frank Armer. Dan Freeman of Prescott was named vice-chairman. Steve Bixby and Ray Cowden were named to the council to serve with carryover members A. C. Everson and John Babbitt.

Program committees for the meeting included Rich Johnson, Frank Armer, and Ben Nelson. They are reported recovering slowly from their work.—*Rich Johnson* and *Ben Nelson.*

California

The California Section held its annual meeting at Davis on January 4 and 5, 1952. An excellent program of papers filled the two-day session. Perhaps we can have a report on the meeting for the July Journal. New officers of the Section are: Chairman, Don R. Cornelius, California Forest and Range Experiment Station, Berkeley; Vice-Chairman, Alfred H. Murphy, University of California Field Station, Hopland; and Secretary, Arnold Schultz, U. of C., Berkeley.

New Mexico

The New Mexico Section held its final meeting for 1951 on January 5 in Albuquerque. The afternoon meeting, attended by forty-two members and visitors, consisted of a short program followed by a business meeting and installation of 1952 officers.

Francis Riordan, in charge of the program, introduced Floyd Lee, President of the New Mexico Sheep and Wool Growers Association, who made an enjoyable and informative talk entitled, "A Rancher Looks at Conservation." He was followed by K. A. Valentine of New Mexico State College, who spoke on "Some Applications of Ecological Principles to Range Management." Jack S. McCorkle, Regional Range Conservationist, SCS, concluded the program with a slide-illustrated talk on his recent tour to South America where he was engaged in studying range and livestock production problems.

J. J. Norris, past-Chairman, reported on the summer field meeting held at Clayton in August. The meeting, organized by E. W. Williams, Arnold Heerwagen, and E. C. Hemphill, was attended by sixty members and visitors and consisted of tours of reseeded areas in the Clayton vicinity. Numerous stops at points of interest were used to point out the various phases of reseeding problems in the N. E. New Mexico area.

Officers for 1952 were installed and conducted a business meeting with the purpose of developing plans for the year. These officers are: Francis Riordan, Chairman; Arnold Heerwagen, Vice-Chairman; F. M. Hodgins, Secretary;

A. V. Steed and Roy Forehand, Council Members. Jack McCorkle was elected to finish the unexpired term of Dan Childress.—*J. J. Norris.*

Utah

The third annual meeting of the Utah Section was held in Salt Lake City, December 1, 1951. More than 50 people attended the full day's program and all found the sessions extremely informative and thought-provoking. Chairman C. Wayne Cook, in a brief report, noted the healthy condition of the Section and urged the formation of membership and publicity committees to sustain and build membership. According to Secretary Odell Julander, whose report followed, there was a total of 159 members in Utah in 1951, a gain of 28 over the previous year, with very few becoming delinquent.

The first speaker, State Commissioner of Agriculture Tracy R. Welling, summarized the history of halogeton, giving an account of how attitudes toward it had changed from indifference, to alarm, to the more calm and effective view that concerted efforts are necessary to control this poisonous weed. He cited the prompt and vigorous action of the Bureau of Land Management in establishing a program of control and reseeding on infested areas, after receiving an appropriation from Congress late this fall. He also praised the Utah section for its part in disseminating information about the plant and for providing leadership in attacking the halogeton problem. Dr. L. A. Stoddart, USAC, presented a short report on behalf of the section's halogeton committee. He described the bulletin the committee had issued in cooperation with the college, and the article which appeared in the Journal of Range Management.

O. C. Olson, soil scientist of the Intermountain Forest and Range Experiment Station, discussed "The Soil Profile and Range Management." He stated that the important relation of soil to management of western ranges was often neglected, and that range managers needed to know more about the character, composition, and present status of soils. He demonstrated two soil profiles—one simple, without much differentiation between layers, and the other more complex—both typical of extensive areas in the Intermountain West. In developing general criteria for judging sites for reseeding or other range management purposes, he discussed the three broad characteristics of color, texture, and depth, and the evidence each one presented about site potentialities.

In the first afternoon session, Harold Crane, Big Game Supervisor of the Utah State Fish and Game Commission, gave a concise history of big game in Utah, pointing out the change from scarcity at the turn of the century to present-day abundance and overstocking in many places. He stressed the continuing need for balancing game numbers with forage supply and for maintaining range productivity.

Participants in a panel discussion, "The Place of Fire in Range Management" included Heber Sargent, president of the East Hoytsville Range Company, John E. Burt, Jr., Utah Board of Forestry and Fire Control, and James P. Blaisdell, range conservationist of the Intermountain Forest and Range Experiment Station. Mr. Sargent told of the efforts of his company to restore its depleted range through burning and reseeding. He gave an encouraging picture of what can be accomplished when thorough planning of such an operation is coupled with energetic action. The program has resulted in greatly increased forage, a profitable livestock business, improved watershed conditions, and, although this was not a

prior objective, one of the outstanding demonstration areas in the State. Mr. Burt reviewed the laws and regulations applicable to burning of range lands in Utah, and Mr. Blaisdell followed this with a brief but comprehensive report on long-time ecological effects of burning on sagebrush-grass range.

The program was concluded by Richard Greenland, Bureau of Land Management, Richfield, Utah, whose topic was "The Use of Bentonite in Lining Stockwater Reservoirs." He reported that bentonite had been successfully used as a liner for about 20 reservoirs in southern Utah, demonstrated its impermeable properties, and suggested that it might be practicable and economical to ship the clay some distance for the construction of reservoirs.

The following resolutions were discussed and adopted at the meeting:

1. That a committee of at least five members be appointed to publicize all activities of the Section—members to be well distributed throughout the State.

2. That a representative membership committee be appointed immediately; that special consideration be given to increasing membership of stockmen; and that members present at the meeting participate actively in the work of the committee.

3. That the National Society organize an advertising committee to include one member from each Section. The Section members would provide the committee with information on prospective advertising and make local contacts as required.

4. That the Section recommend the appointment of a range management extension specialist for Utah under the Agricultural Extension Service program and that officers inform the proper authorities of the Section's desires.

5. That the Section participate in a project being initiated by the Forestry Club of the USAC, namely the selection of the State's outstanding range livestock operator of the year, and that the 1952 officers appoint a committee to work with the Forestry Club on the project.

Incidentally, Drs. Cook and Stoddart of the College should be commended for their efforts in bringing a large student delegation to the meeting. More than a dozen attended; their interest in range management affairs was shown by the above-mentioned recommendation.

Announcement of results of the letter ballot for 1952 officers was the final order of business. New officers are as follows: Chairman, Albert Albertson, Forest Service, Cedar City, Utah; Vice-Chairman, A. Perry Plummer, Intermountain Forest and Range Experiment Station, Ephraim, Utah; and Secretary-Treasurer, Max Robinson, Branch Agricultural College, Cedar City, Utah.

Retiring officers extend their congratulations to the new group. With the full support of the members, the new officers will build an even better section in 1952. —*J. F. Walters.*

Southern

The first order of business for the newly organized Southern Section is to increase the number of Range Society members in the South. The officers are taking active steps toward this end.

Chairman John Cassady started the Section off on technical range management by appointing a committee to study and recommend an acceptable method of computing beef production per acre of range or pasture. The Committee is composed of B. L. Southwell, Tifton, Ga.; O. E. Sell, Experiment, Ga.; L. K. Halls, Tifton, Ga.; and E. M. Hodges, Ona, Fla. They are to try to find the answer to such perplexing questions as, "Should

culled cows sold be classed as beef produced?" "If full gains are credited to growing season ranges, what credit goes to cold season ranges, where the breeding herd is maintained and where gains often turn to losses." There are many others. The committee has already started work. —*R.S.C.*

Texas

The Third Annual Meeting of the Texas Section was held at San Antonio on December 10 and 11, 1951. About 125 were present, and 14 new members joined the Society. New officers are: Chairman, H. L. Leithead, SCS, Marfa; Vice-Chairman, Roger Q. Landers, Menard; and Secretary, Leo B. Merrill, Texas Exp. Sta., Sonora.

After the business meeting, Monday morning was devoted to a discussion of "Range Cattle Breeds, Where and How Each Breed Fits into the Range Conservation Program." J. H. Knox, of New Mexico A. and M. discussed Brahmans, Herefords and Angus. J. K. Northway of the King Ranch, discussed Santa Gertrudis.

Monday afternoon was devoted to a series of papers: E. R. Eudaly, "Supplementary Feeding on Range Land"; Omer E. Sperry, "The Spread and Control of Poisonous Plants on Texas Ranges"; M. A. Hartman, "Water Spreading on Range Land"; C. A. Rechenthin, "Range Vegetation"; and V. A. Young, "Brush Control."

On Tuesday morning, a round-table discussion was held on "Managing Ranches for Range Improvement." Discussion leader was Bill Allred, Fort Worth; and panel members were Clayton Puckett, Fort Stockton; Joseph Vanderstuchen, Sonora; Bill Roberts, Walnut Springs; John Gould, Marathon; and Tom Lytle, Campbellton.

Tuesday afternoon was given over to a display at the SCS Nursery of equipment and machinery used on range land.

HAVE YOU A JANUARY 1950 OR JANUARY 1951 JOURNAL TO SELL?

The Society's supply of these numbers is exhausted. We need copies to supply libraries, colleges and other institutions. One dollar will be paid for each copy that is not mutilated. If you don't need yours, please send it to: W. T. White, Executive Secretary, 209 S. W. 5th Avenue, Portland 4, Oregon.

ARTICLES OF INCORPORATION

CERTIFICATE OF INCORPORATION OF AMERICAN SOCIETY OF RANGE MANAGEMENT

KNOW ALL MEN BY THESE PRESENTS, That

Albin D. Molohon
Robert E. Morgan
Floyd D. Larson

do hereby certify that they associate themselves to establish, make and form an incorporate association under and in accordance with the constitution and laws of the State of Wyoming for the purposes and in the manner hereinafter set forth; and further do certify that the provisions hereof are, and are hereby constituted, the articles of incorporation of said association.

I.

The corporate name of the association hereby established is

AMERICAN SOCIETY OF RANGE MANAGEMENT.

II.

The purposes and objectives for which this corporation is established shall be to foster advancement in the science and art of grazing land management, to promote progress in the conservation and greatest sustained use of forage and soil resources, to stimulate discussion and understanding of scientific and practical range and pasture problems, to provide a medium for the exchange of ideas and facts among Society members and with allied technologists, and to encourage professional improvement of its members.

III.

The term of existence of this corporation shall be perpetual.

IV.

This corporation is not organized for direct gain to itself and is therefore established without capital stock.

V.

The concerns and business affairs of said association shall be managed by a board of Directors, ten (10) in number, and during its first corporate year, or until their successors are duly elected and qualified, said directors shall be as follows:

F. G. Renner
D. A. Savage
Melvin S. Morris
Joseph F. Pechanec
W. L. Dutton
A. W. Sampson
K. A. Parker
Milo Deming
R. S. Campbell
Dan Fulton

VI.

The purposes for which this corporation is formed shall be pursued in the City of Laramie in Albany County, Wyoming, and in such other places in the State of Wyoming and in the United States or its territories or possessions as the officers and directors may decide.

VII.

This corporation assumes to itself and shall and does possess all powers, rights, privileges and franchises granted to and conferred upon corporations of like character by the laws of the State of Wyo-

ming, which are necessary or appropriate to enable it to carry out the purpose for which it is formed, including the right to take and hold by purchase, gift, devise or bequest either real or personal property or both; and to take by gift, devise or bequest money, bonds, notes or choses in action. The corporation shall and does possess the right to issue publications and papers.

VIII.

Management and regulation of the property and affairs of said association; and the officers and members and the manner and selection thereof, shall be fixed and provided by by-laws which may provide for the expulsion of members.

IX.

The corporation shall have a common seal, having on its circumference the words, "American Society of Range Management" and in the center the words, "Corporate Seal."

X.

Annual and special meetings of said corporation will be formed, convened and conducted at such times and in such manner as the by-laws of the corporation shall provide.

IN WITHESS WHEREOF, we have hereunto set our hands and seals in duplicate.

Date: June 6, 1949

/s/ Albin D. Molohon
Albin D. Molohon

/s/ Robert E. Morgan
Robert E. Morgan

/s/ Floyd D. Larson
Floyd D. Larson

STATE OF MONTANA }
COUNTY OF YELLOWSTONE } ss

On this 6th day of June, 1949, personally appeared before me, a notary public in and for the county aforesaid, Albin D. Molohon, Robert E. Morgan, and Floyd D. Larson, to me known to be the identical persons who executed the above certificate of incorporation and acknowledged the same to be their voluntary act and deed.

Witness my hand and seal the day and year in this certification first above written.

/s/ M. J. Bidlake
Notary Public

(SEAL)

FIFTH ANNUAL MEETING

The Fifth Annual Meeting of the American Society of Range Management was held at Boise, Idaho, on January 30, 31, and February 1, 1952. Headquarters were in the comfortable Boise Hotel. The gathering started early in the week with meetings of the Board of Directors, and advance sessions of several range agencies. Total registered attendance was 392, a new high.

The Board of Directors held an all-day session on January 29, and a late afternoon session on February 1. Highlights of their deliberations are reported separately. The Annual Meeting opened at 9:00 a.m. on Wednesday, January 30 with the address of retiring President Dan A. Fulton, which is printed in full in the editorial space beginning on page 109 of this issue. There followed reports of the Treasurer, Secretary, and Editor. These are printed following this account. Decision of the Board to hold the next annual meeting at Albuquerque, New Mexico, was announced.

When the Business Session was thrown open for general consideration, the group voted a recommendation to the 1952 Program Committee that a technical session be arranged for future meetings. It was also voted to request the Board of Directors to make necessary recommendations toward obtaining more leeway in establishing the dates of future annual meetings.

Wednesday afternoon, Thursday, and Friday were devoted to the following sessions: Range Management and Water Conservation, Reed W. Bailey presiding; Livestock Nutrition on the Range, Julius Nordby, presiding; Effects and Control of Range Forage Pests, David F. Costello, presiding; Significant Developments in Range Management and Research, Herman Oliver, presiding; and Applications of Range Science, Leon R. Nadeau, presiding. See complete program in JRM 5:49–51, January, 1952. The meeting room was packed for all sessions, and discussion was ample and lively. The movie "Wyoming Range Management," by A. A. Beetle and Kenneth Lane, concluded the technical sessions on Friday afternoon.

Visiting wives were entertained at luncheon and afternoon bridge by the wives of local members on Thursday. Following the Thursday afternoon technical session, the Idaho Cattlemen's Association generously set 'em up for all members and their wives.

On Thursday evening, the annual banquet was held in the Elks Temple, with about 350 in attendance. Toastmaster Albin D. (Bud) Molohon was at his genial best, displaying his ample fund of "parlor" jokes to the vast entertainment of the group. The program of string and vocal music was enjoyed by all. The high point of the evening was a range condition demonstration by Kay Carmody and Allene Ogan, of Jefferson Island, Montana, who had previously won Montana State 4-H Club honors. Look for more about these girls and their routine in the Annual Student Issue of the Journal next September. Door prizes of hats, shirts, and seeds, offered by local Boise concerns, lent real interest.

After the technical session Wednesday

afternoon, Utah State Agricultural College students made a clean sweep of honors in the plant identification contest. They won team honors, and had the three top individuals: Min Hironaka, Ed Abbot, and Colin Bennion. Boys from Colorado A. & M. and University of Idaho were close behind.

Wednesday night was taken up with most instructive movies of Pakistan by J. R. Shairani, a visiting forest officer; also by Joe Pechanec's lecture with colored slides of his recent trip to Somaliland under joint USA-FAO sponsorship.

Entries in the initial range photography contest and exhibition were judged by popular vote, with the following results:

Class 1, Range landscape, G. John Chohlis, SCS, Yakima, Washington.

Class 2, Individual range plant, Andrew Senti, BLM, Salt Lake City, Utah.

Class 3, Range Conditions, Grant Rogers, BLM, Canon City, Colorado.

Class 4, Close up (portrait lens), Grant Rogers.

Class 5, Color print, Andrew Senti.

Best in show, G. John Chohlis (see frontispiece in this issue).

A beautiful display of range plant and grazing color-photos, and range condition monoliths by SCS was arranged around the hotel mezzanine. The Journal exhibit concentrated on advertising.

There were numerous special luncheons and dinners by Sections and alumni groups, not to mention hundreds of small huddles in the hotel lobby and private rooms to talk range, livestock, recollections of the good old days, and just plain gossip.

Throughout the meeting there was an excellent display of brush control and reseeding equipment and other range machinery by the Harris Tractor Company, Olson Manufacturing Company, BLM, USFS, Steve Regan Company, Bunting Tractor Company, and Glen Dick Equipment Company, all exhibited near the Hotel Boise under the supervision of Bryant Martineau.

Boise merchants contributed to the success of the meeting with attractive window displays, featuring the range management theme, and each day's activities were covered by morning and evening editions of the Idaho Daily Statesman. Programs, featuring the Society's brand, Charlie Russell's "Trail Boss," were provided through the courtesy of our good friend Norman G. Warsinske, publisher of Western Livestock Reporter, Billings, Montana.

Resolutions

The American Society of Range Management meeting in a regular convention at Boise, Idaho, January 30, 31, and February 1, 1952, wishes to express appreciation to the citizens and officials of the host city this year, Boise, Idaho.

Therefore be it Resolved. The work of many people, individually and in communities who gave so freely of their time, is responsible for the success of this convention. Particular appreciation is expressed to:

The Boise and State Chamber of Commerce, City of Boise and its hotels, motels, police department, and business houses, and to the machinery and equipment dealers who provided exhibits, information and personnel to fully inform the interested delegates attending the meetings.

The Idaho Cattlemen's Association for their contributions and the social hour.

The Idaho Woolgrowers Association, Ralph Davis, Men's Shop, Folks Department Store, Bankers Association, J. O. Beck, and Robert Naylor for their generous donations of door prizes.

The local arrangements committee—Milford Vaught, Chairman, Jerry Evans,

Howard Potter, Ray Blair, Foyer Olson, Harley McDowell, Mervin Christenson, Harold Johnson, Elmer Shiff, Bryant Martineau, Liter E. Spence, and Dick D'Essum—for their untiring and effective labors.

The program committee—E. J. Dyksterhuis, Chairman, John Babbitt, Harold Burback, J. B. Campbell, Harold Heady and Joe Pechanec—responsible for this year's excellent program.

Albin D. (Bud) Molohon for the effective handling of his duties as Master of Ceremonies.

Norman G. Warsinske of the Western Livestock Reporter for the very attractive complimentary programs.

Mrs. Howard Potter and the members of her committee for the ladies luncheon.

And to all others who gave so generously of their time in contributing to the success of this, our fifth annual meeting.

February 1, 1952, Boise, Idaho

COMMITTEE ON RESOLUTIONS
W. L. Dutton, Chairman
B. W. Allred
J. A. Campbell

ANNUAL REPORT OF THE TREASURER 1951

The financial condition of the Society at the close of 1951 is good. Income for the year totaled $11,613.36; operating expenses amounted to $9,842.69, leaving a net profit of $1,770.67 for the year.

Compared with last year, income rose sharply—by $2,300.36, but expenses increased even more—by $2,680.08, so that net profits for 1951 were $180.29 less than in 1950.

All sources of income contributed to the increase in volume of business, but the major share of increased revenue was in Memberships and Subscriptions. In 1951 this item exceeded 1950 by $2,431.03, and even exceeded the budget estimate by $1,301.83. Unfortunately, this apparent growth is not entirely reflected in number of members, but is due to more prompt payment of 1952 dues in 1951. Before the end of 1951, 933 members had paid their dues for 1952 compared with an estimated 700 or less who had paid up currently a year ago. This should be recognized in evaluating the financial condition of the Society. Only by continued hard work to secure new members, can income be kept on the upgrade.

The major item of increased expense was in the publication of the Journal. At the summer meeting of the Board of Directors, a $700.00 increase in the Journal budget for the year was authorized. The editor skillfully kept the cost of Volume 4 of the Journal within this increased allotment, and at the same time significant savings in the operation of all the officers slightly more than made up for the increased publication costs so that we did not exceed our over-all budget set up a year ago.

The balance on hand in the Working Fund on December 31, 1951 amounted to $4,919.02.

Income from life memberships has been kept in a separate Life Membership Fund, which totals $1,679.40. During 1951 a Trust Fund was set up to establish a cash reserve. On December 31, 1951 this totaled $5,138.44.

Receipts and Expenditures, January 1 to December 31, 1951 and Budget Allotments

Expenditures	*Budget estimate*	*Actual*
Office of President		
Telephone and telegraph	$ 25.00	$ 34.54
Postage	75.00	32.32
Printing and stationary	50.00	
Secretarial	250.00	15.00
	400.00	81.86

Expenditures	*Budget estimate*	*Actual*
Office of Secretary		
Stationery	200.00	84.39
Postage	200.00	168.27
Envelopes	300.00	135.24
Telephone and telegraph	200.00	14.41
Secretarial		90.22
Miscellaneous		17.63
Cash on hand		43.60
	900.00	553.76
Office of Treasurer		
Stenographic	325.00	311.00
Honorarium	200.00	200.00
Postage	150.00	137.66
Printing	75.00	92.98
Bond	25.00	25.00
Natural Resources Committee	25.00	25.00
Miscellaneous	100.00	35.44
	900.00	827.08
Office of Editor		
Stenographic	500.00	549.41
Postage	100.00	45.00
Miscellaneous	100.00	45.20
Honorarium	200.00	200.00
Cash on hand		35.39
	900.00	875.00
Journal of Range Management		
Volume IV	6500.00	6602.39
Reprints	400.00	357.77
Postage	150.00	113.94
Envelope preparation	150.00	160.00
Service charges	125.00	51.92
Storage	25.00	18.00
Purchase of Vol. III #1 from members		9.00
	7350.00	7313.02
Committees and Meetings	100.00	
Awards committee		25.00
Advertising committee		17.81
Natural area committee		2.90
Planning committee		6.91
Program committee		34.85
Local arrangements committee, 1951, advance		100.00
	100.00	187.47
Grand Totals	$10,550.00	$9842.69

Receipts			
Membership and Subscriptions—1951 / 1952		9500.00	6282.47 / 4518.36
1952:			
821 regular at $5.00	4105.00		
60 students at $3.00	180.00		
50 agencies at $4.50	225.00		
2 irregular	8.36		
	4518.36		
Reprint Sales		450.00	440.20
Back issue sales		100.00	113.25
Annual meeting		50.00	129.45
Advertising		100.00	61.00
Refunds		100.00	68.63
Grand Totals		$10,300.00	$11,613.36

Financial Statement

December 31, 1951

Working Account

Cash on hand, January 1, 1951	$ 8,148.35	
Receipts	11,613.36	
Expenditures, 1951		$ 9,842.69
Transferred to Trust Account		5,000.00
On deposit, Valley National Bank, Tucson, Arizona, December 31, 1951		4,919.02
	$19,761.71	$19,761.71

Profit and Loss Statement

Net income	$11,613.36	
Operating expenses		9,842.69
Net profit		$ 1,770.67

Life Membership Fund

On deposit, Woodward Building and Loan Association, Woodward, Oklahoma, January 1, 1951	$ 1,630.13
Interest	49.27
On deposit, December 31, 1951	$ 1,679.40

Trust Fund

On deposit, Woodward Building and Loan Association, Woodward, Oklahoma, February 6, 1951	$ 5,000.00
Interest	138.44
On deposit, December 31, 1951	$ 5,138.44

Respectfully submitted,
(sgd.) *C. Kenneth Pearse*, Treasurer

Report of Auditing Committee

The Auditing Committee inspected the records of Treasurer Pearse on January 29, 1952, with W. T. White, newly secured Executive Secretary, present.

1. Each withdrawal is substantiated by a proper voucher and all withdrawals appear to be for a justifiable expenditure.
2. Deposits appear to be complete, although cards for each class of member were not individually counted and checked with actual deposits. Deposit slips are on hand, as well as all bank statements.
3. The treasurer's records appear to be complete and accurate.

(sgd.) *E. H. McIlvain, Chairman*
(sgd.) *M. W. Talbot*
(sgd.) *W. J. Anderson*

Annual Report of the Secretary 1951

As you all know, the duties of your Society officers are performed without salary. This means that in an organization as large as ours, the officers have a great deal of work that requires the cooperation of other people. Adequate attention to the work of the Secretary's office would not have been possible without the cooperation of the administrative officers of Montana State College in the form of permission to use some on-duty time and the available college facilities. I wish to express my appreciation to President Renne, Dean McKee of the Division of Agriculture, Fred S. Willson, Head of the Department of Animal Industry and Range Management, and Mrs. Josephine York of the Multilith Department for their cooperation. Even more, the Society owes its thanks to Mrs. Dorothy Baugh, who kept membership files and performed many other Society duties so ably, and to students and staff of the Range Management Department who contributed their time and efforts, directly or indirectly, toward success of the year's work.

Because past-Secretary McIlvain had organized the functions of the Secretary's office so well, and because it seemed desirable to have comparable records from year to year, few changes were made in the membership filing systems and other operations of the office. Every effort was made to keep up to date in correspondence and other requirements of the office, but the requirements of my job did occasion some delay at times. I ask the pardon of those who were victims of such delays.

Major activities of the office were maintenance of the three-way membership files, the reproduction of reports and general letters, the reproduction and mailing of ballots and dues notices, servicing of Society committees and the sections, correspondence dealing with the general operations of the Society, and reproduction and mailing of accommodations information for this annual meeting.

I would like to say here that with the offices of Treasurer and Secretary separate, considerable duplication of effort and much inter-office communication is necessary. With the consolidation of these two offices into one office, more efficient operation should be obtained. I believe this change in Society administration is a real forward step in our growth.

The Secretary's office used $503.77 from February 1 to December 31, 1951, of the $950.00 allotted to it. In addition, the Treasurer made certain disbursements from the Secretary's fund.

In conclusion, I wish to thank the President of the Society for this opportunity to serve our organization. I have had a most interesting and educational year. The excellent cooperation of President Fulton, Treasurer Pearse, Editor Campbell, and many other members of the Society made the assignment a most pleasant association.

Membership summaries are shown below.

Membership by States
(As of January 1, 1952)

State	*Number of Members*	*Rank 1951*
Alabama	1	
Arkansas	3	
Arizona	133	8
California	170	3
Colorado	149	4
Connecticut	1	
Delaware	1	
Dist. of Col.	31	16
Florida	4	
Georgia	5	
Idaho	91	11
Illinois	6	
Indiana	2	
Iowa	3	
Kansas	109	9
Kentucky	2	
Louisiana	7	
Maine	1	
Maryland	14	19
Michigan	1	
Minnesota	2	
Missouri	7	
Montana	287	1
Nebraska	35	15
New Mexico	74	12
New York	13	20
Nevada	42	14
North Carolina	6	
North Dakota	22	18
Oklahoma	31	17
Oregon	134	7
Pennsylvania	2	
South Carolina	1	
South Dakota	70	13
Tennessee	3	
Texas	234	2
Utah	148	5
Virginia	7	
Washington	102	10
Wisconsin	8	
Wyoming	142	6
Canada	61	
International	30	
Alaska	5	

Membership by Employment Classifications

Agency	*1951*	*1950*
Ranchers	409	307
SCS	312	341
FS	308	271
Students	227	214
Personnel of colleges and state experiment stations	180	177
BLM	123	119
Library	78	70
Industry	74	56
Wildlife Department (State Fish & Game—Federal Fish & Wildlife)	52	56
Extension	44	43
PMA	44	42
Indian Service	36	31
International members	30	18
Departments of colleges, experiment stations, and Gov't agencies	23	35
BPI	17	14
Livestock Ass'ns	14	14
Publications	13	11
Canadian Dept. Agric.	11	7
USDA	11	7
Armed forces	11	3
State Dept.	9	6
BAI	8	9
NPS	6	6

Agency	*1951*	*1950*
Research Foundations	3	4
Others	133	141
Total	2176	2002

Respectfully submitted,
Gene F. Payne, Secretary

Editor's Annual Report—1951

The Journal took on a new look in 1951. The two-color cover, featuring Charlie Russell's painting "The Trail Boss," was used throughout the year. The cut was loaned by Past-President Fred Renner. The Journal also continued to expand. As provided by the Board of Directors, Volume 4 was published bimonthly, making six issues for the year instead of the quarterly Journal published previously. A new "Annual Student Issue" was published in September, featuring range management education. Much of the special material for this issue was gathered by Harold Heady.

Volume 4 in 1951 contained 416 numbered pages, an increase of 33 pages over 1950. Some 2,600 copies were printed per issue, an increase of 500 over 1950. The 1951 Journal cost $6,602 to print and mail, as compared to $4,900 for Volume 3. This increased cost was for the enlarged and improved Journal, for the 500 additional copies, and a ten percent increase in printing rates.

The Journal is now publishing manuscripts about as rapidly as new ones are received. There were 32 papers on hand on January 1, 1951, and 47 were received during the year, a total of 79. Volume 4 printed 47 of these papers, and 9 were withdrawn or returned, leaving 23 on hand on January 1, 1952. Eighteen book reviews were published and the regular feature "Current Literature" was continued by Grant A. Harris.

A continuing effort was made to improve and standardize the editorial handling of manuscripts. Samples of typing for manuscripts to be submitted to the Journal were prepared and mimeographed in March 1951. Each prospective author should have and use a copy of these typing instructions, which are available on request. Your Editor took advantage of an official detail to Washington, D. C. to spend a day in the excellent Baltimore plant of our printers, Waverly Press. This visit was extremely helpful in attaining better correlation of the typed manuscript with the final printed Journal.

In 1951, the Editor continued to handle many Journal business matters, including reprint orders, the actual handling of advertising copy, plates and proofs, and a great deal of thought, planning, and correspondence on advertising. These business matters should be assigned to our new Executive Secretary as Business Manager and Advertising Representative of the Journal.

The Journal carried very little advertising in 1951, a gross of only $61. Not a single Section took advantage of the Board of Directors' offer of 40 percent commission on local advertising in Volume 4, although two ads for Volume 5 were secured by Section members. The National Advertising Committee, consisting of A. L. White, Chairman, and Fred G. Renner, did a lot of spade work which has brought in some nice ads for 1952. A gross total of $1,200 worth was under contract by January 28, 1952. The Editor has analyzed the Journal advertising rates and recommends certain modifications in the rate card to bring charges more in line with printing costs, particularly for the smaller ads, and for color ads.

Regardless of how advertising is handled, all members take notice that a successful advertising campaign will require: (1) Active solicitation of local advertising by the Sections, and (2) Widespread acceptance of advertised products by the membership. Advertisers

will not continue their ads unless we members buy their products, and write to the advertisers that we were sold through their ads in the Journal of Range Management.

The Board of Directors has approved a tentative Journal printing budget of $7,400 for 1952. This amount should finance a bimonthly Journal of about 435 pages, with an edition of 2,700 copies, provide for printing of advertising, and meet another possible advance in printing costs.

You will be interested in special Journal features in store for 1952. It is planned to carry the report of the annual meeting in the May issue. The July number will be devoted mainly to foreign papers in honor of the Sixth International Grassland Congress being held in the USA in August. The September number, as in 1951, will be the Annual Student Issue. The Board of Directors favors a new Society Membership list in the November issue.

Retiring members of the Editorial Board are B. W. Allred and David F. Costello. In addition, Harold F. Heady, who was selected last year, has resigned to take up new duties resulting from his election to the Board of Directors. The Board of Directors has selected A. L. Hafenrichter of the Soil Conservation Service at Portland, and W. R. Hanson of Eastern Rockies Forest Conservation Board at Calgary, Alberta, as new members for the three year term 1952–54; and George Weaver of the Production and Marketing Administration, Fort Collins, Colorado, to finish out the two remaining years of Heady's unexpired term 1951–53.

The present Editor will complete his three-year term in 1952. The Board of Directors plans to take immediate action to select a new editor of the Journal for the term 1953–55.

In conclusion, I want to express my hearty thanks to the Editorial Board, the officers, committees, sections, authors, and to Waverly Press for excellent cooperation. I must especially acknowledge the continued personal interest, indispensable help and encouragement of my Secretary, Miss Lillian Redon, and Mrs. Campbell, especially for the way in which they carried on with the Journal during my absence in Washington, D. C. for nearly two months last autumn.

R. S. Campbell, Editor

Report of the Curricula Committee

Full report of this committee will be published in the September 1952 Annual Student Issue of the Journal.

Report of Library Committee

Abstract of this report will be published in the September 1952 Journal.

Report of Membership Committee

(Summary)

A survey was made to determine why certain members were dropping their affiliation with the Society. The reports show the following reasons, listed in order of importance:

1. Neglect to remit dues promptly.
2. Livestock men do not find the articles in the Journal applicable to their operations.
3. Moved out of the state.
4. Not satisfied with activities of the section.
5. Rising living costs will not permit expenditures for dues.

Some of the committeemen have offered the following suggestion, and I do in many ways agree that it has its merits for future consideration. It is suggested that the National Society or the various sections not use high-pressure salesmanship for the simple reason of increasing their

total membership rolls, but rather to solicit interested members who will be benefitted by their affiliation with the Society and who will make a contribution or will be an asset to the Society. There is some reason to believe that they who are brought in and are dissatisfied do much harm to the Society and make it increasingly difficult to obtain interested persons as affiliated members.

I think we will all agree that our membership committees in most of the sections have been active, yet we have not increased our rolls tremendously. This shows that we can expect an increase in future years in diminishing numbers and that our best estimate under present conditions is our Society may level off around twenty-five hundred or three thousand members.

It will be up to the Board of Directors and the officials of the national as well as the sections to make this a worth while society so that we may retain old members, thereby maintaining the solid pillars of our organization. I believe our sections must be encouraged by the national officials to become more active. This I presume can be done through a planning and directing committee and I think it would be desirable to maintain an exchange of ideas through a national committee throughout the various sections. I personally know that each section is groping around for suggestions on how to make their section more active and be of greater service to their members.

C. Wayne Cook, Chairman

Highlights of Board of Directors' Meeting

Boise Hotel, Boise, Idaho

January 29, 1952

Present were: Dan A. Fulton, President; L. A. Stoddart, Vice-President; C. Kenneth Pearse, Treasurer; Board members W. L. Dutton, A. P. Atkins, J. A. Campbell, J. S. McCorkle, D. A. Savage, and Bruce Orcutt; and Gene F. Payne, Secretary. Also present were: Vice-President-Elect B. W. Allred; new Board members H. F. Heady and E. J. Dyksterhuis; R. S. Campbell, Editor; and Section representatives T. J. Snyder, Nevada, W. J. Anderson, Pacific North West, C. H. Wasser, Colorado, D. R. Cornelius, California, E. H. McIlvain, Kansas-Oklahoma, Les Albee, South Dakota, Albert Albertson, Utah, Ray F. Blair, Idaho, W. R. Hanson, N. I. M.

Meeting was called to order by President Fulton at 9:15 a.m.

Minutes of the Board Meeting held in Denver on August 4, 1951 were read and approved.

Treasurer Pearse presented his annual report (see text and financial statement in this issue).

Secretary Payne presented his annual report as printed in this issue. It was generally agreed that Section activity is the best means of increasing membership.

Editor Campbell presented his annual report (see text in this issue). After reviewing the types of membership to be served by the Journal, the Board voted that the Editor should continue the policy of including both popular and technical articles, with technical articles to stress practical applications. Greater direct participation by ranchers in writing articles should be encouraged.

Milford Vaught and Jerry Evans of the Local Arrangements Committee reported on meeting arrangements for the 1952 Boise meeting.

A. L. Hafenrichter and W. R. Hanson were appointed as new members of the Editorial Board for 1952–54; and George Weaver was appointed to fill out the two remaining years of the 1951–53 term of Harold Heady, resigned.

After lengthy consideration of the position and of candidates, the Board appointed W. T. White as Executive Secretary of the Society.

The President appointed an auditing committee of E. H. McIlvain, Chairman, M. W. Talbot, and W. J. Anderson.

The Board agreed that the Executive Secretary should arrange for professional auditing services in future years.

President Fulton appointed G. F. Payne, C. K. Pearse, R. S. Campbell and W. T. White as a committee to develop the 1952 budget.

Civil Service Commitee: The Committee report was presented by Stoddart. A motion was passed that the Civil Service Commission and all land management agencies be informed that Society Policy establishes the suggested curriculum in range management as recommended for entrance requirements into professional positions in range management.

Curriculum Committee: The Curriculum Committee report was presented by Stoddart. The Board agreed that the report be published in the Journal as minimum requirements approved by the Society as a guide for: (1) Schools in developing range management curricula, and (2) students preparing themselves for technical range management as a professional career; and that 400 reprints be made available for use by those interested. The Committee on Curricula is to be maintained for the coming year.

The Board agreed that the Society Articles of Incorporation should be published in the Journal.

Natural Resources Committee: W. J. Anderson presented the Natural Resources policy statement for consideration. The Board voted to send the following telegram to the Natural Resources Council: "The A.S.R.M. approves the principle of sound management and multiple use of natural resources but does not approve all details outlined in the Natural Resources Council Policy statement." It was agreed that the Society membership in the Natural Resources Council be maintained, along with an A.S.R.M. Natural Resources Committee.

The following actions were taken relative to Journal advertising: (1) that the 40 percent commission offer to Sections be terminated, (2) that A. L. White, W. T. White, and R. S. Campbell be authorized to rewrite advertising rates to remove present inequalities, (3) that A. L. White should be asked to continue as chairman of the Advertising Committee, (4) that the Crop Air Service account will have to be considered uncollectable, (5) that the Ross Seed Company account should be given to a collection agency.

Library Committee: The Board passed a motion that the Library Committee draw up an agreement with the Utah State Agricultural College for handling of a Socicty depository, devise means for gathering library material, and perform such other duties as may be required.

Membership Committee: The committee report, as submitted to the directors by mail, was accepted.

Resolutions Committee: W. L. Dutton, B. W. Allred, and J. A. Campbell were appointed as a Resolutions Committee.

Since both old and new Board Members

were present, location of the next annual meeting was considered. It was decided to hold the 1953 annual meeting at Albuquerque, New Mexico.

The meeting adjourned at 5 p.m.

Gene F. Payne, Secretary

Highlights of Board of Directors' Meeting

Boise Hotel, Boise, Idaho

February 1, 1952

Present were: L. A. Stoddart, President; B. W. Allred, Vice-President; Board Members Dan Fulton, A. P. Atkins, J. S. McCorkle, Harold Heady, and E. J. Dyksterhuis; and W. T. White, Executive Secretary. Also present were: R. S. Campbell, Editor; Joe Pechanec, Liter Spence, E. H. McIlvain, W. L. Dutton, Dave Savage, Albert Albertson, and C. R. Wasser.

The Meeting was called to order by President Stoddart at 4:30 p.m. Dr. Stoddart opened the meeting by asking Editor Campbell to discuss the work of the Editor's office. Campbell reiterated that he would be unable to continue with the huge work load of the Editor's office beyond his present three-year term, which will end with the January 1953 Journal. If it is impossible to find a new editor to take over the entire job for the three-year term 1953–55, then the present work of the Editor's office could be spread three ways, as follows:

1. Editor—Journal policy, review and final editing of all manuscripts.

2. Managing Editor—mark up copy for printer and handle all proofs, placement of advertisements and related matters of Journal production. Campbell agreed to serve as Managing Editor for 1953 if necessary, provided his Agency approves his continued diversion of time from official duties.

3. Business Manager—handle all advertising orders, copy and proofs, reprint orders and related Journal business matters—to be a function of the Executive Secretary.

The Board passed a motion that President Stoddart and Vice-President Allred, with such other necessary help as they could enlist, be authorized to act in securing a new editor for the three-year term 1953–55.

It was agreed that the Society membership list should be published in the November 1952 issue of the Journal.

President Stoddart stated that the present period designated for the annual meeting, December to February, seems satisfactory until further study. The Board agreed that announcement of 1953 meeting dates be published in the July Journal, the Editor to be advised by June 1.

Prospects for 1952 Program Committee Chairman were discussed.

Considerable interest in more short technical papers was reported. It was urged that more opportunity for students be provided—possibly in an evening meeting.

President Stoddart directed that a letter of appreciation be sent by the Executive Secretary to E. Wm. Anderson for the very fine grass-monolith exhibit which he set up at the Boise Meeting.

The Board directed that J. H. Christ be informed of the appreciation of the Society for his spirit of cooperation in arranging for W. T. White to maintain his office of Executive Secretary with the Soil Conservation Service in the Portland Regional Office.

The Budget for 1952 was presented and approved.

The Board agreed to allow one free advertisement in the Journal for national advertisers, at the discretion of the Advertising Committee.

The Meeting adjourned at 6:35 p.m.
W. T. White, Executive Secretary

Annual Dues Are Due

The revised bylaws of the Society provide that: "Annual dues for members shall be payable in advance . . . on January 1 of the current year." Also: "Members whose dues are in arrears on the first day of August will be declared delinquent and shall be immediately dropped from the roll of membership."

All memberships are on a calendar-year basis, and a full year's volume of the Journal is provided, regardless of when the member joined. Pay dues to W. T. White, Executive Secretary, American Society of Range Management, 209 S. W. 5th Avenue, Portland 4, Oregon.

THE EXECUTIVE SECRETARY REPORTS

A new brochure describing the Society, its aims and purposes, and a description of the Journal has been printed. A supply has been mailed to each section chairman with application for membership cards. Additional copies can be mailed members who apply for them. Address your request to C. Wayne Cook, Membership Chairman, Utah State Agriculture College, Logan, Utah, or to the Executive Secretary, 209 S. W. Fifth Avenue, Portland 4, Oregon.

New membership lists were mailed to Section chairmen April 4. These lists were corrected to the date of mailing from the Secretary's records. There has been a generally good response from the second reminder notices to delinquent members, mailed out in March. Prompt payment of dues saves the Society money.

A third reminder and notice of suspension of Journal subscription will be mailed in June to members remaining delinquent.

Favorable comments and complimentary statements have been received regarding the readability of the Journal of Range Management from a number of Journal readers, (as notes attached to their remittance letters). We hope there are more of them. The expression of favorable esteem with which the Journal is received by the membership is about the only compensation Editor Campbell receives for his many hours of holiday and overtime labor which he so generously contributes to the editorial job.

Professor Robert L. Lang, University of Wyoming, is the newly appointed agent and resident representative for the Society during Dr. A. A. Beetle's 1952 absence in South America. According to the laws of Wyoming, under which the Society is incorporated, it is necessary to maintain a resident agent to represent the Society in the State in legal or other matters that from time to time need attention.

National Committees

Advertising:
A. L. White, *Chairman*
W. T. White
R. S. Campbell

Census:
Harold Hochmuth, *Chairman*
Tom Lommasson
Riley Pierson

Civil Service:
Donald Hervey, *Chairman*
Arnold Heerwagen
Gordon Gatherum
Russell Lloyd
Merton J. Reed
Harold Burback

Display and Contests:
Victor A. Surface, *Chairman*
Jerry Klomp
Gene Payne
E. William Anderson
Lee Sharp

Elections:
Clark Anderson, *Chairman*
Gilbert Hunter
K. L. Green

Library Depository:
Grant Harris, *Chairman*
Wesley Keller
C. J. Olsen
Blaine Morse

Local Arrangements:
Robert V. Boyle, *Chairman*
J. J. Norris
Harry Pearson
W. L. Hansen
Walter W. Nations
Milford J. Vaught

Manpower:
Fred Leftwich, *Chairman*
DeWitt Abbott
Myrvin Noble
Robert P. Casebeer

Membership:
C. Wayne Cook, *Chairman*
W. T. White
Section Membership Chairmen

Natural Resources:
H. C. Hanson, *Chairman*
Jim Anderson
A. C. Hull

Nominations:
Fred H. Kennedy, *Chairman*
K. A. Valentine
Lisle R. Green
R. B. Peck
Allan T. Arnason
Joe A. Wagner
Rowland C. Thompson
Harold Cooper
W. A. Hubbard
W. H. McKenzie

Program:
B. W. Allred, *Chairman*
E. J. Dyksterhuis
Floyd D. Larson
J. O. Bridges
Arthur H. Roth, Jr.
Otto Lindh
Joseph F. Arnold
Warren C. Whitman
Weldon O. Shepherd
Starker Leopold

Research Methods:
Joseph F. Pechanec, *Chairman*
David A. Savage
C. Wayne Cook