is needed before adapting a radical course, Dr. Paul Ehrlich (Population Bomb, 1968) appropriately replies that "such research initiated today will be terminated not by success, but by the problem under investigation." For those who argue that the future of our profession depends not on population density, but on new concepts of resource management brought about by increased technology, consider this prediction by Dr. Isaac Asimov (True Magazine, January, 1971): Under present trends the earth will have a population of near 6 billion by the year 2000, a value about double present numbers. Pollution, exploitation of resources and concentration of population in metropolitan areas will have increased to far more than double. He further states that "even if we escape an actual nuclear war, our technological civilization, precariously enough balanced now, will topple and the world we know will come to a bloody, catastrophic end." This leaves our profession caught between a rock and a hard place. Are we only marking time when we might be making it? Let's not dismiss this scenario as only one man's prediction. We should know its validity long before the next 30 years pass.

Our professional interests are at stake to say nothing of our environment. We have an obligation and the opportunity to put the pressure where it counts. We can make our contribution toward limiting the guest list in order to preserve the "good life" and the invited guests.—Patrick I. Coyne, U. S. Army Cold Regions Research and Engineering Laboratory, Fairbanks, Alaska.

Proper Use: Old Concept—New Ideas

The amount of grazing based on degree of use of the key forage species remaining constant each year will not permit maximum sustained use. Key forage species are usually grazed first and consequently other forage species will be underused. The definition of proper use in the Society's "A Glossary of Terms Used in Range Management" is, "The degree and time of use of current years growth which, if continued, will either maintain or improve the condition consistent with conservation of other natural resources." The phrase "if continued" limits the practical application since it conveys the idea that the time and degree of use will remain constant from year to year. This would limit application of the proper use concept only to ranges which are used each year at a time other than the growing season. Any use during the growing season is harmful to plants and would therefore not be "proper use."

A good solution is to design a grazing system that will meet plant requirements over time and animal requirements annually. This involves a thorough inventory and analysis of the range resources, including plant phenology, and the needs of the livestock operation using the range. Analysis of these components, along with fence location and water development, will allow the logical choice of a practical system of grazing.

Obtaining proper grazing use has long been emphasized as a means of improving the condition of rangelands. The question might be asked as to just how much range improvement has actually resulted from this practice alone. In reality, without changing the time and pattern of grazing, proper use alone still results in overgrazed areas and undergrazed areas. Grazing animals are very selective. On dry rangelands, increase of desirable native species in the plant composition is very slow at best. Examples to follow show the difficulty of obtaining proper grazing use even under controlled conditions.

E. J. Dyksterhuis (Cattlem. 35(12): 21, 60, illus.) gave some of the principles that must be remembered if sound range management is to be practiced. "Just a few head of livestock will keep areas near water and along draws grazed down. Also, the very best grasses, the kind that need the rest most, will be kept grazed down about as much with 5 head as with 50. A couple of livestock in a poor pasture make the rounds often enough to keep the more palatable grasses from increasing." Dividing the range and running twice as many livestock on a pasture for half as long has many advantages. "It takes about half as much riding to look after the livestock. It gives part of the range a complete rest. It results in more even grazing because the livestock don't spend as much time traveling around hunting 'ice cream' plants. Such plants are soon leveled and then livestock are forced to eat 'meat and potatoes' too.' This points up the need for using a range in some manner other than grazing to a specified degree of use and at the same time year after year.

Each range has a complexity of plant communities and resource problems. Livestock operators have divergent needs. These factors should be analyzed and a grazing system planned to fit the specific operation. A reasonable time should be set to reach the desired objectives. The grazing system selected may vary from simple to very complex. This will depend on the resource needs, ability of the livestock operator to adjust, and availability of funds for financing improvements. The system chosen should be the most economically feasible and physically practical to reach management objectives.

A grazing system, according to the Society's "Glossary of Terms," is simply, "The manipulation of livestock grazing to accomplish a desired result." The desired result, in most cases, is perpetuation of the resource and maximum net returns from grazing animals. These results often may be reached in more than one way, depending on the needs of the resource and the livestock operator. Some examples comparing different grazing systems are offered here, not to promote one system over another but to show that ranges respond in different ways to different systems. Cost of implementing a system must be considered, as well as the amount of time desired to reach objectives. Sometimes all that is needed to gain improvement is a change in the season of use, as illustrated by Hickey and Garcia (U. S. Dep. Agr., F. S., Rocky Mtn. For. & Rge. Exp. Sta., Res. Note RM-33, 5 p).

Three watersheds were studied for 12 years. Yearlong grazing was the practice the first 6 years and stocking rates were adjusted annually on the basis of herbage production. The objective was to utilize 55% of alkali sacaton (Sporobolus airoides), but the utilization averaged from 11 to 87% of this species. Ground cover index of alkali sacaton declined 34% during this period. The second 6 years, the objective was the same but the grazing period was from November through April; i.e., summer deferment grazing season. During this 6-year period, alkali sacaton increased.
in ground cover by 400%. Utilization ranged from 39 to 70%. Precipitation was about average for the 12-year period. Blue grama (Bouteloua gracilis) and galleta (Hilaria jamesii) both showed declining ground cover under the yearlong grazing and an increase under the summer deferred system. This is an example of how difficult it is to achieve proper use even under controlled conditions when a range must be used during the summer grazing season. Many range operations are unable to use a summer deferred system since other forage for their livestock is not available at this time. Under these conditions, the way to make substantial use of our forage plants while maintaining or improving their condition is by designing a grazing system to meet the plant requirements and still harvest the crop of grass.

A comparison of season-long, rotation, and rest-rotation grazing was made by Johnson, W. M. (U. S. Dep. Agr., F. S., Rocky Mun. For., & Rgs. Exp. Sta., Res Paper RM-14, 16 p. illus.). Three allotments were grazed season-long at the same rate of stocking for 2 years prior to 4 years of studies under three grazing systems. There was no significant change in the vegetation in the season-long allotment during pretreatment or after. Vegetation on the rotation allotment showed little change except a decrease in the utilization of the meadows of from 41 to 10%. Vegetation on the rest-rotation allotment received only about half as much utilization overall as it had on the season-long pretreatment. Little change occurred in the pattern of grazing on different vegetation types but generally decreased over all types. Cattle were more evenly distributed over the rest-rotation allotment. The most striking result of this study is the reduced utilization of all vegetation types without any reduction in the number of animals grazed on the rest-rotation allotment. This indicates an increase in forage production.

The definition of range management challenges us to develop our ranges to obtain optimum animal production on a sustained basis while perpetuating the natural resources. There is no grazing formula that is best for every range. The range manager must analyze the needs of each range and use his knowledge of vegetation requirements and livestock needs to reap the most benefits.

A well-designed grazing system not only benefits the resource but also is generally reflected in better animal production. Continuous grazing, 2- and 4-pasture systems of deferred grazing are compared by Waldrip, W. J. et al. (Abs. papers, 20th annual meeting, ASRM, Seattle 51). Flexible livestock numbers were used to remove approximately 50% of the annual forage production. Weaning weight averages of calves grazing the three allotments were 522, 506 and 484 pounds under the 4-pasture, 2-pasture, and continuous systems respectively. In addition, because of a continued increase in forage production, only 16 acres are now required to support a cow in the 4-pasture system, while 20 acres are necessary under the 2-pasture deferred-rotation and continuous systems.

Only a few examples have been given, but it seems clear that grazing management systems designed for perpetuation of the desired vegetation will accomplish improvement in range condition and increased animal production. Grazing systems should be designed with "degree of use" and "time of use" as essential parts of the management plan, but the "proper" degree of use is still very difficult to achieve. Even though the "proper" degree of use is not attained regularly, there are other provisions for the plants to gain vigor, reproduce, and accumulate mulch which assures a healthy range.

In the illustration used from Hickey and Garcia, the objective of reaching 50% utilization was more nearly reached in the deferred treatment, but even though the desired use was exceeded at times, improvement was still made in the range. Sometimes the idea is conveyed that any use other than optimum will destroy the resource. If this were true, then we would have very little rangeland left today since some of it has been abused over a long period of time. Some degree of flexibility is necessary in any grazing system, and exact compliance is not necessary to achieve objectives. As long as plant requirements are met a large percentage of the time, then improvement will be made in the range resource. All the examples cited mention degree of utilization, which in a sense is alluding to the proper use concept. If a grazing system is properly designed and followed, then amount of utilization in any one year is not too important, especially in the more complex systems. However, it is a key in the long run to the amount and rapidity of increased forage production and vigor. If the needs of the plant are fulfilled, then some flexibility in the livestock operation may be made without harm to the resource. Good range management tests the range manager's skills and knowledge in the manipulation of plants and animals, but a little common sense is essential.--Harry C. Lawson, Jr., Bureau of Land Management, Portland, Oregon.

**Why Not Say It the Way It Is!**

The value of range forage on the public lands of the West can be pointedly demonstrated by considering herbage as a source of energy for the production of table meat in the following manner. Let us assume that the conventional practice of raising beef calves on the range followed by finishing these animals in the feedlots is reversed. Thus the cow-calf operations would be carried out in total confinement on mixed rations and the offspring would be finished to high good grade of marketable meat on the public ranges during the spring and summer grazing season. Based on this assumption the actual energy and food potential of the native forage resource on public lands can be presented in the proper perspective.

During the past five years or so, we have commonly heard or read reports from economists, preservationists and nature lovers that livestock grazing on public lands is of little or no economical consequence. This philosophy is based on the biased reasoning that the forage resource on public lands furnishes less than four percent of the total feed requirement for table red meat from lamb and beef in the United States. Certainly such reports do not adequately evaluate the true worth or this renewable source of energy.