DISCUSSION

CONSERVATION VERSUS PRESERVATION

THE Yellowstone Park Act of 1872 refers to "preservation from injury or spoilation of all timber, mineral deposits, natural curiosities or wonders within the park, and their retention in their natural condition." It was apparently considered illegal to carry on any "control" measures under the old law. The National Park Service Act, 1916, states that the purpose "is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." The Secretary of the Interior was further authorized to remove timber, control attacks of disease and insects and to provide for the destruction of such plant and animal life as may be detrimental to the use of the parks. This was very unfortunate legislation, as the confidence in beneficial results from such "control" has, since that time, materially weakened.

Many people conceive of the National Park Service as a conservation organization. To conserve, as the term is now most frequently used, means to preserve while in use and it often implies ultimate depletion. In actual practise the operations carried on in the name of conservation are not designed to preserve the natural order but to establish and maintain a different order as regards kind and abundance of plants and animals present. The difference between preservation is well illustrated in a recent publication by Wright, Dixon and Thompson,[1] who advocate the preservation of the birds and mammals in national parks. They point out the importance of dead timber to various birds and mammals, and the need of such timber for numerous invertebrates might well be added. Conservation as usually practised removes dead and mature timber, while preservation lets nature take its course.

In a series of suggestions by the authors mentioned nearly all the ordinary "conservation" views are reversed:

> Every species shall be left to carry on its struggle for existence unaided, as being to its greatest ultimate good, unless there is real cause to believe that it will perish if unassisted.
>
> No native predator shall be destroyed on account of its normal utilization of any other park animal, excepting if that animal is in immediate danger of extermination, and then only if the predator is not itself a vanishing form.

The authors of the report further advocate the encouragement of visitors to see animals; *e.g.*, bears in their natural surroundings rather than about a garbage pile.

The conservation idea may reasonably be extended to cover the preservation processes described in this recent publication. If so, one may conceive of the maintenance of exotic pheasants in South Dakota as very near the zero point of the conservation of nature with most other so-called conservation measures not far above this level. A nature sanctuary in a national park or national forest in which every effort was made to preserve a sample of original nature without disturbance may well stand at the top of the conservation series.

In nature sanctuaries the natural fluctuations of organisms are allowed free play and serve among other things to show what natural fluctuations in abundance are like. There is or has been so much interference with natural processes in the form of "control" of this and that organism that the student of "wild life" management who would seek a basis for more scientific treatment of the animals in his charge, is left without guiding principles or reliable information and will continue thus until the preservation measures advocated by Wright, Dixon and Thompson with additional measures of equal importance are put into effect in as many nature reserves as possible.

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NOTES ON A SPHAGNUM BOG AT FORT BRAGG, CALIFORNIA

THE farthest south sphagnum bog which the writer has seen on the Pacific Coast is located about three miles east of Fort Bragg, which is on the coast, about 125 miles north of San Francisco. It is from 200 to 400 feet or more in width and is perhaps three fourths of a mile long. The bog occupies an irregular depression in a flat about 300 feet above sea-level. A creek originates in the bog and flows into the Noya River which flows into the ocean at Fort Bragg. The soil of this flat is almost pure sand known as Mendocino sand.

The bog is in a young stage of development in which the aspect is mainly given by *Ledum columbianum,* forming a dense growth four or five feet tall, and a large sedge (*Carex* sp.) which is a little taller than the Ledum and is equally abundant. Scattered *Myrica californica,* mostly five to ten feet tall, occurs much as in the bogs of the Oregon coast, and a low growth of *Gaultheria shallon* is also found. A robust species of *Sphagnum* forms a dense growth among the *Ledum* and *Carex* and forms many hummocks. The herbs identified are *Drosera rotundifolia, Hypericum anagalloides, Lilium maritimum* and *Gentiana* sp.

[1] "Fauna of the National Parks of the United States," Contribution of Wild Life Survey Fauna Series 1, 1933.

[2] Chairman of the Committee on the Preservation of Natural Conditions, Ecological Society of America.

The forest succession comprises small scattered trees of the three species—*Cupressus pigmya, Pinus muricata* and *Pinus contorta.* The first of these is the dominant one, though the last one shows occasional larger individuals (30 feet or more tall). Young specimens of the dominant tree (3 feet or less in height) are as abundant as the older ones (20 feet or more in height).

The plant community surrounding this bog is a scrubby forest of small trees (mostly 40 feet or less in height) forming a dense growth. It is largely *Cupressus pigmya,* but there is some *Pinus contorta* and an occasional specimen of *Pinus muricata.* The shrubby undergrowth in this forest is largely *Myrica californica, Ledum columbianum* and *Gaultheria shallon.* The first two of these grow much taller in the forest than in the bog. Herbs occurring in both forest and bog are *Lilium maritimum* and *Gentiana* sp. This forest forms a belt about two miles wide on the level stretch of Mendocino sand. Back of this is the redwood forest on good soil.

Borings made in this bog near the origin of the creek show three strata of peat. (a) A surface layer of living sphagnum, under which is dead sphagnum, little disintegrated and much mixed with roots of *Ledum* and *Carex.* This layer of living and dead sphagnum is mostly 12 to 18 inches deep. (b) A layer of sedge peat with many small roots and some wood. The depth of this layer is mostly 1.5 to 2 feet. (c) A mixed layer of mud clay, sand and wood about 4 feet deep. The wood in this layer, like that in (b), is in a fairly good state of preservation. The boundaries between these layers are not very distinct. The borings were made with a Davis peat borer, and the large amount of wood encountered made sampling very difficult.

Evidently this bog has been formed in a relatively flat, shallow ravine by a dense growth of sedges and other swamp vegetation on the accumulated mud, sand, clay and remains of woody plants. The sphagnum is a comparatively recent invader. Drainage in this bog is better than that in most Pacific Coast bogs and this may account in part for its lack of maturity.

Fort Bragg has wet winters and dry summers. The average monthly and annual precipitation in inches (37 years' record) is as follows: January, 7.71; February, 6.89; March, 4.89; April 2.45; May, 1.49; June, 0.42; July, 0.08; August, 0.04; September 0.81; October, 1.80; November, 5.01; December, 6.11; annual, 37.70. The only snow reported during the last 17 years is 1.0 inch in January, 1923. No temperature data are available for Fort Bragg, but the 45 years' record at Eureka to the northward shows an average of 51.40° F. and the 41 years' record of Pt. Reyes of 52.5° F. The monthly data for Eureka are as follows:

	Jan.	Feb.	Mar.	Apr.	May
Average ...	47.1	47.6	48.4	50.0	52.2
Highest ...	77	85	78	79	78
Lowest	20	24	29	31	35

June	July	Aug.	Sept.	Oct.	Nov.	Dec.
54.5	55.7	56.2	55.7	53.6	51.1	47.8
85	76	79	82	84	81	70
40	43	45	36	35	27	24

The maximum recorded at Pt. Reyes is 98° (September) and the minimum 30° (March). All the above data were furnished by the U. S. Weather Bureau office at San Francisco.

The character of this bog is of interest in the general problem of the occurrence and course of development of sphagnum bogs along the North Pacific Coast of America. It is reported that sphagnum forms considerable growths at various points in the forests of the coast of northern California, but detailed information about bogs formed by it is not available. This bog has much in common with the coastal bogs of Oregon, though it has not reached the somewhat mature stage shown by many of the Oregon bogs. Its forest succession resembles that in bogs of Oregon and Washington in including *Pinus contorta* but differs strikingly from them in the occurrence of *Cupressus pigmya.* The climatic conditions under which it has developed do not differ greatly from those under which the bogs of Western Oregon and Washington have developed.

The writer made his study of this bog on August 26, 1931. His first information in regard to it was received from Mr. W. G. Corbitt, and valued assistance in its study was given by Mr. V. B. Davis. He will welcome further information in regard to the occurrence of sphagnum areas in California.

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SEDIMENTATION AND SEDIMENTOLOGY

THE terms "sedimentology" and "sedimentation" are subjects of comment by W. H. Twenhofel in the *Bulletin of the National Research Council,* Report of the Committee on Sedimentation, 1930–1932, p. 18. Dr. Twenhofel considers the terms "sedimentation" and "sedimentationist" as more fitting designations than "sedimentology" and "sedimentologist" for "the range of geologic processes concerned in the formation of the sedimentary rocks" and for "a student of sediments," respectively. He rejects "sedimentology" because it contains "roots from two languages."

The choice of terms is perhaps not of great importance for the present. It has seemed advisable, however, to reconsider the question, because, whatever term is now adopted, it will be difficult to change when once entrenched in the literature.