DISCUSSION

THE CONSERVATION OF PUBLIC LANDS

THE present great enthusiasm for conservation seems to be just another illustration of the old story of covering the well after the cat is drowned; but I suppose we are entitled to all the consolation we can derive from that other old adage, "Better late than never." In this connection it might be of some historic interest to present an unpublished chapter of Bulletin No. 25, of the United States Department of Agriculture, 1901, entitled, "Field Work of the Division of Agrostology." This chapter of the manuscript was returned to the writer by the Secretary of Agriculture, Mr. James Wilson, with the following note: "All too true, but not best for us to take position just now. J. W."

GOVERNMENT CONTROL OF GRAZING LAND

According to the present laws there is no provision for dealing with the vast areas of the public domain which are fitted only for grazing purposes. Provision is made for the disposition in small areas of agricultural, mineral, forest and desert lands which are capable of improvement, while the public grazing lands, which are estimated to include 365,400,000 acres, are left free for the use, or more frequently abuse, of any one who may be able to occupy them. This lack of any system of controlling the grazing lands has led to many serious results and it is already becoming recognized by the more progressive public men and stock raisers throughout the West that some plan should be adopted for controlling these lands. There are various quite evident reasons why steps should be taken in this direction. Under the present lack of control it would seem to be a rational supposition that all citizens of the United States are equally entitled to any advantage which might be gained from occupying these lands, if they are regarded as free and open to all. This feeling on the part of stockmen naturally leads to trouble between different persons wishing to occupy the same territory. These contests not only engender quarrels and bad feeling but frequently lead to serious damage and bloodshed. This is particularly the case in the troubles arising between the cattlemen and sheepmen. Sheep are generally regarded as causing most destruction to the range and leaving it unfit for cattle grazing, and as there is no legal basis for settling disputes of this kind, firearms are sometimes resorted to and slaughter of stock and murder results. Instances of this kind are often brought to our attention. Were this the only evil resulting from the present condition, it alone would be sufficient to justify an investigation and an attempt to adopt some method of remedying the matter. This is, however, but one of the many evils which arise. The effect in retarding the development of the country is also great, especially in relation to the development of irrigation works. Without any means of acquiring right or title to large areas of land, there is little or no inducement to individuals or companies to construct reservoirs, tanks or other works looking toward the irrigation and improvement of large tracts of arid land. The greatest injury, however, at present arising from lack of control is the destruction of the many grasses and forage plants which grow on these grazing lands. Without any means of acquiring a right to graze upon an area except by force or illegal fencing of the range, there is no inducement to one to protect or improve the grazing, while on the other hand there is every incentive to the avaricious person to reap as great benefit as possible from the land in as short a period as possible and then move on to fresher fields. Control of the range land by some to the exclusion of others having equal right to it is frequently secured by the preemption or purchase of the land upon which the available water supply is located, thus making it impossible for others to use the adjoining range.

Of course there are instances where the range lands are at present treated with consideration and with a view to conserving their production, but the general tendency, as shown by the present condition of the grazing lands as compared with their past condition, is to get as much as possible from them without seriously considering the future. The grazing lands as a whole have, according to our observations and reports from reliable sources, become deteriorated to the extent of between 25 and 50 per cent. This means an actual loss in the productivity of the country of many millions of dollars each year. Without means of controlling these public lands there can be no hope for any general or extensive improvement of them. While the investigations of the Division have shown that it is possible to renovate and restore the greater portion of these lands by simple and practical methods, yet there is no inducement for any one to attempt it because they have no assurance of being allowed to profit by the results. Without some method of government control which will insure stockmen the use of the grazing lands for a continuous period sufficient to make it to their advantage to improve and protect the range, there can be little hope that any extensive improvements will be made. On the contrary, the present devastation and destruction will probably in-

crease until the grazing lands are hopelessly destroyed. While the loss to the country in forage each year may be approximately determined, the loss to the country as a whole and its future development and prosperity can not be estimated.

The injurious results of partial or complete denuding of the land are very far reaching. As already pointed out in treating of the Southwest, the normally insufficient moisture supply is greatly decreased by the rapidity with which the rainfall runs off the bare and hardened surface of the soil and also by the great amount of wash and erosion which results from the rapid running of the water. This matter of erosion is also one which affects the irrigation problem, as reservoirs built in such districts fill so rapidly with the silt washed from the bare soil that their usefulness is soon destroyed.

If none of the serious consequences already pointed out could be traced to the present lack of control of these lands, there would still be justification for taking charge of them for purely financial reasons. It is not clear why the government should not derive some revenue from the use of its public lands and any such income might be advantageously expended in the building of reservoirs or other improvements which would facilitate the development of the country. We know of no other country where the government lands are left entirely to the mercy of the squatter.

C. L. SHEAR

NOTE ON THE PRESENT SUN-SPOT CYCLE

STUDIES of solar activity as measured by sun-spot numbers reveal that at the end of 1935 solar activity was well on towards the half-way mark between the last minimum and the next maximum. The minimum just passed was reached near the end of 1933, when for thirty-eight consecutive days the Wolfer number was sensibly zero. This occurred five years after the preceding maximum in 1928. On the basis of present indications, the probability is high that the next maximum will be reached in the early part of 1938, making the interval from the last maximum only about ten years.

A study of the nine completed cycles of the last hundred years gives for the mean value of the period of solar activity from the occurrences of minima to be 11.11 years. The average value of the intervals between maxima has been 11.37 years or a quarter of a year more than the average value between minima. Twice during the century there have been as few as ten years between successive maxima in the sun-spot cycle and three times the interval has been as great as twelve years. The interval between minima, on the other hand, has three times been as small as ten years. The interval from one maximum to a succeeding minimum has undergone wide variation, ranging from eight to five years. Three times the interval has been as great as eight years and only once has it been so brief as five years. This was actually the interval between the last maximum and minimum in the present cycle. The average interval from maximum to minimum for the period has been 6.8 years. Calculations show, on the other hand, that the interval from minimum to maximum has ranged from three to five years, the average being 4.3 years.

The interval was only three years from the minimum of 1867 to the maximum of 1870. This is the shortest step in the series between minima and maxima. This was followed by one of the longest steps between maxima and minima, the next minimum following in 1878, or eight years after the previous maximum. The rapidity of the rise in the sun-spot numbers after a minimum appears to be some index for predicting the following maximum. The rapid rise of the sun-spot numbers during 1935 taken together with the very short interval between the maximum of 1928 and the minimum of 1933 would appear to indicate that the next maximum should occur in 1938.

Again, since the last minimum can now definitely be fixed at the end of 1933 (1933.8) and since the average time from minimum to maximum is 4.3 years, it appears that the next maximum should occur in the very early part of 1938. The high value of the sun-spot number (58.8) for the last quarter of 1935 is another indication that we are not far from the half-way point between minimum and maximum. It is suggested that, since the last sun-spot maximum gave high values for solar activity throughout the years 1927, 1928 and 1929, the next maximum may prove to be one with a sharper peak, although at present any exact knowledge is lacking for the prediction of relatively flat or, on the other hand, sharp peaks in the sun-spot curve. The largest group of spots recorded thus far since the last minimum occurred at the end of November and the beginning of December, 1935.

It is to be expected that the rapid change in the solar index during the next two years will be accompanied by magnetic disturbances and generally impaired conditions for distant radio reception in the broadcast band. Studies in field intensities from controlled broadcast stations are being continued at the Institute of Geographical Exploration with the cooperation of three additional stations equipped with field intensity recorders. Two of these lie on nearly the same isogone, and one lies at nearly right angles to its direction.

HARLAN T. STETSON

INSTITUTE OF GEOGRAPHICAL EXPLORATION
HARVARD UNIVERSITY
JANUARY, 1936