PROCEEDINGS OF THE FIRST PARK NATURALISTS' TRAINING CONFERENCE

HELD AT

EDUCATIONAL HEADQUARTERS, BERKELEY
CALIFORNIA

NOVEMBER 1 TO 30, 1929

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

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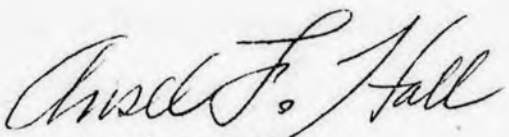
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INTRODUCTION

These Proceedings of the First Conference of Park Naturalists now make their appearance after some two years delay. The press of current administration in the rapidly developing Branch of Research and Education makes excuses for this delay unnecessary.

In distributing the Proceedings to park superintendents, park naturalists and other officers of the Service, we have aimed to present not merely an outline of discussions, but rather a condensed statement of the principles underlying the major fields of activity in the so-called "educational" work in the national parks. It is felt that this material has permanent value and will be of practical use in the field.



Ansel F. Hall,
Senior Naturalist,
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Field Educational and Forestry Headquarters
333 Hilgard Hall, University of California

Berkeley, California,
August 12, 1932.

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MEMBERSHIP OF THE CONFERENCE

Ansel F. Hall	Chief Naturalist, Educational Division, National Park Service	
Carl P. Russell	Field Naturalist, " " " " "	
Joseph S. Dixon	Field Naturalist, " " " " "	
George M. Wright	Field Naturalist, " " " " "	
John D. Coffman	Fire Control Expert, " " " " "	
George A. Grant	Photographer " " " " "	
C. A. Harwell	Park Naturalist	Yosemite National Park
Dorr G. Yeager	Park Naturalist	Yellowstone National Park
George C. Ruhle	Park Naturalist	Glacier National Park
C. Frank Brockman	Park Naturalist	Mount Rainier National Park
Frank T. Been	Park Naturalist	Sequoia National Park
Edwin D. McKee	Park Naturalist	Grand Canyon National Park
George L. Collins	Asst. to the Supt.	Lassen Volcanic National Park

VISITORS

Dr. E. D. Merrill	Dean, College of Agriculture, University of California
Dr. Joseph Grinnell	Dept. of Vertebrate Zoology, University of California
Dr. H. C. Bryant	California State Fish & Game Commission
Dr. Frederic E. Clements and Mrs. Clements	Carnegie Institution
Prof. Walter Mulford	Head of the Division of Forestry, University of Calif.
Prof. A.B. Recknagel	Division of Forestry, University of California.
Prof.Woodbridge Metcalf	U. S. Extension Forester, under Clark-McNary Act of California.
R. M. Holmes	Chief Clerk, National Park Service, Washington, D. C.
Prof. S. C. May	Director, Bureau of Public Administration, Univ.of Cal.
Prof. W. T. Horne	Division of Plant Pathology, University of California.
Prof. W. H. Davis	Manager, Stanford University Press
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Duncan Dunning	California Forest Experiment Station
A. E. Wieslander	California Forest Experiment Station
Chas. J. Kraebel	California Forest Experiment Station
Gerald Marsh	Instructor in Public Speaking, University of Calif. (Formerly of Yellowstone Educational Staff)
Joseph Slevin	Curator of Herpetology, California Academy of Sciences.
Frank Tose	Chief Preparator, California Academy of Sciences.
Mrs. Rose Taylor	Formerly Librarian, Yosemite Museum

THE FIELD OF EDUCATION IN THE NATIONAL PARKS

Program for November 6 and 7, 1929

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THE IMPORTANCE OF A PERSPECTIVE OF PARK EDUCATIONAL PROBLEMS

By Ansel F. Hall

"Perspective" is the key-note of this conference. Each one of you, as an administrative officer, handles such a complicated program of service to the public and of scientific service to the park that the multitudinous details -- were it not for the fact that you maintain a comprehensive grasp of the entire situation -- might very easily surround you and exclude the distant view of the enormous potentialities that lie near the horizon. You may personally have had excellent scientific training; you may know educational methods; you may be a brilliant success in your public contacts -- but without a broad perspective not one of you can be a successful Park Naturalist.

It has many times before been written into our Park Service records that a Park Naturalist must have three necessary qualifications: First, he must be well grounded in sciences; secondly, he must have administrative ability; and, thirdly, he must be specially qualified to interpret the natural features of his park to the public. The degree to which each officer's personality and training meet these requirements will determine to a large degree his perspective of the work which it falls his lot to administer, and, it follows, his success in this work.

In discussing this matter, "perspective", I want to specifically show how it plays a very important part in each field of a Park Naturalist's park program.

First of all, let us consider a man's scientific perspective. The trend of scientific training during the past several decades has been towards greater and greater specialization. The "old fashioned naturalist" who had a comprehensive scientific knowledge of trees, flowers, mammals, birds, insects, geology, and many other phases of natural history has practically ceased to exist. The reason is, of course, evident to all of us. The vast and fast accumulating mass of scientific knowledge now makes it practically impossible for any one man to be a master of all subjects, and therefore most scientists have in recent years adopted the policy of extreme specialization. I believe, however, that the world's greatest scientists, although they have penetrated deeply in their own specific subject, are oftentimes great because of their broad conceptions which entail not only a knowledge of their specific field but also an understanding of science as a whole It is this understanding of the field as a whole which gives one the scientific perspective which is so absolutely necessary for logical thinking whether it be turned in the direction of depth or breadth.

A broad scientific perspective is vitally necessary to each Park Naturalist. Without a well rounded knowledge, it is impossible to maintain a well planned program of service to the public or of scientific investigation. I would urge you, therefore, that without neglecting your own specialized field of science you make every attempt to broaden your scientific knowledge to cover all fields so as to develop the point of view so essential in the work you are administering. I believe that this is important not only in the administration of the work under your direction, but that it is also important to you personally; regardless of what your future work may be, it will have a definite value in your future whether this future is directed toward broader fields or in detailed technical activities.

Secondly, there is a necessity for each Park Naturalist to develop a broad perspective of the field of administration. A study of methods of business management or of the administration of various public activities such as schools, museums, etc., will be of great value in helping us individually to grasp the principles of administration of our own educational department. During the past two or three years the headquarters staff of the Educational Division has attempted to provide assistance to each Park Naturalist in developing the administration plan for the educational activities of his individual park. A still broader plan of administration has been prepared for the Educational Division as a whole. The main purpose of these administration plans has been to help individual Park Naturalists and other administrative officers of the Park Service to develop and maintain a perspective of the administration of the educational activities as a homogeneous unit, and therein lies their chief value. As documents they are not final but change from year to year; their vital importance lies in the principles which they codify.

Thirdly, it is important that each Park Naturalist develop a broad perspective of educational methods, and I greatly fear that many of us who received our training in science have had to learn by experience many of the principles which are clearly stated to students receiving their training in the field of academic education. An understanding of these principles of organized education is vital and I believe that each one of us should make it his duty to investigate this field, if he has not already done so. It is not only necessary for us to understand the principles of academic education but also vital that we understand principles of the new fields in which we are pioneering. One of the major objectives of this conference is to clearly define for ourselves the principles of each of our educational activities. It may be necessary to eliminate the discussion of certain details as they apply to individual parks, but the understanding of the principles involved is essential.

There is the fourth kind of perspective which each Park Naturalist should endeavor to develop personally, and that is a perspective of human nature, which will enable him to sympathetically understand each park visitor whom his organization serves. We might call this field "public psychology" but I believe that it is even broader and is more

nearly expressed by the phrase "sympathetic human understanding" with all that this may imply.

Let us, then, plunge into the work before us with the idea that the coming month will be spent in developing a perspective of our work as a whole and in each individual field in which our endeavors lie.

A DISCUSSION OF NATIONAL PARK STANDARDS

By Frank T. Been

In the preparation of this introduction to our discussion of national park standards, I found that these standards were very clearly and concisely presented in the leaflet "National Park Standards" prepared by the Camp Fire Club of America, whose statements have been approved by clear-thinking men and by the outstanding outdoor organizations of this country. Additions to this publication would be superfluous. Discussion of this important topic can be advantageously based upon the statements set forth in this pamphlet.

May I suggest that we review these standards in order to determine the worthiness of them? If they meet with the approval of this conference, should we not request Mr. Hall to submit a statement of his approval as it was determined during discussion in this meeting? If these standards do not seem to us high enough, let us prepare another set to present to the Director for his approval.

Perhaps the standards as presented by the Camp Fire Club are too high to be effectively maintained. For instance, in the outline of standards the object of the national parks seems to be mainly scientific and educational. The original purpose of the national parks was to preserve areas in their natural state for the enjoyment of the American people. In spite of their valuable scientific and educational possibilities, they are generally accepted by the public as areas of recreation. Shall we interpret "recreation" to mean only physical exercise in the out-of-doors, or has it a broader significance?

We are building more and more roads. Are we defeating the park principles by so doing? We are expanding the privileges given to concessions and hotels in the parks. Is this expansion becoming objectionable to park visitors? Standard No. 7 states that "parks must be kept free from industrial use". In the national parks large scale hotel developments are encouraged with the justification that they are necessary for the accommodation of the park visitors. If the parks are to be sanctuaries for inspiration and nature education, we may be obstructing their purpose by permitting large hotels because the people who patronize them are primarily pleasure seekers. If there were no hotels, these people might use the government campgrounds where they would be closely surrounded by the wonders of the park.

Being forced to live this close to Nature, they might be more readily affected by the wonder and beauty than if they were surrounded by bellboys, waitresses, lavishly appointed suites and lobbies, steam heat, etc. It may be maintained that the people using these places are a small percentage of the park visitors. We may grant that, but I feel that large hotels and busses are out of place in areas where nature is to be preserved, and the presence of these is benumbing to the people who appreciate nature, and they detract from our efforts to instil an appreciation of nature. Every day during this past summer I heard objections expressed concerning these concessions. If there must be accommodations maintained for train travelers, I contend that they should be conducted in the simplest manner possible because love and appreciation for nature cannot be inspired in ultra civilized surroundings.

As the parks are today conducted their outstanding attraction is "recreational", in spite of the fact that park standards place recreation last in consideration. If they are to be preserved as natural areas, people must be attracted to them for their natural attractions and not for their recreational possibilities. To draw people to our parks we have stressed fine roads and comfortable hotels rather than the knowledge to be gained by visiting them. In short, our whole plan of administration thus far has been largely centered around recreational use, but if appreciation in Nature is to be the primary purpose, we may find it necessary to take drastic steps to change our methods.

References: National Park Standards. By Camp Fire Club of America.
Essential Facts of War on National Park System. By The National Parks Association.
Educational Activities in National Parks By Ansel F. Hall.
Studying Nature in Place. By Chauncey J. Hamlin.
Administration of the National Parks of the United States. By Stephen T. Mather.
Investigations for the site of a national park in Japan. By Sazo Ujihara.
Nature preservation and national parks in Japan By Keiji Uyehara.
(Last five taken from Proceedings of the First Pan-Pacific Conference on Education, Rehabilitation, Reclamation, and Recreation)
National Parks and National Monuments. By E. Lucy Braun.
Union of Interests and Management of Natural Areas. By V. E. Shelford
(Last two taken from Naturalists Guide to the Americas).

Note: Following each paper presented at this conference the subjects thus introduced were discussed in detail, the park naturalists and other members present expressing their views. In each case an effort was made to arrive at a consensus of opinion, and these conclusions recorded - only in exceptional cases involving a difference of opinion - is the discussion reported verbatim.

The lively discussion precipitated by Mr. Been's paper on National Park Standards hinged around the following important questions:

1. Are the parks being "over developed"?
2. Is mass production mitigating against effective educational work and should we attempt to limit the numbers served?
3. What is the correct interpretation of "recreation"?
4. National Park Standards.

1. Are the parks being over developed? It was agreed that:
   A. Accommodations should not be limited to any one class as, for example, camp grounds for automobile tourists or hotel camps, but instead that there should be all scales of accommodations provided by public service operators and the government within the parks and that this should be required by the Park Service as warranted by physical conditions. This is advisable as it will result in visitors having accommodations similar to those to which they are accustomed in every day life and will not make necessary a personal readjustment which might interfere with their physical, intellectual and inspirational enjoyment of the park.
   B. At the earliest possible moment a survey of the parks should be conducted by the administrative department of each individual park with the cooperation of the engineering, landscape and educational divisions, to determine definitely upon a permanent plan of land use which would definitely limit utilization as follows:
      (1) Areas of intensive use by large numbers (centers of population, roads, etc.)
      (2) Wilderness areas penetrated by trail only.
      (3) Wilderness reserves or research reserves to be protected against all outside influences and not penetrated by the public.
   C. It is felt that the setting aside of areas of intensive use and the provision for physical necessities and comforts of the visiting public within these areas will very definitely result in lessening the damage to virgin areas of the park, and will make for the closer realization of the ideals set up under the "National Park Standards".

2. Is mass production mitigating against effective educational work and should we attempt to limit the numbers served? A lively discussion on the advisability of limiting the numbers served by the educational division in order to provide for the opportunity of more intensive service resulted in the conclusion, that:

   A. All park visitors are potentially interested in the educational program and that any attempt to limit the number of park visitors would essentially mean limiting our educational possibilities.

   B. That an opportunity should be given to all park visitors to voluntarily take advantage of the service offered by the educational division and that their acceptance or rejection of the invitation will, for the present, be the extent of our "selection".

   C. That it is the duty of the Park Service to meet the needs of the great number of park visitors by an increase in staff which will adequately take care of both physical administration and interpretation of major features.

3. What is the correct interpretation of "recreation"? After much discussion on this subject it was concluded that the word "recreation" as applied to the national parks should include physical, mental, and inspirational elements and that our educational program should be directed toward the realization of the latter two features without losing sight of the first. All members of the conference are agreed that the term "physical recreation" should be substituted for the word "recreation" in the pamphlet National Park Standards and other Park Service records.

4. National Park Standards. The pamphlet, "National Park Standards" was read and discussed as a whole and then each individual paragraph was discussed in detail. The results of this discussion were as follows:

I

> "National Parks are spacious land areas essentially in their primeval condition and so outstandingly superior in quality and beauty to average examples of their several types as to demand their preservation intact and in their entirety for the enjoyment, education, and inspiration of all the people for all time."

We believe that this definition should be modified so as to also include areas of outstanding archeological and historical interests.

We also suggest that the phrase "in their primeval condition" be modified to read "in their primeval condition or as nearly primeval as circumstances permit". This would justify the setting aside of such areas as the Great Smoky

and Shenandoah National Parks, and similar areas which might conceivably be added to the park system in the future.

We question whether national parks should be defined as "spacious land areas", and suggest that it might be advisable also to include a statement as to the quality of the exhibit regardless of area. As an example, we cite Bryce National Park which occupies a comparatively small area but which is a superb example of one of our types of natural features.

"It follows:

1) That park areas must be of national interest to warrant their commitment to national care."

Concurred unanimously.

2) "That the area of each park must be a logical unit, embracing all territory required for effective administration and for rounding out the life zones of its flora and fauna."

The Park Naturalists especially endorse this statement and are agreed that boundaries should be adjusted to include sufficient areas to guarantee a year round habitat for fauna and flora. Furthermore, it may be advisable to add biotic and scenic units even though it be necessary that these be set up as separate administrative units.

3) "That each park area shall be a sanctuary for the scientific care, study, and preservation of all wild plant and animal life within its limits, to the end that no species shall become extinct."

We interpret this paragraph as also including predatory animals.

4) "That wilderness features within any park shall be kept absolutely primitive."

We agree as to the value of the objective of "preserving wilderness features in primitive condition", but we question whether this is practicable. We ask, "What shall be the policy to be adopted in the control of insect infestations, tree diseases, diseases of park fauna, and forest fires occurring under natural conditions (lightning, etc.)?" While not recommending the discontinuance of such artificial control, we wish to point out that such control very definitely influences "natural conditions".

5) "That with respect to any unique geological formations or historic or prehistoric remains within its confines each park shall be regarded as an outdoor museum, the preservation of whose treasures is a sacred trust."

Unanimously concurred.

6) "That the existence of the parks is justified and insured by the educational and spiritual benefits to be derived from contact with pristine wilderness."

We suggest that this read, "spiritual, educational and physical benefits".

7) "That parks must be kept free from all industrial use, and that sanctuary, scientific, and primitive values must always take precedence over recreational or other values."

We feel that "industrial use" should be more definitely interpreted to mean any commercial use not directly essential to the tourist or park administration.

We feel that this entire statement needs a more definite interpretation. Our interpretation of the term "recreation", as noted above, is that it includes physical, mental and inspirational elements, and also we feel that the epxression "or other values" needs amplification.

II

"National Parks must be considered from two points of view: as a system, and individually.

The National Park System should be perfected: (1) by elimination of units that fail to meet its standards; (2) by addition of units that will fully maintain or increase its supreme scenic magnificence, its scientific and educational superiority, and its character as a unique national institution; and (3) by withdrawal of existing legislation authorizing in certain parks the utilization of resources in a manner inconsistent with National Park Standards."

Unanimously concurred.

"National Parks should differ as widely as possible from one another in their physical aspects, and the National Park System should represent a wide range of typical land forms of supreme quality."

We suggest that the phrase "a wide range of typical land forms of supreme quality" be modified to read "a wide range of typical land forms, biotic communities, or extensive archeological or historical exhibits of supreme quality."

We further suggest that the word "typical" be omitted as being inconsistent with the phrase "supreme quality".

> "To preserve the National Park System, it must be recognized: (1) that any infraction of standards in any park constitutes an invasion of the system; and (2) that the addition to the system of any park below standard lowers the standard of the system. Every proposed use of any park in defiance of National Park Standards and the admission to the system of any park falling short of the standards must be resisted. Areas essentially of state-park caliber or primarily of local interest must not be admitted to the National Park System."

Unanimously concurred.

Section III of National Park Standards is repeated below with the paragraphs numbered for purpose of discussion, which follows:

> 1. The first official step toward National Park creation by Congress is the introduction of a bill. According to Congressional precedent since the beginning of the system in 1872, the bill is referred to the Committee on Public Lands, which in turn refers it to the Secretary of the Interior for a report on its standards and availability.
>
> 2. The Secretary of the Interior refers the bill to the National Park Service for examination of the area and for report back to him. Such examination should be made at the expense of the National government, not of the local community which would profit by the park's creation. In this procedure lies the great safeguard of the standards.
>
> 3. Exact metes and bounds from studies made by the National Park Service should be established by Congress in the organic act of every new park.
>
> 4. Congress should not empower individuals, committees, or commissions to choose new National Parks or to determine their contents and boundaries, but it should depend upon the government's one permanent expert park organization, the National Park Service, which alone possesses the requisite knowledge, tradition, and experience, united with responsibility to the people.

5. Committees to consider boundary problems should be strictly advisory to the National administration, to which alone they should be empowered to report.

6. National Parks and additions thereto should be created only from lands now in the possession of the Federal government or from areas presented to the government free from private holdings.

7. Land offered for creation of a new National Park, whether in national or private possession, should not be considered by Congress, nor should the proposed park be promoted, until it is thoroughly studied by the National Park Service and found fully up to standard.

8. Areas required to round out existing National Parks should be added at the earliest opportunity, but only if recommended by the National Park Service; and wherever possible , park areas should be rounded out so as to include feeding grounds for the wild life found therein.

9. It is the fixed policy of the Federal government to purchase no land for new National Parks, but it should purchase at once alienated areas within the boundaries of existing parks. This distinction is fundamental and exceedingly important.

10. All existing National Parks now up to the standards set forth should remain as created, subject to modification only upon the favorable recommendation of the Secretary of the Interior and the Director of the National Park Service, based upon expert investigation.

11. National Parks not up to National Park Standards should be transferred to some other classification in the national domain or turned over to states for local care and use.

12. Appropriations should be adequate to enable the National Park Service to protect existing parks and their forests against fire, vandalism, and any other agencies of destruction, and to maintain the system in accordance with National Park Standards."

Referring to paragraphs 1, 2, 4 and 5 above, we are agreed that it would be desirable to have the investigation of an area conducted prior to the time that the bill is introduced in Congress.

We believe that more study should be given to the question of whether the proposed national parks should be investigated by:

(a) solely the National Park Service;

(b) the National Park Service in co-operation with advisors appointed from without the government service, or;

(c) by either or both of the above agencies in cooperation with other government bureaus.

Paragraph 3 of Section III is unanimously concurred.

In considering paragraph 6 of Section III, we believe that the criterion for the creation of a new National Park or an addition to a National Park should be principally whether or not the area meets the National Park standards as defined above. We believe that if the area in question does meet these standards, the government should take a definite part in its acquisition rather than leaving it solely to private initiative.

Paragraph 7, Section III, unanimously concurred.

Paragraph 8, Section III, unanimously concurred.

Paragraph 9, Section III, referred to discussion of paragraph 6 of this section.

Paragraph 10, unanimously concurred.

Paragraph 11, the phrase, "turn over to States for local care and use" was questioned by several delegates, who held that there was danger in including this phrase and that it might be inadvisable to provide for reclassification only in this manner. Other delegates approved the phrase as it stands. No unanimous decision was reached.

Paragraph 12, concurred unanimously.

IV

"In administering National Parks and keeping the system up to standard, it is important:

That development of parks as units be planned

with a view to their coordination as parts of the system. Interpark highways and air lanes, for example, should be planned from the systemal point of view."

Unanimously concurred.

"That each park be administered individually for the development of its highest usefulness to the people of the nation first, and thereafter to the people of its neighborhood."

Unanimously concurred.

"That no industrial use be permitted. For example, no logging should be permitted on park lands, by exchange or otherwise."

Refer to remarks above under Section I, paragraph 7.

"That scientific, educational, and inspirational values dictate the major uses of parks.

We suggest that this paragraph read that "inspirational, educational, and scientific values dictate the major uses of the parks".

"That cultivation of crowds for the sake of records or profits, and the introduction of the pleasures of ordinary roadside and mountain resorts be regarded as a violation of National Park Standards."

Unanimously and heartily endorsed.

"That scientific administration be applied to the maintenance of every park standard, and particularly to the preservation of wilderness, wild-life, and geological features."

Unanimously endorsed. We consider this paragraph particularly important.

"That a suitable educational program be developed, using the natural features of the parks as instructional material. The National Park Service should inform the public concerning park aims and emphasize the necessity of caring for irreplaceable objects of natural and scientific interest."

We suggest that the phrase "irreplaceable objects" be changed to read "all objects".

> "That roads be developed in each National Park only for the purpose of protection and to bring the public in touch with the principal features of the park. In no case should they be built where they would in any way impair natural features. Wilderness and sanctuary areas should be reached by trail only,--such areas to remain undeveloped."

Unanimously endorsed. In this connection it is suggested that at the earliest possible moment the Park Service announce a permanent land classification plan for all areas within each individual park, certain areas being reserved in wilderness, others developed only by trails, and others allocated to permanent intensive use. Such a classification should be based on a study from the protective, administrative, engineering, landscape and educational points of view.

> "That airplane landing fields, as in the case of railroad stations, be located outside park boundaries. They should be considered only for the needs of interpark flights. Flying across National Park areas should be closely regulated."

Unanimously endorsed.

> "That any park buildings be as unobtrusive as possible, harmonizing with their surroundings. They should be erected only where necessary for the protection of the parks and the comfort of the public, and at the locations where they will least interfere with natural conditions."

Unanimously endorsed.

> "That concessions be granted only for such business as is necessary for the care and comfort of visitors, and then in definitely localized areas. Such concessions should not interfere with the rights of individuals under park rules to provide for themselves while visiting the parks."

Unanimously endorsed.

> "That recreational use of any park be confined to roads, concentration locations, and trails so chosen as to interfere as little as possible

with major uses and not at all with the rights of future generations to enjoy nature unmodified."

We believe that this statement should specify the types of recreational use to be so regulated. Our conception of recreation is expressed above in the section preceding the discussion of the pamphlet "National Park Standards".

THE PARK VISITOR

By Dorr G. Yeager

Since time began, man has inquired into the nature of that which puzzled him. He has attributed some explanation to its cause, either supernatural or scientific.

Every year thousands of visitors are flocking to our national parks eager not only to view the wonders contained therein but to learn what they can concerning them. It is, therefore, our duty to interpret these wonders to the park guests in as simple a manner as possible. In order to perform this duty with the greatest efficiency it is necessary for us to understand thoroughly the visitor's point of view.

Let us take the average visitor entering one of our national parks. There is something awe-inspiring about the word "government" to the average person. He knows that he is on government ground and he feels that he is being constantly watched for the slightest misdemeanor. Our first duty, therefore, is to establish a friendly relationship with the tourist at the outset. This can be done only by the men at the gate. If the tourist is made to feel that he is welcome the battle is half won.

In interpreting park phenomena to the visitor, I feel that the most important thing, at least the thing which I am striving hardest in Yellowstone to avoid, is the practice of "talking down" to him. This tendency is probably the result of attempting to counter a weakness that is equally vicious, that of using language too technical for the average person to understand. In attempting to get away from this a guide or lecturer may make a subject rediculously simple and thereby give his audience the idea that he is "talking down".

I firmly believe that in dealing with a park visitor and explaining the phenomena to him, all things taken into consideration, we should resort to methods used to teach a child of 15 years. This is not intended as an insinuation that the average visitor is mentally deficient. It simply means that the average person, not trained in science must be treated as a 15 year old child when scientific principles are being explained. We must, however, guard against the tourist knowing this. Even though his scientific faculties are of a child he must be treated as an equal an admittedly difficult task but one vitally necessary to the success of the work.

Many other matters should be considered from the point of view of the tourist. My assistant has often said to me that the tourists, as sheep, require herding; and we have all heard the remark from rangers similar to "riding herd on dudes". I am convinced that there is much truth in this statement and that a tourist group, as any group, can be handled best with mob psychology. From the time a tourist enters the park gate, especially be he a rail traveler, he is herded. Necessity demands that these measures be adopted, deplorable as it may seem. In a certain type of guiding which we are attempting at Old Faithful next year we are relying largely on the "herd system". That is, the crowds from one guideparty will be fed on to the next guide.

During the past season several complaints came to my office from park operators that the tourist did not have time to do anything all day long and that he was herded from the time he got up till the time he retired. The source of the complaint being in the operators, the cause may be well imagined. The fact, however, remains that tourists are herded. Unless they are pushed from one lecture or guide trip to another they will not attend, either because they knew nothing about it or because they were inclined to sit in the hotel or lodge lobby over a good cigar.

In this discussion I have considered the factor of totals as one of the most important things. The matter of herding can be reduced to a minimum only when the Park Service recognizes quality instead of quantity, as of prime importance in our work.

In closing, I want to read an article in the 1929 Ranger Naturalist Manual for Yellowstone which deals with this problem.

THE TOURIST AS A CRITIC

By Dorr G. Yeager, Park Naturalist

Someone has said that America is not a nation of critics. That we are satisfied with the surface and that we do not investigate. However true that may be of the nation as a whole, I believe that every experienced ranger naturalist will agree with me, and the new men will admit before the coming summer is over, that it is not true of the Yellowstone tourist.

Because the Yellowstone tourist is a critic, because he is interested in his surroundings and because he is very likely to know as much about the subject upon which you are talking as you yourself do. It is the duty of every naturalist to watch carefully the statements which he makes.

The critical Yellowstone visitor falls into one of two classes: those who criticize for the pure love of trying to make someone else miserable, and those who want to be helpful and give constructive suggestions for the work.

The first is by far the most difficult to handle. He will ruin a lecture or a guide trip if he possibly can. He will make life miserable for the guide and the party in general. He will attempt to belittle everyone in order to display his own knowledge of the subject, which is usually scant. In a previous article I pointed out the necessity of a ranger naturalist being a diplomat. This is especially true with a person of this sort. When one is in your party or audience it is a case of prevention instead of cure, and you can always take it for granted that you have one with you. Pick your statements carefully. Pick those statements that will offend no one nor cast reflections on any creed or nationality. I well remember an incident that occurred a few seasons ago. A naturalist at Mammoth thoughtlessly offered up a prayer to the Devil upon entering the "Kitchen" on the formations. It was a good prayer, too, but it offended certain people and reports kept coming in that the naturalists were sacrilegious. It was necessary to do away with prayer in that case. On another occasion several years ago a naturalist caused a near-riot by speaking lightly of a past president. It was carelessness on his part, as no Government man in uniform should ridicule either present or past administrations. I well remember a story I used to tell at lectures which illustrated a certain point. The story had to do with why it was always the woman who asked the foolish questions in Yellowstone. I soon found out that I must eliminate this story, as it invariably struck home to some woman in the audience.

There is another thing, which has no direct bearing on the subject, but which might well be taken up here. In the above paragraph I used the phrase "foolish question". It is a byword in the Park during the summer. However, I believe all of the men who have spent several seasons in Yellowstone will admit that there is no such thing as a foolish question. When you first hear questions of this type you will likely disagree with me. However, if you stop and analyze it you will find that the person was really trying to find out something

and that it was the wording rather than the context of the question that made it sound foolish. Such questions as "Do the hot pools freeze over in the winter?" and "Were the trees in the formations always dead like that?" are really not so foolish if you get down to the thought behind them. Again I say, it is the wording rather than the real context that sounds foolish. Never let a tourist know that his question amuses you. Even though the rest of the audience laughs, keep a straight face and explain what the person really meant to say before answering it. Then, after the lecture, you may laugh and nine chances out of ten the person who asked the question will laugh with you.

Then the second type of person, he who criticises from a purely unselfish and helpful motive. One thing I have found. The man who really knows his subject will seldom criticise or argue with you in front of a crowd. He will wait until after the lecture and then come to you quietly and talk it over. You need never worry about this man. He probably knows more about the subject than you do yourself. He may be a renowned scientist, for all you know. Talk it over with him and thank him for making the suggestion. It is from that type of man that we can learn much if we will let ourselves.

I think you will be able to see why it is necessary to lay so much stress on accurate information, as well as statements that will offend no one. It is not an easy job, but it pays in the end and it is the only way that the standard of the Ranger Naturalist Division can be maintained."

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2. The Park Visitor. - Dorr G. Yeager

During the discussion which followed the above paper, Park Naturalist Dorr G. Yeager brought out the vital necessity of studying the needs of the park visitor, particularly in parks like Yellowstone where they follow a definite routine schedule which has already been arranged before they enter the park. The question was raised as to whether or not we could eliminate the "herding" necessary under present conditions when such large numbers of visitors wish to take advantage of guided trips. Mr. Yeager reported that he plans to try out a new system at Old Faithful next season; namely, of conducting a guide trip after each eruption of Old Faithful. He states that this is expected to somewhat reduce the number of visitors on each guide trip. The only permanent solution of this problem however

which could be suggested by the members of the conference, was a sufficient enlargement of the educational staff, to provide for more guides and thereby increase their effectiveness by diminishing the number of visitors in each park.

Another point brought out by Mr. Yeager was the danger of overdeveloping an educational program. He stated that some persons claim too many lectures are now offered in Yellowstone National Park and that they are almost forced to listen to them. On the other hand, however, an equal or greater number of visitors recommended the further extension of lectures, guided trips, etc. The matter was discussed in detail. It was agreed that it is advisable to hold the lectures in government auditoriums or other points within easy reach of visitors, and that as soon as possible lectures within hotel lobbies and elsewhere on the premises of the public utility operators be transferred so that no visitors have the lectures foisted upon them. Under these conditions, then, a system of lectures can be developed which adequately meets the needs of the visitors; the extent to which the lecture system will be developed shall be determined by a careful study of the situation within the park.

THE PURPOSE OF EDUCATIONAL WORK IN NATIONAL PARKS

By Dorr G. Yeager

Time was when circumstances forced the American tourist to assume the role of sightseer only. He had a keen interest in what he saw but he feared to ask questions because of the attitude of the early guides who took it for granted that every tourist was a fool and was naturally the object of much humor. The two situations were anything but conducive to educational work.

But times have changed and the sympathetic guide now works hand in hand with the knowledge-seeking tourist.

What is the purpose of the educational work in our National Parks? We find many statements in our park and educational literature. Mr. Albright makes the following statement in the 1927 Ranger Naturalist Manual for Yellowstone:

> "We are the faculty of the biggest summer school of nature study in the world--a school of 200,000 pupils! Our glorious task is, in John Muir's words, 'to entice people to look at Nature.'"

Again, Mr. Hall states in the "Proceedings of the First Pan Pacific Conference:"

"Through the Educational Division the National Park Service is endeavoring to help every visitor to enjoy these great areas with an enjoyment based upon understanding. That, if you please, is the keynote of all our educational activities."

In Dr. Frank Oastler's Report on Educational Survey, National Park Service, Summer of 1928, we find the following statement:

"The purpose of this educational program is to enable those who visit the National Parks to obtain an accurate interpretation of the natural phenomena presented by each park and peculiar to it, in order that they may carry away with them a greater appreciation of the value and delight in a better knowledge of those expressions of nature."

In my opinion, the idea that our main duty is to teach and interpret the park phenomena to visitors is only half true. The average tourist on a vacation does not want to go to school. Far greater, it seems to me, is our task of interesting the tourist in Nature, or in the above words of Muir, "to entice people to look at Nature" and, I will add "to keep on looking."

In a recent article which I wrote for the 1929 Ranger Naturalist Manual I made this statement: "It matters not to me if they have learned what a wild geranium is, or whether they can distinguish a Clark's crow from a grasshopper. What does matter is whether they have been left with an aroused interest in living things. Whether or not that interest has become so aroused that they will not stop at learning a wild geranium but will continue in this great field of knowledge and delve further and further into the mysteries of Nature."

That, it seems to me, is our main objective and one that I have always attempted to carry out on every guide trip. Our duty is to teach, to be sure, but our duty does not cease there. If we arouse an undying interest in Nature the teaching will automatically follow, and I may go a step beyond and say that if that interest is great enough a guide or lecturer will be unnecessary.

Our activities in national parks are many fold. The informational activities are carried on largely through the mediums of lectures, field trips and museums. Of these, museum interpretation is by far the most difficult and my theory of "arousing interest" is the hardest to carry out, as the printed label must in many cases be the only guide. For this reason, I am inclined to think that the label is the most important part of the entire exhibit. Given two exhibits, one of a deer poorly labeled and one of a chipmunk with an instructive label. Naturally, the deer will attract more interest for the time being but the chipmunk exhibit will leave a more lasting impression and will tend to push the visitor further on his search for more facts.

Our duty then in the educational work is not alone to teach; not alone to interpret; not alone to inspire. The three must be combined so skilfully, so subtly that the visitor upon leaving has, through our teaching and interpretation, obtained an entirely new outlook upon nature; an outlook which will not dim with his passage through the park gates but which will become ever brighter as he continues to seek out truths for himself.

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The above paper was discussed in detail but no new principles were added. An objection was raised to the statement in the first paragraph as to the opinion of early guides on the subject of park visitors. This matter, however, was allowed to stand as it does not apply to the lectures or guides of the present regime.

WHAT ACCEPTED ACADEMIC METHODS CAN BE APPLIED TO EDUCATIONAL ACTIVITIES IN THE PARKS?

By C. A. Harwell

Our park visitors come away from their vocations to find relaxation for a time in an avocation which is greatly increasing in popularity, out-of-doors activities, as camping, hiking, and the study of things of Nature in their natural setting. They come to our parks in a very receptive mood. The quiet beauties of the park grip them. The stupendous spectacle of massive cliffs, great waterfalls, grand canyons, glaciers, geysers, lakes and other natural phenomena fill them with wonder. They become eager to know the why of these things.

To satisfy this insistent questioning for truth the National Park Service established an educational service. A system of nature guiding, lecturing, museums, exhibits, nature trails and publications has been developed to answer many questions before they are asked and to teach the park visitor the truth concerning the stories of at least the outstanding features without his becoming aware that he is being taught.

Distinct methods are being employed to accomplish the results. Leading people afield under the leadership of well trained ranger naturalists,

where the purpose of all including the leader is to explore in the field of Nature, is the method we emphsize as most important.

Lecturing to groups where they may be found available and where the man to lecture can be made available, illustrated either by the objects themselves or by slides, is the method perhaps receiving second place in emphasis.

Setting up exhibits in place or in more easily accessible locations where the visitor is assisted in finding out for himself what he is interested in learning about park features is perhaps our method of third importance at present.

Nature trails are still experimental. In method they perhaps do not differ from that of museums and exhibits in place. Publications are not so much concerned with method but apply more to extending our work to outside groups.

In our guided trips we are more nearly approaching the project method than any other of the accepted academic methods. There are four types of projects provided in classroom procedure: (1) those involving the achieving of ideas, (2) those involving appreciation or enjoying, (3) those involving problem solving, and (4) those involving knowledge or skills and requiring practice or drill. In some ways we make use of all four types. The first two are perhaps stressed in our general work. In children's trips, in our special interest trips such as those scheduled regularly for flowers or birds, in our work with special groups such as Scouts or in Yosemite with our Yosemite School of Field Natural History, we use all of them working for the acquirement of special knowledge and skills.

As this is now recognized as the best in educational methods it should be the one most often used by our men. To "learn" a lesson and be thorough with it is one thing; to "love" the subject as a result of the learning and to desire to learn outside the class when coercion is withheld is quite another. We want our visitors to be stimulated to want to know more and to "love" the subject matter we have to present.

Lecturing is an accepted academic method where groups are to be reached. Properly organized, properly illustrated and above all well presented, they serve a large purpose in our educational activities.

Visiual aids are being treated as more and more important in all programs of education. We are well ahead of academic education in this field. Each park is a great museum with the outstanding "pointed" out. Our museums from which the exotic is carefully eliminated and in which all materials are arranged to illustrate one big story, fit well into our general method.

It can be safely stated that the best of the academically accepted

methods fit very well into our National Parks program of educational activities.

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The above paper was discussed in detail and the following additional points brought out:

A fertile field for park educational activities, one which has scarcely as yet entered into our program, is that of "Extension", i.e., lectures, radio talks, etc., outside of the park proper.

Another suggestion which was discussed in detail was the utilization of laboratory methods as useful in certain places in the presentation of the park educational program. It was agreed that it might be advisable to experiment with the introduction of simple laboratory experiments conducted either by the ranger naturalist or by the visitor himself as demonstrations during field trips and lectures at the museum, etc. We have as yet scarcely entered this field, but it may present splendid possibilities if carefully studied.

NEW METHODS OF OUTDOOR EDUCATION

By Edwin D. McKee.

Undoubtedly the most important factor in the practice of outdoor education, and one which is becoming more and more to be recognized with the development of this type of education, is the use of an exhibit in place and in its true relation to all surrounding objects. This importance cannot be overemphasized. Simple and elementary as it may perhaps appear it has been definitely shown to be the real secret of obtaining genuine interest, as well as the best method of demonstrating the scientific principles involved. Schools and colleges apparently are just beginning to realize this factor for it is only within comparatively recent years that they have organized summer field parties in geology and biology--or indeed even organized

any field trips whereby the students may see their theory put into practice. The rapid and recent growth of such applied practical methods in our principal academic institutions is proof of their success.

To be more specific in the relation between the National Park educational work and the principle just mentioned, it may be well to examine some of the methods which are now being tried out by Dr. John C. Merriam, President of the Carnegie Institution of Washington. After several years consideration and experimentation by Dr. Merriam and by a committee consisting of about a dozen others of the country's leading scientists, a general decision and agreement along these lines has been definitely reached. The Yavapai Observation Station at Grand Canyon has been the object of experimentation. It is probable that many such stations functioning in a similar manner will appear in time at other localities and in other parks. In the case of the Yavapai Station the Grand Canyon itself is used as the main exhibit in explaining and demonstrating the great truths which it is so capable of presenting.

These truths have roughly been classified under five heads: (1) the story of erosion, (2) the crustal movement of the earth, (3) the processes of sedimentation and rock forming, (4) the geological evolution, and (5) the modern life zone principles. As an aid in explaining them numerous tubes and telescopes fixed on certain carefully picked exhibits are arranged on the parapet wall. Beside these are placed carefully worded cards of explanation, and a few very fine exhibit specimens which will assist materially in giving a clear understanding. By no means are other specimens, ones which perhaps are very excellent but which are of a general nature or do not bear a direct relation to the story, to be anywhere in the vicinity. They are merely distracting and serve to break up a train of thought which might otherwise persist. At Yavapai there is an inner exhibit room in which are placed still other and more detailed explanations and specimens which demonstrate the same five points indicated by the telescopes on the parapet. These center around some very fine and carefully made transparencies which serve to show the true relationship to the Canyon itself as seen from the porch.

Another and related method of outdoor education which is of rather recent origin is the nature trail, especially what is commonly termed the "Self Guiding Trail." The value of this is unquestionable. It has been tried out in many places and, I dare say, almost always with success. The methods used will be discussed in the regular program so I will not attempt to go into explanatory details now.

Additional new methods of outdoor education which might be utilized in the parks were brought out by other members present, as follows:

Exhibits of cut wild flowers playing an important part in the educational program in several parks. The maintenance of a good flower display,

however, requires from one quarter to one half a man's time, and therefore Park Naturalists are urged to study the educational effectiveness of each individual flower exhibit so as to determine whether or not it justifies the time being expended upon it.

Wild flower gardens were suggested as being exceedingly important inasmuch as they are more attractive to the visitor, and once established require less time for their maintenance than does the cut flower exhibit. Experimental wild flower gardens have been started in several national parks and should be carefully studied by the Park Naturalists so as to determine their effectiveness in the public program and to develop the best methods of establishment and maintenance.

The utilization of wild flowers on dining room tables was discussed and it was concluded that the use of wild flowers for this purpose would be discouraged except that when in the opinion of the Park Naturalist, and with the approval of the Park Superintendent, flowers can be so used without detriment to the native flora. In every case where flowers are so used they should be labeled and each Park Naturalist should make arrangements for this to be carried out by a member of the operator's staff, in cooperation with the government educational staff.

Park Naturalist Harwell briefly reported the inauguration in Yosemite of the daily "auto caravan" to points of geological interest which are too far away to be reached afoot. This experiment seems to have proven a success and should be tried out in other parks in connection with the program of current service to the public.

Another possible development of new methods not at present used widely in the park educational program is the production of mimeographed or printed trailside notes for the motorist, trail guides for the hiker, museum guides and natural history leaflets, the latter to be distributed where their use will be most effective.

THE "POPULAR" INTERPRETATION OF SCIENCE

By Carl P. Russell

In searching for an avenue of approach to the subject I found very little in the way of published material which would suggest ideas. I turned to a study of the question, "What agencies are attempting to popularize science?" and disclosed the fact that activities in this line of endeavor are numerous and wide spread. As examples of the active agencies in popularizing sciences the following may be cited:

American Nature Association. "--to stimulate public interest in every phase of nature and the out-of-doors, and dedicated to the practical conservation of natural resources of America." Publishes Nature Magazine. A scientific consulting board checks published material.

American Game Protective Association. -- Publishes monthly journal - Bulletin of American Game Protective Association. Conducts researches in problems pertaining to game.

National Conference on Outdoor Recreation. -- Cooperative association of many organizations interested in promotion and development of one or more kinds of recreation, in the use of which the land, water, forest, plant, scenic or wild life resources of the U. S. figure. Publishes bulletins from time to time.

National Association of Audubon Societies. -- Devoted to protection of birds and animals. Publishes Bird Lore, bird pictures and leaflets and various bulletins and pamphlets on birds.

American Forestry Association. -- Founded on the principle that education is the basis of proper care and use of our forests. Publishes American Forests and Forest Life.

National Parks Association. -- To promote the educational and inspirational use of the National Park System. Publishes National Parks Bulletin.

U. S. Bureau of Bilogical Survey. -- Investigates the economic relations and environmental needs of wild life in general. Results of investigations are made public. Publishes in the bulletins and other series of the Department of Agriculture. Publications cannot be called popular but personnel of bureau cooperates with most of the organizations engaged in popularizing science.

Izaak Walton League of America. -- Exercises preventive measures against the pollution of streams, destruction of forests, and promotes conservation of natural resources in general. Publishes Outdoor America to which scientists contribute.

Science Service. -- Cooperates with the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science for the popularization of Science. Publishes Science News Letter.Weekly.

When we attempt to analyze the motives that prompt the activity of these organizations we find that conservation of natural assets is in almost every instance the object in their endeavors. They strive for (1) preservation of fish and game, (2) preservation and appreciation of general fauna, (3) preservation and appreciation of general flora, (4) preservation and appreciation of physiographic features, and (5) establishment, preservation and appreciation of natural land areas.

It is hardly necessary to point out that all of these endeavors coincide with the activities in which we are engaged, and that we may rightly be listed as one of the most important agencies now giving popular interpretation of Science. Dr. J. D. Merriam, in a recent memorandum to the Director of the National Park Service states, "the opportunity (for popular interpretation of science) - in national parks - exceeds that of any great educational institu-

tion or group of institutions, and it is essential that there be leadership of the highest type for definition of the problems, furtherance of the researches, and for selection and guidance of the men to assist the public in understanding the material presented to them."

We may look upon Dr. Merriam's recognition of our opportunities as significant and, I believe, we may well consider his comment regarding our Park Naturalist personnel as indicative of the fact that we are under observation by those most vitally interested in conservation problems of the nation.

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THE EDUCATIONAL PROGRAM AND ITS PLACE

IN NATIONAL PARKS ADMINISTRATION

November 8, 1929

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WHAT ARE THE ELEMENTS OF A "WELL ROUNDED" EDUCATIONAL PROGRAM.

By C. A. Harwell.

The following five elements occur to me as essential in developing a "Well Rounded" educational program in any national park.

1. Natural phenomena
2. Sympathetic visitors
3. Personnel
4. Program
5. Equipment

Natural phenomena of outstanding significance of course are present in every park. These phenomena attract visitors. If the comforts of these visitors are adequately provided for we have sympathetic visitors. A staff trained in science is needed to study the natural phenomena. They should be trained in the sciences of sociology and education that the larger truths discovered may be interpreted through these studies to visitors. A program of educational activities requiring suitable equipment must needs be set up to accomplish this.

These elements need to be kept in balance. In view of this, the Park Naturalist whose duty this is must be much more than a scientist. The larger the park, the larger are his responsibilities in administrative matters. He must know much of human nature. He is often before the public. He is consulted in matters of great importance by the Superintendent and others of the Service, and must learn to refine his quick judgments. He must be able to understand quickly the problems and viewpoints of others and other departments so that in such matters as budget and meetings of department heads called by the Superintendent his own department is well represented. He must know men--how to select them for particular duties; how to build programs to use man power wisely; how to keep them a unified and well informed group by such means as regular staff meetings, etc.; how to train them on the job by conferences and by such means as assigning a younger man to observe some one who is more experienced. He must impress his staff with the importance of their work in the park and see to it that they are neat in appearance and courteous to the public. The Park Naturalist must apportion his own time wisely. I feel that his time for research should be scheduled for the slack season. He should have matters in shape by summer so that he can devote himself entirely to the big problem then in hand, which I consider to be interpreting the natural phenomena to visitors. He should take part in guiding, lecturing, making trips to observe other guides, and lectures, meeting the public in many ways, and in trying out new methods so that he has a first hand knowledge of

conditions. In this way he can guide discussion at staff meetings and program more wisely. He must keep himself free enough from the program so that he can maintain a broad perspective of the whole program. This is the time the Park Naturalist should visit all the important outposts to see where new work needs to be developed and perhaps some activities changed. A study of all educational activities and facilities at the time of their maximum use is essential to any plans for his next year's program.

The Park Naturalist should certainly be well trained in science. Natural phenomena needs to be scientifically studied. The truth needs to be pretty well known about them by him before he can lead a staff in their interpretation. He must meet and assist visiting scientists in many fields. He should be able to speak their language. I think it is growing more important that a Park Naturalist be able to use material from the scientific researches of others than it is that he carry on intensive research himself. This seems to me so because outside agencies are becoming more and more interested in our parks as laboratories for research and because scientific aids are being attached to the Service.

Following a detailed discussion of the above paper, Mr. Hall stressed the necessity of planning the educational program so as to interpret the major features of the park to visitors. Each member present was then asked to write the definition of "A major feature of a national park". The following definitions were submitted:

"The major feature of a national park is an exhibit of some natural or historical subject which is of an especially fine nature, and which is of a calibre equal if not better than that of any other such exhibit displayed in the United States and so has extreme value in explaining and demonstrating a definite story. It should have inspirational, educational and scientific value."

Edwin D. McKee,
Grand Canyon National Park.

"A major feature of a national park is any feature of such outstanding interest from a scenic, scientific, or historical standpoint that it serves as an ideal illustration to the general public of certain formations, flora, fauna, or other natural phenomena, or historical event."

John D. Coffman,
Fire Control Expert.

"When it is set aside as a national park, the area so designated has contained within its boundaries either very unusual, exceptionaly beautiful, or historical attractions, which have been considered worthy of being preserved for posterity. These features vary with the park--they may be geological, biological, scenic, historical, archeological, or botanical--or perhaps more or less a combination of each. The major feature is that for which the park is set aside to be preserved."

Frank T. Been,
Sequoia National Park.

"A major feature of a national park is one which is outstanding in uniqueness, beauty, or scenic interest, the preservation of which has been one of the factors in making the area a national park."

Dorr G. Yeager,
Yellowstone National Park.

"A major feature of a national park is a feature so outstanding in grandeur, in sheer beauty, or in scientific significance, that its story is of interest to all visitors."

C. A. Harwell,
Yosemite National Park.

"A major feature of a national park is one which best expresses one of Nature's basic forces, upon which hinges our interpretation of some phase of natural history."

C. Frank Brockman,
Mt. Rainier National Park.

"A major feature of a national park is a substantial characteristic, that (1) distinguishes a park, or (2) awakens great interest on the part of visitors. The second may or may not be a characteristic that is unique."

Carl P. Russell,
Chief Naturalist.

"For our own clarity of mind I propose a classification of the potential educational features of each park into three groups:

1. Major features: examples of scenic, geological, biological, archeological, or historical phenomena, which are outstanding among such features in the country as a whole and which are essential to the understanding of the park.
2. Important features: examples of geological, biological, archeological, or historical phenomena, which are important when considered from the standpoint of the story of the park as a unit, but not necessarily outstanding examples in the country as a whole.

3. Minor features: examples of scenic, geological, biological, archeological or historical phenomena which may have an educational value and which may be exceedingly important in studying the story of a limited area but which do not necessarily play an essential part in telling the well rounded story of the park as a whole."

Ansel F. Hall,
Chief Naturalist.

After the above definitions were discussed, the following composite definition was prepared by a committee of three with Mr. Harwell as chairman:

"Major features of a national park are exhibits of scenic, geological, biological, archeological, historical, botanical, or other scientific phenomena, which are outstanding among such features in the country as a whole, possessing great inspirational and educational values."

An inquiry by the chairman developed the fact that all members present were familiar with Yosemite and therefore each was asked to submit a list of the major features of Yosemite National Park. The answers are tabulated below, numerals indicating the order in which the major features were mentioned. It will be noted in studying this table that it might be advisable, inasmuch as certain closely related features were listed under different headings, to combine or rearrange the subjects listed under "features".

Yosemite National Park

Features	Yeager	McKee	Russell	Harwell	Brockman	Hall	Been	Coffman
Cliffs	1			3				
Domes	2							
Waterfalls	3			2				
Bears	4							
Sequoias	5			6		6	4	2
Animals(other than bears)	6			9				
Birds	7			10				
Flora(exclusive of Sequoias)	8							
High Sierras	9		2			3	3	3
History	10							
Erosian by ice and water		1	1					
Fauna) Life zones		2	3		3			4
Flora)		3		8	4			5
Story of Mountain forming		4						
Granite (igneous action)		5						
Archeological remains			4					
Indians (and history)			5	7	6			
Geological story				1	1			1
Views				4				

Features	Yeager	McKee	Russell	Harwell	Brockman	Hall	Been	Coffman
Forests				5	2			6
Ecology of life zones					5	4		
Yosemite Valley						1	1	
Glacial action						5	2	
"Recreation"							5	
Merced River (including waterfalls)						2		

The park naturalists present from other parks were each asked to submit a list of what he considered the major features of his park. Following are the lists as submitted:

Major features of Grand Canyon - E. D. McKee

1. The Story of Erosion
2. Sedimentation and land forming processes
3. Crustal Movement
4. Fossil Evolution
5. Demonstration of Life Zone Principles.

Major features of Mt. Rainier - C. Frank Brockman

1. Geology (Volcanic features
   (Glaciers and glaciation
2. Flora
3. Forests
4. Fauna (Mammals
   (Birds
5. Ecology
6. History

Major features of Sequoia - Frank T. Been

1. The Big Trees
2. The High Sierras
3. The Wild Life
4. The Life Zones
5. Recreation (Physical)

Major features of Yellowstone - Dorr G. Yeager

1. Thermal phenomena
2. Animals: (1) Bears; (2) Elk; (3) Buffalo; (4) Moose; (5) Sheep; (6) Deer.
3. Geological history, exclusive of thermal
4. Birds
5. Fish
6. Trees and flowering plants
7. History

WHAT PART DO THE EDUCATIONAL ACTIVITIES FOR THE PUBLIC PLAY IN THE ADMINISTRATION OF THE PARK AS A WHOLE?

By C. Frank Brockman

Probably the answer to the question which titles this paper hinges largely upon the definition of "educational activities".

Does this term take into consideration a rather narrow outlook concerning our particular park--or perhaps even the park system--or are the responsibilities of our job bounded by the broader confines of a wider outlook in the matter, that is, a more general understanding and appreciation of natural history and the outdoors as a whole? Personally, I like to think of it in the latter sense. If this is correct, we have a broader field of service to the public, for if we send our visitors away with a better understanding and a greater appreciation of the outdoors and nature that will continue to bear fruit after they have reached their homes by prompting them to become interested in their own particular regions, then we have accomplished a great deal. In doing this the parks themselves serve as a laboratory in which to conduct, and bring to a satisfactory conclusion, this experiment. They are all admirable examples of their kind and should, because of their outstanding features, serve as a fitting proving ground. In short, we are "salesmen of mother nature"--not merely dispensaries of information concerning our park or our national parks.

If this be the case, then the general administration plan and the educational policies will naturally go hand in hand, for the parks were created for the good and enjoyment of the people and we take it for granted that our visitors--the majority of them at least--have had some sort of incentive aroused or they would not be among the crowds who come. The general administration of the park makes available first the physical needs of the visitor and protects the area so that it shall be safeguarded in its virgin state for all time. Yet the educational activities are as much a part of the general administrative plan as the above mentioned features because they are primarily to enable the visitor to see with seeing eyes. It is not enough that the visitor look at a beautiful panorama and remark upon its beauty. He should be informed of the how and why of the features that brought about this certain phenomena. Just as an artists who intends to paint a picture of an animal can create a better interpretation of the subject if he is aware of its physical make-up--that is the muscles, bone structure, etc., which give it individuality--so the visitor can appreciate the forces of nature if he understands the structure of the scene upon which he is looking and the forces which brought about or are bringing about the changes.

So both the administrative plan and the educational plan, once the physical needs are taken care of, attempt to give the visitor some incentive to visit certain features. Then they attempt to capitalize upon

this aroused interest by making the methods by which these features are reached easily accessible: i.e., trail hubs that serve as a central point from which to serve as a starting point for all trails.

The museum serves as an arouser of interest as well as a method of instruction on what to see; likewise the nature trails serve to give the hasty visitor a general idea of the features in the vicinity or possibly serve as a method of looking farther along the longer trails to more distant points; talks should serve as instructive features that will aid the public in making the most of every minute of their stay by telling the audience what to see, how to get there and what to look for along the way; nature hikes also key in with the desire to give the visitor some incentive for seeing and learning things for himself. In this connection might be mentioned pamphlets of various kinds given to each visitor at the entrances, nature notes, trail guides, timely nature topics mimeographed on weekly bulletins and all the artifices which are among the generally accepted methods for giving the visitor an idea as to what to see, how to see it and arousing his appreciation of nature by making it easy to understand the various phenomena that greets his eyes as he follows his inclination to see these things.

To sum it up briefly, the educational and administrative features have a common objective--to utilize to the fullest extent the areas within the parks as a means of bringing natural history and the story of the outdoors closer to the general public.

The chairman stressed the fact that the educational activities of a park should not be considered as a distinct unit without relation to the work of the other administrative force of the park. Instead, the entire government staff has a common objective and it should be the effort of our division to work in closest harmony with individuals or departments with which our work should be coordinated.

The chairman then introduced the following questions which with the answers were as follows:

Question A. In what ways is the work of the ranger at the park entrance related to the educational activities within that park?

Answers: 1. He should be well informed about the park in general, about its most important scientific features, and about the educational service offered by the government, and should make every effort to reach the public with this information.

2. He should have at his disposal a copy of the park Manual of Information and other similar informational data.

3. He should have available and distribute circulars telling of the educational service offered within the park.

4. A weekly program of educational service offered should be placed in the hands of the checking ranger so that he will be in a position

to tell visitors what "special events" will occur in the near future.

5. At places where the public has leisure (as, for example, when waiting on a controlled road), the ranger in charge should have exhibits illustrating local phenomena or certain portions of the park story; or, at other places, it may be possible to develop local exhibits in place.

6. In places where the public tarries and where there is sufficient parking space, there is a possibility of erecting small structures containing information about the educational program and exhibits pertaining to the park.

Question B. What part should the chief ranger's office play in the educational program?

Answers: 1. The ranger on duty should announce activities of the educational program while checking auto camp tourists, and patrolling rangers should also announce the program while inspecting auto camps or on similar duty. Where possible the above should also distribute circulars, programs, etc.

2. The chief ranger's office should, when possible, provide help in conducting technical surveys (mammals, birds, insects, etc.).

3. Rangers should cooperate in the writing or furnishing of data for Nature Notes.

4. The educational department should take an active part in ranger conferences, providing whatever assistance is deemed by the chief ranger and superintendent as advisable.

5. The educational department should be of service in training rangers and other personnel and, conversely, the ranger naturalist personnel should receive basic training from the ranger department in case it becomes necessary for them to make arrests or serve in emergency.

Question C. What is the relation of the superintendent's office to the educational service?

Answers: 1. The superintendent's office is the chief point of liaison between the educational program and other departments of the parks.

2. The park naturalist, as head of his department, should be present at all staff meetings and should take an active interest in the affairs of other departments as well as his own.

3. Each member of the educational staff, including ranger naturalists, should have police powers which should be exercised when necessary, and the chief ranger's office should cooperate in providing necessary training.

HOW CAN THE PROGRAM OF INVESTIGATION BE CORRELATED WITH PARK ADMINISTRATION?

This topic was assigned to Park Naturalists Been and McKee, and was divided into the following two papers:

3-A Frank T. Been

3-B Edwin D. McKee

3-A Frank T. Been

In conducting the administration of a national park efficiently and according to the commonly recognized National Park standards, there is need of investigations by men who are equipped to conduct them. These men are the Park Naturalists because they have the fundamental knowledge which warrants their carrying on this work. At least, they are better qualified than the usual park employee. If a condition requires the attention of a specialist, the Naturalist is able to interpret the findings of the investigation for the administration, conduct preventive or remedial measures, observe the results, and prepare reports and records for the National Park references and for the use of interested outside organizations.

To stimulate the interest of the people in the park, the Naturalist's work now is primarily searching out the most interesting features of the park, examining their natural and historical phenomena, and making these findings presentable to the public in interesting everyday language. This work is closely related to the park administration because it deals primarily with the park visitors who require a great deal of the time and effort of the park employees.

However, an extended field is opening up. This is the carry-out of investigations and experiments as they may have to do with safeguarding the attractions of the park. Some of the problems that may come up are the investigation and control of plant, tree, and animal diseases, the investigation of predatory animals, of animal food with regard to quality and abundance, of the condition and numbers of park animals and birds, the effect of grazing, the effect of road and trail construction, the desirability of certain regions for wilderness areas, and the condition of fish and fish food. These illustrate a few of the problems that involve park administration, but because of the differences in parks there is a wide divergence of park problems which Park Naturalists may be called upon to solve.

There seems to be far reaching possibilities for the Naturalist in park administration as explained above, but can this be considered educational? The primary purpose of the Naturalist is to guide, teach, and explain to the park visitor the natural features of the park. This work naturally requires much investigation and research, but if we take upon

our shoulders problems of park administration may we not so burden ourselves that we may lose sight of the main purpose of our position? We have stated in previous meetings that we are so new in the Service that our status is not definitely determined. If we are to establish our place, we should concentrate upon the job of contracting park visitors, devising means for their enlightenment, and improving existing methods of educational work--in other words, concentrate upon the job of popularizing natural science. We shall naturally come in contact with scientific, research, and educational organizations, but if we give much time to investigations not related to our department we will fail in our purpose of showing the people how to enjoy the parks. We are working in the midst of regions so advantageous for scientific investigations that, for our personal gratification, we may become so deeply immersed in research that we will neglect education.

3-B Edwin D. McKee - How can the program of investigation be correlated with cooperative organizations?

While the participation of the National Parks' educational staffs in scientific investigations and research is necessarily of prime importance in its relationship to the park administration, nevertheless such research may also have another and equally great value; namely, its assistance to the work of other institutions, especially those of a scientific nature such as biological and geological surveys, museums, etc. Science must precede technology. We must first thoroughly understand a principle before we can well popularize or present it. The American nation today possesses many institutions whose primary function and purpose is to act as pioneers in the various fields of science. It is frequently our assignment and our privilege to assist in this work where it is related to the national parks, and in many cases we are better fitted and better situated to carry on such investigations than are any others.

There are many and varied types of research which a Park Naturalist or members of his staff may be called upon to undertake in cooperation with National Park Service projects. They may be along biological, archeological, geological, or any of a great number of other lines. Indeed, the possibilities for such work are so numerous that it is almost impossible to enumerate the various opportunities. I say opportunities for they can be nothing less. If we expect to have a clear, concise idea of the thoughts and facts which we are to present the public in our educational work, and if we are to continue to gain new material from the study of our problems by other institutions, it is about the least that we can do to supply cooperation and assistance in scientific work whenever possible.

A few examples of the type of work which may be done along these lines might perhpas be appropriate at this place. Systematic collections of plants and animals, and careful records of the birds might well serve in the study of ecological problems by the Bilogical Survey. It has been my experience that all such material is not only gladly but gratefully received by the Survey. The collecting of fossils and geological

structures is another field of this work which is highly valuable. Many of our leading museums and other institutions are not only very appreciative of any such specimens presented or even loaned but also will be glad to cooperate by using their experts to classify and identify them. Still another important type of scientific work which should be carried on in some of our national parks is the excavation and study of archeological ruins. In every field of natural science, indeed, there is much material deserving of considerable study in advance of any publication or other use. It is very important for us, therefore, to do our share at least in this advance work of the educational program.

Discussion following the above two papers brought out the vital necessity of including scientific investigations as part of a Park Naturalist's personal program as well as activities involving public contacts. It was furthermore brought out that in parks where educational activities are just being established it may at first be necessary for the Park Naturalist to confine his efforts largely to public contacts and current service to the public but that this should be accompanied by work on the accumulation of scientific information from sources where it is already available in written form. This period of intensive service to the public should be followed by a program of activities containing reasonable allocation of time for investigations on scientific subjects and to allow the Park Naturalist the opportunity of keeping in touch with all branches of natural history.

Another important point brought out was that the Park Naturalist should correlate all scientific research activities pertaining to his park and should especially make efforts to correlate the activities of specialists engaged in cooperative work with the scientific research undertaken by members of the Park Service.

WHAT PART SHOULD THE PARK NATURALIST PLAY IN THE ADMINISTRATIVE PROGRAM OF HIS DEPARTMENT?

By Dorr G. Yeager

In several pieces of literature the Park Naturalist is referred to as "the educational administrative officer of the park". He is the officer upon whom the entire administration of the Educational Department devolves according to the Yosemite Plan of Administration, as approved by the Director.

Obviously the situation varies in different parks and the part which the Park Naturalist plays in the administration of his program varies with conditions. In the smaller parks where the staff is composed of a Park Naturalist and only one or two Ranger Naturalists it is necessary for the former not only to plan the work but to take an active part in the lectures and field trips. On the other hand, in parks such as Yosemite and Yellowstone, with the varied activities, it is necessary for the Park Naturalist to spend a considerable portion of his time in planning and administering his organization activities.

In my opinion, the Park Naturalist should possess full administrative power over his department, receiving his instructions from his Superintendent in regard to change of policy, etc. It has proven necessary in Yellowstone, due to the large staff of summer men, to appoint a Head Ranger Naturalist as a summer assistant. His duties are to organize the summer work with my help and to see that the organization runs smoothly throughout the season. Fortunately, the man chosen for this position is one in whom I have thorough confidence. This arrangement leaves me free for the many other duties such as museums, office work, nature notes, special parties, books, etc. I have found it absolutely necessary to assign certain duties to the Head Ranger Naturalist and to my assistant in order that I may keep a perspective of the work as a whole, as well as carry on other important duties. With a large organization, especially where museums are established or in the process of establishment, it is necessary for the Park Naturalist to portion out the work, and absolutely impossible for him to oversee each phase of the work in its entirety. I am of the opinion that the more details a subordinate can shoulder responsibly, the better position his superior is in to maintain and plan an efficient organization.

During the winter months I have a full time assistant and again I have been extremely fortunate in obtaining a good man. I have found very little real call for administration in my department during the winter months. Each week, on Monday, in fact, we talk over the work for the coming week and a schedule of work is drawn up for both of us, and posted. In addition, a second bulletin is posted, upon which appears all of the projects remaining for the winter and the date upon which each project should be completed. This not only aids us in retaining a bird's eye view of the entire work

but it also keeps before us the necessity of completing each project in the allotted time.

In the administration of an educational department in a national park a strict policy should be adhered to in regard to those who give and those who receive instructions. Theoretically orders should come from one person, the Superintendent. This is far from the case, however, especially where outside committees are concerned. When such a thing is permitted a labyrinth of conflicting instructions are given, not only to the Park Naturalist but to the staff.

In closing, let us sum up the answer to the question "What part should the Park Naturalist play in the administrative program of his department?" In brief it is this:

The Park Naturalist should spend sufficient time in the actual program of public activities to keep his perspective of the work as a whole. As much administrative responsibility as possible should be given to subordinates and the whole program so arranged that instructions are received from one man only.

After a discussion of principles outlined in the above paper as they could be applied in the daily activities of the Park Naturalist, Chief Naturalist Hall presented the following outline of the classes of activities which should each claim a part of the Park Naturalist's time:

1. The Park Naturalist should accumulate all available scientific data on subject related to his park to serve as a basis for the educational activities.

2. The Park Naturalist must maintain a program of current service to the public, the object of which is the interpreting of the park to visitors.

3. A Park Naturalist should conduct detailed studies of the scientific aspects of any particularly important park feature which is necessarily affected by the administrative program, and he should work in close cooperation with the other administrative units in devising and carrying out plans for the management of these features.

4. If possible, the Park Naturalist should allocate a portion of his time for original research pertaining to the park along lines in which he is specially qualified.

It was stressed that, although during the initial stages of the development of a park educational program, it may be necessary to lay

undue emphasis upon the program of interpretation to the public, Park Naturalists should make every effort to so arrange the allocation of their personal time that ultimately each of the above fields will be given its own logical importance.

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* After the reading of Mr. Yeager's paper on the part Park Naturalists should play in the administrative program, there followed a lively discussion which resulted in the formulation of the following statement, which was unanimously agreed upon by all delegates present:

> "We realize the importance of carrying on a continuous program of educational service for the public during the park season; but to secure the greatest efficiency on the part of the station, it is advisable that educational workers be free on one day each week. We recommend that this be accomplished by increasing the staff sufficiently to allow for substitutes on this day, but feel that if no increase is possible arrangements should be made to curtail the current program in order to reach this objective."

It was agreed by all present that the Park Naturalist should take as active a part in the program of current activities as is possible without interfering with his administrative duties.

It was agreed that when a new educational activity is being inaugurated it is advisable that the Park Naturalist take as big a part in this activity as possible without unduly interfering with his administrative duties.

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*Discussion as continued at opening of session on November 9.

MUSEUMS IN THE NATIONAL PARKS

November 9, 1929

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INTRODUCTION TO MUSEUM SESSIONS

By C. P. Russell

We have planned a five day program of Museum discussions that will cover scope, details of activities, installations, administration, and laboratory technique, including one day to be given to visits to local museums. Mr. Hall has requested that I prepare papers that will introduce the topics and afford a general picture of what each day's work is to cover.

It is our ambition to secure a common viewpoint in all of our museum activities and, judging from results of the sessions that have preceded, open discussions of our museum affairs may be expected to do much toward placing us all on the same footing from which we can gain a proper perspective. In our consideration of museum problems we shall strive to answer such questions as the following:

Why create park museums?
How are park museums to be brought into existence?
What should constitute a park museum?
How are its features to be planned and installed?
What will be the management of a park museum?
To what extent can park personnel engage in technical museum preparation?

This list of questions might be extended indefinitely but in a broad way these six represent the subjects to be discussed during the next few days.

When we have completed today's program we should have answered the question, "Why create park museums?" Papers that are to be read today all have to do with the functions and field of National Park museums. We are going to attempt to point out the fundamentals of our museum activities; how our field is related to other departments in the park organization; the part that the museum plays in the actual program of public contacts; and the museum duties that we may reasonably impose upon temporary Ranger Naturalists. When we have had opportunity to express our individual ideas we will seek a common understanding and attempt to formulate a policy regarding the extent of the field of action for National Park museums.

FUNCTIONS AND SCOPE OF A NATIONAL PARK MUSEUM

By C. P. Russell

National Park museums are extremely young. The first one was brought into existence in 1920. We may feel that we are handicapped in that there is little or no precedent to follow; small experience upon which to rely. On the other hand, we may well welcome an opportunity to pioneer in a field that is uncrowded and but little explored. No misconceptions should exist as to the importance of the niche in the museum world which park museums may occupy. It has been pointed out that our entire educational opportunity is exceptional and our material unique. The attention of leading scientists and educators has been focused upon us and we are challenged with the responsibility of making good with an "opportunity which exceeds that of any great educational insitution or group of institutions."

In seeking an understanding of the purpose of park museums one quite naturally gives consideration to the functions of museums in general. I am sure I can do no better in describing museum functions than has Mr. Coleman in his Manual for Small Museums. I should like to read his chapter, "The Purpose of Museums." (Reads pages 10, 11 and 12.)

There are certain high lights in the chapter which I may well repeat and emphasize as being especially pertinent to our consideration of the purposes of a park museum.

"The ultimate purpose of museums is to raise the general level of refinement by giving pleasure and imparting knowledge."

"Research may find but limited opportunity in a small museum, however, in general, a natural balance between scholarship and educational activity is prerequisite to continued growth and vitality."

"Relations with museums are voluntary ones, they are recreational, and therein lies their greatest power."

"Educational work of museums applies the principles of visual instruction. Through the work of a museum people may be led to intelligent understanding. They may learn greater love for the out-of-doors and become protectors of the country's natural resources."

We are safe, probably, in stating that park museum functions differ from general museum functions only as their scope differs from the scope of the usual museums. Our emphasis can, quite logically, be placed upon that aim which makes for intelligent understanding of the out-of-doors.

The park museum is one cog in the wheel and perhaps we can agree that it is the most substantial and important cog in the entire machine of the educational department. I think we may state that the primary function of the park museum is identical with the purpose of the general educational program. In previous discussions of the purposes of our general educational program we have agreed that our great objective has been to interpret park features so as to make for an appreciation of the park and, incidentally, to aid the cause of conservation. May we not say that this is also the ultimate aim of the park museum?

So far as scope is concerned it is obvious that we must limit our field, geographically at least. Mr. Harwell and I have just finished assorting and storing the Yosemite Museum accessions which are not exhibited. They are not all pertinent to Yosemite. Some will find use in Yellowstone, some at Grand Canyon, and some in other parks. These will be preserved until they are needed. Some few others have no American significance and these will be disposed of. Exhibits, of course, are limited to those objects which have some bearing on the Yosemite story.

I am leaving the concise statement regarding the scope of park museum exhibits to Park Naturalists Been and McKee.

The following bibliography may be of interest to those of you who wish to refer again to this subject after you have returned to the parks:

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THE PLACE OF THE MUSEUM IN THE PARK ORGANIZATION

By C. A. Harwell

The museum in a national park should be considered as equipment of the educational department of the park necessary to the program of interpreting the park to visitors. The Educational Department is one of several departments set up in each park as units directly responsible administratively to the superintendent. The museum, then, in the park organization is a government plant of greater or lesser extent requiring a budget for maintenance and personnel for operation. Museums thus far have largely been donated to the National Park Service from private funds. Non-governmental boards and individuals have for this reason exerted quite a measure of control over them. Educational work is new and museums are newer in national parks. They must be studied experimentally for some time to come, as for example, in the matter of their centralization or decentralization. For these reasons their exact place in the park organization has not as yet been well established.

The museum at Yosemite is important in the park organization because it is visited by such a large proportion of our park visitors. It is a very important contact agency. Our museum is the hub of our educational organization. It furnishes headquarters for the administration and scientific work and preparation, of our staff. It also furnishes facilities for our Yosemite School of Field Natural History. It furnishes headquarters for park information and sale of publications. It houses a nature library and general county library for the park.

In addition to all these, our museum contributes in a large way to give favorable advertisement to our Park and to National Park Service as a whole

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Following Mr. Harwell's paper there was a long discussion on the subject of how museums can best be established and developed and what place they play in the educational activities of national parks. A discussion of the values of a park museum brought out the following:

The park museum is exceedingly important in the program of current administration because (1) it provides for park visitors a medium through which the park is interpreted to them and through which they gain in understanding, (2) it aids in laying the foundation of public understanding and love of out-of-doors which is necessary in furthering the cause of conservation, (3) it is the natural hub of educational activities and is indispensable as a headquarters for the educational staff, and (4) it is an exceedingly important point of contact between the public and the National Park Service and offers unique opportunities for visitors to become personally acquainted with representatives of the Park Service.

THE PLACE OF THE MUSEUM IN THE EDUCATIONAL PROGRAM OF A NATIONAL PARK

By Dorr G. Yeager

Many references have been made to the park itself as a great museum. This is true, of course, fanciful as the idea is. There is, however, a real need for the museum in the common acceptance of the word; a building housing exhibits of local interest.

I am going to treat this subject from two points of view. First the point of view of the Ranger Naturalist himself and second the point of view of the tourist. There is a noticeable difference in the morale of men in parks with museums contrasted with those in parks without them. I have found this true especially in Yellowstone and specifically at Old Faithful where I have observed the before and after effects.

Mr. Russell has spoken of the Yosemite Museum as "the hub of educational activities" in that park. It is all of that and it is most important and vital that it should be. The Ranger Naturalist with his headquarters at a museum feels anchored. When he arrives for summer work it is the first place where he reports. He makes use of its exhibits to prepare himself for the seasonal duties and throughout the summer months he is constantly absorbing more material from and checking his data by means of its exhibits. It is his workhouse. All his interests center about it and radiate from it. His

reference books are here, his desk is here, his associations are here. There is something about the whole atmosphere that breathes of comradeship and a unity of purpose. I was struck last summer with the difference in attitude of the Ranger Naturalists and Rangers over the preceding year at Old Faithful, where we recently completed a museum. The offices of that museum served not only as a workshop for the naturalists but as a gathering place for the rangers. The feeling of the two groups was one of mutual comradeship and the "razzing" of the previous years was almost lacking. The rangers took a real pride in the building and of their own accord would suggest to visitors that they visit it before leaving the district.

Now, from the point of view of the tourist. I believe that the average National Park visitor is struck at once with the nature of a park museum. He is prepared to see rows of dusty exhibits on motheaten felt in a room which is dimly lighted and musty. Instead he is given a revelation to find objects of live interest, groups that speak for themselves and Ranger Naturalists who are happy and eager to explain more.

At Yosemite several lectures on geology are given each day by Ranger Naturalists. This both informs the visitor and encourages him to seek out more information for himself. At the Old Faithful Museum in Yellowstone an illustrated lecture is given each evening in an outdoor auditorium and the crowd usually exceeds the capacity by several hundred. At the Norris Trailside Museum in the same park the tourists leave their busses for 30 minuites, pass through the museum and accompany the guide over a portion of the formation, being picked up by the busses at the end of the trip.

In my opinion, the park museums serve another purpose of vital importance. I am speaking now of the Trailside Museums as they will be in use next year at Yellowstone. They are what might be referred to as local museums, in that they tell the story of that particular point. For example, a Trailside at Madison Junction tells the story of the expedition which proposed the national park idea. The museum is placed at the point where this idea was proposed. In addition, then, to exhibiting certain groups, they tell a story "on location" so to speak. The story of this expedition could be told at any other point in the park but it would not be as effective.

Park museums as a whole serve a double purpose from the tourist's viewpoint. They either create an interest and encourage him to learn more through our guide and lecture service, or they aid him to go deeper into the study of natural history, geology and history, after the guide or lecturer has made his contact. It is, then, either a preface or a conclusion to his park education.

In conclusion, let us sum up the part that the museum plays in our program as follows:

1. It serves as headquarters around which a Ranger

Naturalist operates. It is his workshop, office, clubroom and library.

2. It aids the tourist either before or after having made contact with guides or lecturers, in rounding out his knowledge of a subject, or assimilating sufficient interest to desire to round it out by attending lectures and going afield.
3. It aids in telling local stories and may, at times, act as a shrine to commemorate great events.

PARTICIPATION OF THE RANGER NATURALISTS IN MUSEUM ACTIVITIES

By C. Frank Brockman

Because of the fact that the park museum serves as a primary point of contact with the public through various informative services and as a focal point of curiosity or of interest the Ranger Naturalist stationed at this point has a decided responsibility to the museum.

An outline of his responsibility might be listed as follows:

I. Regular duty at museum: The Ranger Naturalist should, of course, be required to spend certain and specified hours on museum duty and in this connection general personality and ability to meet the public and affably mix with and interest the museum visitors in seeing the park is of primary importance. Technical training is obviously of necessity but no subject should be unduly stressed in museum contacts - he should endeavor to present a broad and general picture. In regular museum duty he should:

   (1) Expound the information wherever necessary as it appears on the labels to interested visitors.
   (2) Direct the museum so that its purpose as a "key" to the park is developed to the utmost. This can be best accomplished by mixing with the visitors, determining their interest, or their most likely interest and in a conversational manner arousing their curiosity on certain areas so that they will visit it out of their own initiative.
   (3) He should single out people interested in his park, get name, address and other facts for the park records.
   (4) Scientists should be encouraged to give suggestions.
   (5) Possibly an effort should be made toward donations and accruing accessions, but at any rate he should do all in his power to arouse interest and build up a following among the visitors that will persist after they leave the park.

II. Study of museum and aiding in its improvement and in the development of ideas. This is particularly important in parks where museum activities are just beginning to take form. The Ranger Naturalist can help a great deal by giving his opinions on the type of museum buildings necessary, their location, architecture, etc. Also the arrangement of exhibits of the present or future building and in the suggestion of new exhibits, their manner of preparation, etc.

III. Collection of objects for scientific or general educational purposes. He should keep open eyes at all times in performing his varying duties for objects of interest that would be suitable for inclusion in museum and must bring them in or make a report as to their location if not able to do so.

References:

1. Dell, H. R. Training Museum Workers. Proc. A. A. of Museums, Vol. XI, 1917.
2. Russell, C. P. Responsibilities of Ranger Naturalist on Museum Duty. Yos. R. N. Manual, Vol. I, 1929, P. 21.

The discussion which followed this paper was directed chiefly toward two of the many interesting points, namely, (1) the possibility of interesting the visiting public in the out-of-doors through the medium of the museum and, (2) the probability that the museum will aid in attracting to the park visitors who are especially interested in that region and in the story of the park.

DEFINING THE PARK MUSEUM AND FORMULATING A POLICY REGARDING ITS FIELD

By Frank T. Been and Edwin D. McKee

Frank T. Been

Museums are institutions containing labeled exhibits of specimens taken from history, art, and science--arranged to give the visitor knowledge and recreation. The museum is a place for visual instruction, but also a place where the objects of instruction are so interestingly arranged that people are drawn to them as a source for pleasure, and through that motive may obtain knowledge.

According to Bryan, the field of the museum is five-fold: to collect, preserve, study, educate, and entertain. Because the museum is usually intended to attract people from all walks of life, it must be conducted with a view toward stimulating the interest of all people so that the knowledge contained in a museum may be impressed upon the casual observer.

Edwin D. McKee

A national park museum should necessarily be a center for all educational activities within the park in which it is situated. As such a center it should not only serve as a headquarters and place of office for the educational staff, but also as a key for all park visitors. It is well brought out in Yosemite Nature Notes, May 1926, that such a museum is unique among American institutions. These same factors which make it unique, moreover, are the ones which must be most emphasized in order to make its utilization of the highest order. In brief, a park museum should have a very distinctly local flavor--it should present no materials irrelevant to the story of the park in which it is located, and all materials should act as a single unit in telling this story. The exhibits, no matter how excellent, are worth practically nothing when presented in a heterogeneous manner, but when leading from one to another in a definite well defined course which will serve to emphasize the greater truths demonstrated by the park itself, they are invaluable.

Every park should have a central or key museum to the park at large--a museum serving to begin the stimulation of interest, to guide people to the important features, and lastly to serve as a means of interpreting these. In some of the smaller parks this museum alone must suffice, but it appears desirable to supplement the central key wherever possible with smaller local museums, exhibits in place and trailside structures. Each and every one of these should bear a very definite relationship to the parent museum, but should be strictly local in nature and in most cases deal with only one definite feature such as archeology, geology, etc.

References: Nos. 1, 5, 6, 16 and 22 on list compiled by Mr. Russell, p. 49

Following a long discussion on the definition of the exact field of the park museum, Chairman Hall asked each member of the conference to record his definition of a park museum. These definitions follow:

"A park museum is a key to help interpret a natural phenomenon or some other phase of that park which could not be made available to a visitor in any other way."

C.A. Harwell.

"A park museum is an institution in which are exhibited labeled specimens from art, history, and science as these apply to the park in which the museum is located."

Frank T. Been.

"A park museum is one housing the educational offices for the department as well as exhibits pertinent to the park, so arranged as to convey to the visitor the spirit of our work and the educational opportunities present in the park itself."

Dorr G. Yeager.

"A park museum is an institution that portrays the story of the park and its relation to the outdoors and natural history as a whole by means of carefully placed and arranged exhibits of natural science, history, etc."

Frank C. Brockman.

"A park museum should be a center for educational activities serving both as a headquarters for the educational staff, and as a key to the park for all visitors. It should be supplemented, where possible, by trailside museums of a strictly local nature, principally for demonstrating certain definite features in place. The central museum should attempt to stimulate interest, to guide people to the important features, and to serve as a means of interpreting these."

Edwin D. McKee.

"A national park museum is that central agency in the park educational department which, through its practice of visual education, lays the foundation of public appreciation of the park. It may also be regarded as indispensable to staff members as headquarters for official labors and personal study."

Carl P. Russell.

"A park museum is a collection of exhibits so arranged and labeled as to give the park visitor a comprehensive conception of the story of the park as a whole or of that particular section of the park or scientific field covered by that museum. Such a museum should lead the interest of the visitor out to the natural features of the park."

Ansel F. Hall.

PLANNING A PARK MUSEUM

November 11, 1929

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SURVEY OF MUSEUM POSSIBILITIES IN NATIONAL PARKS

By Carl P. Russell

During the past ten years a new movement has made itself felt among museum workers. Ideals and objectives for museums have changed and it is recognized that "the worth of a museum is in its use."

Until quite recently the literature on the founding and management of museums was limited to the classic paper by George Brown Goode on the principles of museum administration which was published in the 90's. Now, as we all know, a great army of workers are constantly contributing ideas and the museum movement advances with an impetus that comes from public interest. National parks, fortunately, have been caught in the current of museum progress and are championed by a number of visual education specialists who are determined that park museums shall occupy the place that exists for them.

We, as park officers, are challenged to meet our obligations in our accepted field of public service, and to qualify to the point of properly employing the museum--a most important agent in visual education--in reaching our designated goal.

Before we can expect to properly utilize the medium of the museum we must know something of its possibilities. No one man knows exactly what the possibilities of a national park museum are, nor does he know all about how it should be managed so as to most efficiently serve its purpose. In fact it is reasonable to say that experience has not yet developed this knowledge in any group of men. It is a part of the problem that we are all working on. But ideas are accumulating and we should be on the alert to collect such ideas just as we collect museum objects.

The papers to be read today will present our original ideas on park museum planning and with our ideas will come the ideas of some of those designated workers who have contributed to modern museum literature.

Questions to be answered in today's discussion may be represented by the following:

In the park where no museum collections exist what is the first step to take?
What shall be collected?
How can the interest of other park employees be stimulated?
Who, outside of parks, can be expected to help?

How should the museum building be constructed so as to best serve its purpose?
What will be the organization of exhibits?
How will exhibited objects be installed?
What are the principles of labeling?
How should copy for labels be prepared?
How should the labels themselves be prepared?
What are the principles of label display?
How will study collections and surplus objects be stored?

WHAT THE PARK NATURALIST CAN DO TO START A MUSEUM

By C. A. Harwell

If the Park Naturalist is convinced that a museum is a necessity in his program of interpreting the park to visitors, and if the superintendent supports the project, then there are a number of worth while things he can do, all the while having in mind the definite objective of building and equipping a permanent museum.

He can collect exhibit material himself on his trips within and without the park. He can direct Ranger Naturalists and Rangers to make such collections for him. Interested operators and visitors can also be counted upon for help. He can at first, if necessary, utilize an exhibit space somewhere near the center of activities. It may be only a table under canvas or a corner of some room. His first exhibit must be planned with great care. It is the start of **big** things. It must arouse favorable comments. The material exhibited must be outstanding in some way. It must have a fresh appearance. It must be arranged in a pleasing and logical way and well labeled. The exhibit must not be crowded or jumbled.

It should be watched closely by the Park Naturalist the first season. Materials should be kept fresh and clean, labels in good shape, and the exhibit changed, expanded or modified in some way from time to time to give it freshness of appeal.

I believe one phase of the park, and if possible the most outstanding one, should be chosen to be stressed from the very beginning. If it is geology, then have a good geological exhibit and have in mind adding others as space and time may become available. Do one thing well. As space becomes overcrowded, the Park Naturalist can ask for more with more assurance of success.

Complete and systematic records should be kept from the very start. Each article placed on exhibit or stored should be given a number which is placed on it in some way. An accession book in which these numbers are recorded and all data concerning description of article, name of donor with date and address, etc., should be kept. Donors should be thanked in writing. In other words, good museum technique should be used from the day the first articles are displayed. This is looking forward to the permanent project for which the Park Naturalist is planning and building up public opinion and support.

There followed an open discussion on the subject introduced by Mr. Harwell's paper. Many points of particular interest and value to Park Naturalists were brought out.

It was concluded that in parks where there is no immediate prospect for a permanent museum building, or even if it is impossible for the time being to establish a temporary museum, the Park Naturalist should nevertheless immediately start collecting material which will form the basis for exhibits in the future museum.

Chief Naturalist Hall briefly outlined the situation as follows: He accentuated the importance of collecting valuable materials such as archeological or historical exhibits which are rapidly becoming more and more scarce or unobtainable. When this special field is exploited, or partially so, the Park Naturalist faces the question of whether to attempt to form museum collections covering the field of all sciences or to specialize. It was concluded that when collections are about to be started, the scope of the future museum will first be planned and the efforts of the Park Naturalist will then be directed toward collecting in the field most important in that particular park. If material related to other fields of science can be collected concurrently without extra effort, these additional exhibits should be obtained for future use, but the Park Naturalist's efforts should be concentrated upon one field to insure maximum effectiveness of his own work and maximum quality in exhibits.

When sufficient material has been collected to form a creditable exhibit, this should be carefully labeled and displayed, the installation being temporary if necessary but the arrangement and labeling as carefully planned as if the exhibits were housed in a permanent museum building.

In most cases it will be necessary for the Park Naturalist to form good basic collections before the erection of a permanent museum building will be undertaken by the Park Service or through the assistance of cooperating agencies. It therefore follows that the materialization of

a hoped-for museum building will depend largely upon the initiative of the Park Naturalist in forming preliminary collections and also upon the thoroughness and scientific accuracy of his work.

The Park Naturalist should seek the help of specialists at Educational Headquarters in planning the collection, preparation and installation of museum exhibits. Also he should from time to time record data to be used in planning the museum building. A tentative building plan might also be prepared to form a basis for study when construction is contemplated. In each case, however, the ultimate plan for a permanent building will be worked out in cooperation with a Field Naturalist from Educational Headquarters, who specializes in this field and who in turn will consult with cooperating advisers in preparation of final plans. While encouraged in the studying and planning the ultimate museum layout as it particularly affects his park, the Park Naturalist is expected to devote the greater part of his energies toward the actual collecting and preparation of the material for exhibit.

HOW OTHER PARK AND OUTSIDE AGENCIES CAN AID IN STARTING A MUSEUM.

By C. Frank Brockman

Each park and particularly its naturalist has a definite responsibility to the development of the educational work. Each park represents some great truth of natural history--each is outstanding in some feature of interest to the public--and if we are to utilize these regions to the utmost in presenting the story of natural history they must be developed in a uniform manner so that their particular chapter in the story can be readily understood.

Some parks are already fairly far advanced in the development of museums. These have a particular responsibility in this connection as they have a better understanding of the requisites of this feature. May I suggest that some system be devised in which all plans and developments in any park be made available to other parks so that when museums are built we will all have the benefit of a knowledge of these developments and a broader conception of what has gone before. In the case of the new Yellowstone Trailside Museum, if plans, photos, etc., of that structure were available to Mt. Rainier National Park we would be better able to formulate our own plans in that regard and when the time came we would be able to take advantage of such experience. Perhaps it might also be well to include, in our monthly reports, any new ideas or suggestions that proved successful relative to the entire scope of our work and that these be compiled in a monthly news letter for all Naturalists.

It might be well to include one or two exhibits from other parks in the museum to serve to illustrate the complete story of the system.

Also in the accessioning of exhibits if some feature is offered that is not suited to one park and is suited to another steps should be taken to aid in placing this exhibit in its proper locality.

Thus, as far as the parks are concerned, a system of interrelationship whereby ideas, plans, information and exhibits could be worked out so that uniform, representative and respectable museums could be established throughout the entire system.

In the case of outside agencies however, a new angle enters the field. This develops through a natural desire to further the cause of conservation and advancement of scientific knowledge, both popular and otherwise. Outside agencies such as universities, technical organizations, academies of science, conservation leaders, publications, mountaineering clubs, etc., can be of vital assistance in many ways. As a rule such organizations are more than glad to aid in any way possible--to exchange services in the matter of technical cooperation. In this manner a broader training will be made available to the Naturalist that will be reflected in specimens gathered for exhibition purposes and will build up good will and an understanding, the value of which cannot be overemphasized. But from the standpoint of immediate results assistance with outside organizations is of great importance in that we reach a maximum of interested people with a minimum of effort. By being closely allied with them we are able to get a sympathetic audience for our story and these people, being actively engaged in the cause of conservation, can thereby aid in the personal contribution of exhibits, books, and aid in the development of museum plans for the park.

In the discussion which followed Mr. Brockman's paper, it was brought out that machinery already exists for the correlation of museums in the national parks -- work which is being undertaken at the present time under Field Naturalist Russell and Chief Naturalist Hall.

All present were agreed that there should be some method of presenting to the Park Naturalists a summary of newly developed museum methods or the principles of standard methods now in use in museums as applicable to museums in national parks. It was proposed that a manual for national park museum practice be developed but that this material would be sent out gradually by Educational Headquarters, the most important subjects being covered first in a series of short mimeographed sheets to be known as "The Park Naturalists Forum."

The Park Naturalists agreed to append to each monthly report one or more short articles concerning principles or methods which they have developed in their individual parks which would be applicable to the work in other parks. Also the Park Naturalists will at this time each month submit questions on methods or technique in museum practice or the other fields of educational work which they are administering. These questions

will be answered by the Educational Headquarters staff in a form which will be useful to all Park Naturalists and included in the Park Naturalists Forum. Each item submitted for the Park Naturalists Forum will be accompanied by a bibliography on that subject.

Whenever possible, these articles will be illustrated by simple sketches or with photographs. In the latter case, if negatives can be supplied prints will be made for all Park Naturalists.

It was agreed that each Park Naturalist will arrange with his Superintendent to read the monthly report from all parks, which is circulated from Washington Headquarters, in order to inform himself of the educational activities in other parks.

It was agreed that each park museum should, if possible, be an official member of the American Association of Museums.

PLANNING THE MUSEUM LAY-OUT

Frank T. Been

The exterior of the park museum building must be planned so that it harmonizes with the principal feature of the park where it is located, or with that particular portion of the park where it is situated--as with trailside museums. The museum of the national park is quite apt to be in a rather small building. For this reason it must be planned for the maximum utilization of space according to the authorities which I consulted. Rectangularly planned buildings can best be arranged to meet this requirement. If there is a possibility of expansion which may require additional space, the building should be planned so that it can be enlarged harmoniously with the original. The rectangular building, in this event, is again the most satisfactory.

The lay-out of the interior is our most important problem. The building should be distinctly divided into public rooms and staff rooms. The public rooms will be exhibition, library or reading, and lecture. The staff rooms, office, study or conference, and workshop. In a small museum the public room may have to have all public rooms combined in one, but that room can be so arranged that each of these three public requirements are available. The staff rooms may also need modification into one room, but this room should be securely shut off from the public room because efficient and rapid work cannot be accomplished when museum visitors are interfering.

In arranging the exhibition room the following factors must be considered:

1. What objects are to be exhibited

2. Relative importance and size of collections
3. Exhibits arranged in logical sequence
4. Exhibits arranged naturally
5. Exhibits should not be crowded

Concerning the first factor, we have already decided that the park museum exhibits should be pertinent only to the park where museum is located. Paintings and photographs taken of the park, relics and pictures associated with the park history, and natural exhibits of objects native to the park should only be placed in the museums.

The trailside museum should feature only its immediate vicinity so that each trailside museum will be distinctive.

The collections on display in the museum will no doubt be predominated by exhibits which reflect the feature of the park. These collections are the most important and should be given the choice location in the exhibition room.

Around, or perhpas leading up to this important collection, should be placed the other exhibits so arranged and so labeled that a story is unfolded to the observer as he moves from one display to the other. Large museums have rooms devoted to certain types of exhibits which are divided into art, history and science, and each of these are sub-divided. In the usually small museum of the park, art, history and science may be displayed in one room; but the displays can be placed in sequence.

For the greatest effectiveness the collections must be arranged naturally--natural in preparation of each mounting or group of mountings and natural in sequence of groups or collections. The background of the mounting should blend in conspicuously with the group. When a painting of the natural setting is not available, plain buff color presents an unobtrusive setting. The lighting is very important also, and in museums where artificial light is not continuously available is a problem. Windows placed high, however, with frosted glass or equipped with light colored shades cause the natural light to be gently diffused preventing sharp shadows and protects the exhibit from the bleaching force of direct sun-light. Also, high windows do not take up room along the walls, thus making available the maximum space for exhibits.

In the small park museum there is great danger of packing as much material into the exhibition room as the space will hold. Crowding exhibits results in loss of effect so that the surplus material should be stored until more room is available. This surplus is not wasted because a crowded exhibit detracts from the features of the display, thus resulting in a real loss because the object of the museum is to show the observer the park features and park story and stimulate him to seek greater knowledge. A crowded exhibit may befuddle him.

Reference: Coleman, L.V. Manual for Small Museums, Vol. VIII, No. 3

Following the presentation of Mr. Been's paper, the discussion again centered around the question of the scope of a park museum. The representatives present agreed that the park museums should specialize on the story of the park but that the story of the park need not necessarily be confined to the exact boundaries; for example, in case of history, archeology, etc., the materials exhibited might refer to the region as a whole with special emphasis upon the park and the significance of scientific or historical features within its area.

It was again accentuated that the sequence of exhibits in a park museum should tell the entire story of the park as a unit.

It was also agreed that although the efforts of the Park Naturalist will at first be directed toward the assembling of a complete series of exhibit specimens, attention should also be given to the formation of study collections with a view to ultimately having on file scientific material which will be of value to the Park Service educational staff, to visiting scientists, and to specially interested laymen; this material, however, should not be on exhibit in the general museum but should be kept for reference.

The question of crowding exhibits was discussed, as in many parks there is very limited room in the temporary museum buildings now available. The point was again brought out that exhibit material should not be crowded, even though it may be temporarily necessary to store such material until such time as adequate housing facilities are available.

There followed a lengthy discussion of the location of park museums, and it was the consensus of opinion of all present that it is important that some means of liaison be provided so that such problems can be studied concurrently by representatives of the Educational Division, the Engineering Division and the Landscape Architecture Division. It was agreed that the four primary considerations in museum location, in order of their importance, are:

1. Where can the story best be told?
2. Where are the people?
3. How will the museum best direct visitors to places of interest and educational value?
4. How will the building best fit into the landscape?

It was agreed that every park museum should be supplied with a copy of Coleman's "Manual for Small Museums" and any other basic publications of similar nature as they appear.

PRINCIPLES OF INSTALLATION PLANS AND FINISHED EXHIBITS

Dorr G. Yeager

In a paper of this length it is impossible to treat this subject in a thorough manner. The field is so large and the treatments of exhibits so varied that volumes have been devoted to it. One of the best of these volumes is Coleman's "Manual for Small Museums".

The subject can best be treated under separate headings:

1. Purpose of Exhibits: Each exhibit should be so planned that it tells a story. These may be stories of biotic associations, which are so successfully carried out in Yosemite. They may tell an historical story, or a geological story or a life history. The field is almost limitless. But telling a story is only a partial function of an exhibit. It is highly important that it should link the visitor intimately with Nature itself, and create an interest sufficient to compel the visitor to go beyond the exhibits into the field and learn still more.

2. Sequence: It is highly important in installation, not only for each case to tell a story but that the entire museum be considered from a standpoint of a unit. We may say that each exhibit is a chapter and the whole museum is a book. Obviously it is essential that the sequence should be orderly and that when the visitor has completed the last case he has a well rounded story in his mind. This is highly important in museums such as that at Old Faithful where a definite story, that of thermal activity for example, is to be told. In this case we introduce the subject by telling how a geyser basin is formed, leading through the steps of the formation of a geyser itself, the products of geyser activity and ending up with the last case which is devoted to human history of the geyser basin.

3. Labels: Of greatest importance is the matter of labeling this sequence of exhibits. The labels should contain subject matter pertinent to the exhibit as a unit. The labels play an all important part in the sequence plan. Master labels should accompany each case. These master labels are, if you please, the chapter headings of the book. Naturally the matter of text is vital. Such subjects as type, length of text, size, etc., will be taken up in another section and there is no need to spend time upon it here.

4. Presentation of Subject Matter: Closely linked with the labels is the subject matter contained. Above all it should be human. It should be presented in a dignified yet intimate manner. I pointed out in a previous paper the importance of the subject matter to an exhibit. I firmly believe that the label is just as important as the exhibit proper and that more museums are killed because of difficult labels than from

any other source. The material should be presented in much the same manner as material is presented on our field trips, and there is no more call for use of technical or difficult wording than there is on a field trip.

5. Museum Fatigue: This is an important factor in museum planning. This subject, if extensively treated would include such topics as lighting, height of cases, size of print on labels, extent of subject matter treated, etc. Suffice it to say that an exhibit should be so arranged that it is pleasing and restful to the eye. The tops of the cases should be low enough so that the person is not obliged to cramp his neck to see all of it. The light should be subdued to a minimum and the labels should be so placed that it is not necessary for the visitor to strain his eyes to read it. The subject of museum fatigue is one which is of vital importance in our program.

6. Hand Specimens: A relatively new scheme of exhibits which is working out with great success in many museums is that of hand specimens. Just as on field trips, the visitor should be allowed to handle certain exhibits, that he may learn not only from the sense of sight but also that of touch and smell. Last year we installed a hand specimen exhibit in one of our Yellowstone Museums. It happened to be a geological exhibit, containing igneous, sedimentary and thermal specimens. Ordinarily these specimens would have attracted no attention behind glass but we found, after a month, that it was necessary to enlarge the exhibit in order to accommodate the number of visitors at the table.

7. Study Collections: In planning the exhibits the matter of study specimens should always be kept in mind. Specimens of every exhibit should be in study skin cases in order that the visitor may, if he so desires, examine the skin at his leisure. I was surprised last summer at the number of people who expressed a desire to become more familiar with the structure and skins of certain specimens which we had on exhibit. Several times I took visitors to the preparation room that they might examine skins and mounts more closely.

Bibliography:

1. Coleman, L. V. Manual for Small Museums
   Proc. A.A.M. Vol XI , 1917, pp. 54,59,65.
   " " " III , 1909, pp. 84, 139
   " " " X , 1916, pp. 93

Following Mr. Yeager's paper the various topics were discussed. One exceedingly important point brought out was that in planning future museums and in planning for the administration of existing museums,

arrangements should be made for seating facilities for visitors on account of the observable "museum fatigue" which is apparent even in museums as small as those in national parks.

The subject of the utilization of living specimens was then discussed, and it was brought out that living specimens are particularly valuable in the Yosemite Museum and possibly have an even more important place in connection with branch museums.

MUSEUM LABELS

Edwin D. McKee

The importance of labels is extremely great in park museums as well as in others. It has been said that the best museums present exhibits to accompany their labels rather than labels to accompany their exhibits. While such is scarcely true to the letter, still it is significant of the consideration which should be given labeling. In brief, a poor exhibit specimen with an excellent explanation accompanying it, is frequently more valuable from an educational standpoint than is a very good specimen with only a mediocre label.

Of What, then, should a good label consist? Let us first consider the matter of material. This should be prepared with the following thoughts in mind. What is the important or significant factor that should be explained? What kind of questions are the observers most likely to ask? How can the relation of this specimen be shown to other exhibits and to the park story as a whole?

Having determined the substance of a label, the order of presentation is then to be considered. A matter of perspective is here involved. It is highly important to determine which facts are of prime importance and which are of lesser importance, though still necessary. Those of the first group must then be condensed into a clear concise statement to be used for a title, while those of the second group must be carefully and interestingly worded for explanation.

The matter of label making necessarily involves many mechanical processes and details which should be given consideration. The factor of size is one which requires judgment to meet any particular condition. Naturally a label should be large enough to be readily seen and read, yet care should be taken not to make it so large that it will detract from the exhibit itself. The same factors should be carefully considered in the placing of labels. Another item of importance is the construction--for they should be neat and artistic in any case. Good hand printing has

generally been proven to be more attractive and more pleasing than typewritten letters. Lastly a good contrast in size between the more important title letters and the less important letters of explanation is to be desired. To this list, no doubt, could be added many other factors, though it is believed those enumerated are sufficient to demonstrate what care and thought should be given in the making of any museum label.

Following the above paper, the subject was reviewed and discussed in detail. It was agreed that additional study would be given to the matter of the preparation of museum labels and that the subject would be specially treated in a future issue of the proposed "Park Naturalists Forum".

In again discussing the general features of museums and museum planning, it was agreed that it is advisable for the Park Naturalist and the other members of the educational staff to set down written plans for the ultimate educational development and that, in so far as possible, these plans be incorporated with the general plans of park development. To accomplish the latter the Park Naturalist should take definite part in the Superintendent's planning program and should correlate his plans of administration with those of the other departments within the park in which he serves.

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MUSEUM TECHNIQUE

November 12, 1929.

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NOTE:

The entire day of November 12 was spent at the museum of the California Academy of Sciences in San Francisco. The morning was devoted to presentation and discussion and the afternoon to a demonstration in museum technique and materials by Frank Tose, Chief Preparator for the California Academy of Sciences.

GENERAL CONSIDERATION OF MUSEUM PREPARATION WHICH MAY BE UNDERTAKEN BY THE NATIONAL PARK SERVICE STAFF

By Carl P. Russell

The following is a brief of Mr. Russell's paper:

The development of museums in the national parks during the past several years was traced in detail. Mr. Russell then suggested that park superintendents detail their park naturalists during a portion of the winter season to work with some especially well qualified museum preparator. He also pointed out that a park naturalist should be able to make herbarium specimens and study-skins of birds, mammals, reptiles, amphibians, etc. He also suggested that one person on the headquarters staff of the Educational Division should be available to specialize in the field of preparation and, if possible, to devote at least half his time to research and field investigations along this line. To summarize: "Each park naturalist should be qualified to conduct museum preparation work to a greater or less degree and each park naturalist should be responsible for museum collections and study collections."

In the discussion which followed the presentation of the above subject, Chief Naturalist Hall suggested that park museums be designated "museums" even though it may often be necessary during the preliminary stages to house temporary installations in buildings which may serve as museums for the time being.

The park naturalists thoroughly discussed the matter of securing training during the winter months, and the consensus of opinion was that it is highly important that park naturalists be detailed during a part of the winter season to work under an expert preparator either at Educational Headquarters or at museums or institutions at other places throughout the country. Also the park naturalists are agreed that it is highly important that technical assistance be provided in their own parks in order to assist them in learning the best technique in collecting and field preparation.

Mr. Frank Tose, Chief Preparator for the California Academy of Sciences, briefly reviewed the various methods of museum preparation and discussed the subject of materials in a broad way. He suggested that each park naturalist specialize in some particular process or field of preparation and that a cooperative arrangement be concluded whereby they might prepare exhibits from a number of parks, providing these exhibits fell within their own chosen specialized field. Mr. Hall stated that under the present circumstances the latter arrange-

ment, although possibly desirable, might not be practicable inasmuch as the individual park naturalists have insufficient time at their disposal to specialize on certain fields of museum preparation. The alternative was suggested of having on the headquarters staff of the Educational Division one well qualified preparator whose duty it would be to assist park naturalists in the field in collecting and field preparation and to work at Educational Headquarters during the remainder of the year where he could train park naturalists in the technical phases of museum preparation.

There followed a long discussion of the value of study collections and their place in park museums. It was concluded that the value of study collections in national parks is threefold: (1) For reference of the park scientific staff; (2) for the use of visiting scientists; and (3) for examination by especially interested laymen .

The following conclusion was unanimously agreed upon: "We are of the opinion that the park naturalist or his staff should assemble study collections of flora, fauna, and geology of his particular park region and that he should so arrange his program that time will be allotted for this project in coordination with other activities."

GENERAL CONSIDERATION OF MUSEUM PREPARATION OF WILD LIFE COLLECTIONS

By Dorr G. Yeager

1. PLANTS: Several methods of preparation of plants for exhibition purposes have been used in the past. Good exhibits have been prepared by placing plants carefully pressed in Riker Mounts and displaying them in racks prepared especially for the purpose. This is one of the most effective and simple of all the exhibits.

Some exceptionally fine work has been carried out in wax flowers at the different museums throughout the country. I have in mind an exhibit at the Field Museum in Chicago. Fungi have yielded well to this method of treatment. However, the wax preparation is an exceptionally difficult one and unless some one from the outside is brought in for the express purpose of making wax vegetation it is not advisable to attempt extensive work of this sort.

Another method of preparing material, especially for use in cases where vegetation is required, is the processing method.

In this case, the vegetation is placed in a solution of acetone, glycerine and alcohol for a certain period. After the vegetation has been left in this solution for several days it is removed, thoroughly washed, and dried. It is then painted the desired color, as the solution has the tendency to bleach the foliage. It is desirable to use a small spray brush in this painting for the sake of saving time. This method, although it sounds complicated, is simple and easily carried through. When treated in this manner the vegetation lasts for an indefinite period in a good state of preservation. Complete instructions for this method are to be found in Rowley's "Taxidermy and Museum Technique."

2. STUDY SKINS AND MOUNTED SPECIMENS: There seems to be very little which can be said in a paper of this type on the preparation of mounts and study skins. The methods of mounting vary greatly, as do the effects obtained. Only practice makes a taxidermist, coupled with powers of observing the natural positions of the living specimen. Many books have been written on this subject but it is not possible to make mounts from reading them. Ideas may be gained it is true, but in order to make good mounts it is necessary to practice and keep on practicing.

The matter of making study skins is less difficult, although, as in mounted specimens, practice makes perfect. The matter of study skins has been treated at length in books on the subject. Methods vary; some taxidermists prefer a "round" skin while others prefer the "flat." Needless to say, each skin should be well labeled with the name, date, locality, sex, and collector. Many skins that are too badly shot or torn to be used as mounts may be made into very presentable study skins.

In building up a collection of mounted specimens it is always advisable to keep the study skin collections in mind when collections are being made. It is a good policy to shoot at least three specimens of each species, one for the mounts and two for the study collections, hoping, of course, to obtain a male and female by this method. The study skin collections should be housed in cases especially constructed for the purpose and fumigated often. Many preparations are on the market. In Yellowstone we use carbon disulphide, replenishing the stock about twice a year.

3. REPTILES, AMPHIBIANS AND FISH: Several methods of preparing this group have been used in the past. The preserving of specimens in solutions (a method used so extensively in zoological laboratories) is used in many museums. This is by far the most simple of all the methods. It is, however, not without its drawbacks. Solutions dry up, specimens are not readily examined, etc.

Another method, which was used extensively at one time but which is now fast losing favor, is that of mounting in the same manner as birds and animals are mounted. The plaster cast and wax methods are

becoming very popular, especially at the larger museums. Wonderful results are being obtained, but here again it is almost necessary to have a skilled technician. The casting is not so difficult but the painting of the cast requires an artist. During the past month I did some experimental work in making casts of fish and I was surprised at the amount of detail which can be brought out. I worked on an eastern brook trout and the skin design was nearly as perfect on the completed cast as on the fish itself. The above methods are, of course, limited to the exhibit specimens. For study collections of amphibians, reptiles and fish, it is necessary to place them in solutions where they may be taken out and examined. It is perfectly possible, especially if the specimen is rare, to utilize it as a model for casting and place it in the study collection afterward. The solution to be used in the case of preserving these specimens is 5% of the commercial 40% formeline. It is advisable to inject the specimen full of the solution in addition to placing it in the liquid.

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Proceedings of A.A.M., Vol. III 1909
Proceedings of A.A.M., Vol. VII 1913

COLLECTING OF MUSEUM MATERIAL IN GEOLOGY AND PALEONTOLOGY

By Edwin D. McKee

In the collection of geological material, just as with zoological, botanical, or any other, the work must be done with two equally important yet vastly different aims in mind. The first of these aims is to provide excellent specimens for exhibit purposes, the second to gather into a study collection all of the material available which is of interest and importance. From this, it may be readily seen that almost every geological specimen which is of an unusual or fine nature (except those which have greater value in place) will find a place in a museum - though not necessarily for exhibit. The importance of a good study collection with as complete a representation as possible of various phases of the subject can scarcely be over-emphasized since it forms a background for exhibits and a basis upon which to work up the subject.

A good classification of the various phases of geology which may be represented in a collection and demonstrated in the exhibits of a museum is as follows:

1. The land forming processes as demonstrated by sedimentation, igneous activity, or metamorphism.
2. The structural features resulting from local or general earth movements.
3. The processes and results of erosion.
4. The development of stratigraphic history as represented by fossils.

To this list might be added still another group, namely "ores and minerals" which are of general interest though scarcely as significant in the story which they tell.

It may readily be seen that the groups listed above have a very definite relation one to the other and it is their combination which makes any region and its topography what we find it today. Where geological exhibition is concerned, therefore, it is clearly desirable to show this relation and thus to present a unified, definite story of the earth's history in the region designated.

In geology, even more than in most other subjects, the necessity of excellent specimens and clear well-defined statements of their significance is extremely important. Many specimens which have great value to a geologist are merely confusing and so worth less than nothing as a demonstration to the layman. In some cases this factor may be remedied by the use of a good label.

A good introduction plays an important part in the telling of geological history. This introduction should take the form of carefully selected maps of the park itself, and of the park in its relation to larger units such as the state or country as a whole. Where possible, relief models should also be introduced in this capacity.

SOME NOTES ON ETHNOLOGICAL AND HISTORICAL COLLECTIONS FOR PARK MUSEUMS

By Frank T. Been

In treating this subject I have considered archeology with ethnology in the manner that we are primarily interested in these subjects as they deal with the history of the national parks. There is available to all the parks some material to illustrate the history of primitive man as he was associated with the park area both before white man came and after white man appeared. Because there is this division in history, the park exhibits may be arranged with this in mind so that one section of exhibit may deal with life of Indians or aborigines and another section with the white man. There will be a dove-tailing of the late Indian history with the early white man, resulting in a natural sequence of presentation.

Perhaps, with the arrangement of historical specimens there is greater need of logical and orderly arrangement than with any other people, whether past or present, so that they will normally inquire more closely into how people lived at a certain period than they would into animal or vegetable life of a given era. For this reason careful arrangement is required, as people can then follow the change in man's mode of living. The extent to which this arrangement can be carried depends entirely upon the amount of material available. In a general way exhibits are arranged in the following divisions, illustrating:

1. Ordinary mode of living, food, and clothing.
2. Social life, sports, and war.
3. Religion.

Unless a park is very rich in historical material, the above arrangement cannot very well be adhered to, but it can be kept in mind as a possibility.

A great deal of the material suitable for historical exhibits may be obtained from private sources. People whose hobby it is to collect are frequently willing to contribute, and descendants from pioneers often have heirlooms which can be made to fit into the scheme. These contributions may be articles of dress, cooking utensils, money, implements of war, conveyances, pictures, documents, and models. Besides objects obtained from this source, former Indian places of habitation, burial and warfare may yield material. In the latter case, however, a line must be drawn as to the amount of material to transfer to the museum and that which should be left in its natural location, if we can consider a region of human interest "natural."

This brings us to the problem of quantity of display. Because much historical material is contributed, we may feel obligated to display specimens which are mediocre or duplicated. For the best effect, however, only enough should be exhibited to tell the story thoroughly. Dr. Walter Hough, Curator of Ethnology at the United States National Museum said, "An exhibition is valuable as much for its omissions as for its inclusions. ..... The chief idea of exhibit is not quantity but perspicuity. .....The museum is a place of impressions. .....A museum is not a place for a studious grind, but a temple of the Muses where knowledge may be acquired through a gratified application of the higher senses."

Efforts should be made to have historical mountings inclosed in cases because dust quickly accumulates upon them and detracts from the effectiveness of the display. Cases also protect the property as articles of historical consequence are tempting to collectors and those who may hope to realize on the monetary value of the specimens.

The principles of labelling, as discussed in another meeting, may well apply to history exhibits, but they should be very brief if referring to an object the purpose of which is generally known. Implements, the uses of which are known only to archeologists, may well deserve a careful explanation as to use, and possibly also methods and materials of construction should be treated.

Because a properly arranged exhibition should be limited to produce the maximum result, a mass of material may necessarily be stored. In storage, however, the labels should be carefully attached because specimens acquired later may be used in the exhibition with storage material. It may be that articles in storage can occasionally be used in temporary exhibits; a place for such exhibits should be reserved among the permanent displays. Often displays may be loaned for a

limited time or the celebration of a special event may be illustrated by showing reserve exhibits pertinent to that episode in history. Stored specimens can also be used in exchange and for loan.

References: Boas, Frank - Methods of Ethnology - American Anthropoligist N.S. Oct. Dec. 1920.
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Coleman - Manual for Small Museums - 1927.
Hough, Dr. Walter - Installation of Ethnological Material - Proc. A.A.M. 1916.
Parker, A. C. - Method in Archeology, Toronto, 1913.

Following Mr. Been's paper he presented for discussion the question of whether or not the exhibited material in the field of ethnology should be limited to that from within the borders of the park. It was the consensus of opinion among those present that the ethnology and archeology exhibit should be limited to the cultural region within which the park is situated but not necessarily within confines of the park, although material within the park boundaries would be of greatest value. It was agreed that occasionally it would be advisable to exhibit comparative material from other nearby cultures so as to demonstrate differences and similarities between related or different aboriginal stocks.

It was proposed that it might be highly important to have a specialist in archeology and ethnology on the headquarters staff of the Educational Division --- a man who would during the summer work with individual park naturalists in their own parks in collecting and preparing exhibits and who would work during the remainder of the year at Educational Headquarters preparing exhibits of archeological nature. Mr. Russell pointed out the fact that the National Park Service has already appointed a Chief Archeologist and that he can be called upon to assist in an advisory capacity. Also, assistance can be obtained from other specialists in this field for the time being, although ultimately it would be highly advisable to have a specialist in this line working in cooperation with the other scientists on the headquarters staff.

SOME NOTES ON THE COLLECTING AND EXHIBITING OF HISTORICAL MATERIAL IN NATIONAL PARK MUSEUMS.

By C. A. Harwell

The History room at the Yosemite Museum has certainly demonstrated the intensive interest of park visitors in the human history of the region. Mr. Hall and Mr. Russell are the ones responsible for the collection of

the materials and the success of the exhibit. It is only seventy-eight years since the official discovery of the Yosemite Valley by the Mariposa Battalion yet there is a mass of interesting material available for worth while display. Here are some types:

1. Progress in travel, as to ways of travel and roads and trails shown by display of early stage coach, photos and relics.

2. Progress in the human development of area as shown by maps, photographs, charts, etc.

3. Progress in development of system of protection as shown by relics, photos, etc.

4. Progress in photography as shown by series of photographs featuring the earliest.

5. Progress in Mining of region.

6. Progress in any other phase of the parks' development and history of the region of outstanding interest when attractively arranged and labelled.

Methods of collecting these data, relics, and materials, depends on interest and resourcefulness of park naturalist and his helpers. Surely every park should be making every effort to secure such materials before they are scattered and made unavailable.

Personal contacts, letters, appeals in lectures, posters, circulars, etc., can be used. Private funds can be solicited to build up such work. Outside agencies can be appealed to.

In every case the permanence of the materials asked for or collected must be assured. A fireproof building is the answer.

It should be kept in mind that what is common today may be historically valuable fifty or a hundred years hence. Some current materials should therefore be filed with history collections for future use.

Following Mr. Harwell's paper Mr. Hall again accentuated the desirability of the park naturalists immediately securing all available historical material as this is year by year being destroyed or becoming harder to find. The accumulation of historical exhibits will at best take considerable time and the work should be started in this field immediately, even though the materials collected will have to be stored until exhibit space is available.

RANDOM NOTES ON MUSEUM TECHNIQUE.

By C. F. Brockman

In any park museum which has approached to some extent a more finished accomplishment there might be included a series of exhibits relative to all the parks which would show the relationship of each area to the entire system. The best possible way of doing this probably would be by using small relief models - such models being constructed to a uniform scale.

In the arrangement of rocks and minerals, rather than assembling a conglomeration of specimens, we in Rainier have found it more suitable to exhibit the various rocks in sequence so that the story of the park's geology is portrayed as well as making the visitor acquainted with the various characters of the individual specimen. In mounting these rocks, if a plaster of paris base is prepared the specimen will always be exhibited in the same and most advantageous position.

Flora exhibits offer a problem as pressed flowers oftentimes are contorted by the pressing process and sometimes lose their color. During the season flower displays or wildflower gardens give one an opportunity to study this feature (exclusive, of course, of study along trails); but during off-seasons a cabinet containing several swinging "leaves" of beaver board with specimens arranged upon them according to botanical classification will give visitors some conception of this feature. It is understood that each park should be possessed of an herbarium, but this is for scientific use or study only. If it is desired to preserve cones, foliage, etc. of trees for photographs or exhibit, such material can be kept intact for long periods by preserving in a solution of glycerin (5%), formaldahyde (5%), and water (90%). This will tend to destroy the natural color but it is suitable for photographic purposes.

Considerable difference of opinion was expressed by the members present as to whether or not it is advisable to place in a park museum exhibits from other parks or regions. No agreement was reached on this point as most park naturalists felt that the park museum should tell only the story of the park itself and its adjacent region. Others felt that we could profitably devote one room to exhibits from other parks. It was concluded, however, that if the latter were done these exhibits should be of a general nature, such as maps, relief models, pictures, etc., and that such an exhibit should be entirely separate from the sequence presented in the main museum.

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ADMINISTRATION OF PARK MUSEUMS

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FUNDAMENTALS OF MUSEUM ADMINISTRATION

By C. P. Russell

Successful administration of a museum --- as of any other organization --- depends upon clearly defined relationships between staff members. It is a fundamental law of group action that an individual in an organization be responsible to but one superior. That one superior should be the man who is empowered to recommend his appointment or revoke his appointment. If administrative organization is not set up with this fundamental in mind invasions of rights and insubordinations are bound to follow.

The American Association of Museums has drawn up a code of ethics for museum workers. It bases its admonitions to personnel on the qualities of devotion to a cause, faith in the unselfishness of co-workers, and honor as a controlling factor in action. In the last analysis the effectiveness of museum administration depends upon the character of individuals who make up the organization. If the three qualities mentioned above do not exist in the individuals in an organization, the Director of that group, be he ever so business-like, is not going to have clear sailing. Good administration begins with the selection of personnel and the development and maintenance of an esprit de corps.

Special interests of the Director should not bring undue favors to one branch of work and neglect to others.

All decisions of a director should be based upon policy - never upon favoritism.

Rules must, without exception, be enforced impartially.

A channel of authority must be established before the authority can be exercised.

The sphere of a superior is his subordinate, not the subordinate's work.

MUSEUM PERSONNELL

By Frank T. Been.

The personnel of a National Park museum consists of a group of museum workers headed by the park naturalist, who may be considered the museum director. As the director, the naturalist is an administrator, but he is also to some degree a curator. In a park museum,

the management of personnel may be a rather simple matter as the size of the institution will not ordinarily require a force of more than two or three. However, while it is possible to do so, the museum should have at its disposal a man qualified to arrange the technical details of museum installations; the naturalist usually has not the time for this detailed work. This man may be available only in the summer season as a ranger-naturalist, or if the naturalist has an assistant, this man may have time available for this kind of work.

A valuable part of the museum is the library which, when fully developed, should have a librarian who may possibly be detailed to do some of the museum preparation.

Although it may not be possible to obtain as a park employee, a man equipped to carry on museum preparation, there are men in museum work who are willing to become temporarily a member of the staff in order to prepare exhibits which may be urgently required. Such men may be paid or they may contribute their services.

The preparation of cabinets, frames, panels, etc., will require a cabinet-maker or carpenter, but this work can be done by a park service carpenter; and high school manual training classes are frequently glad to have tasks of this kind upon which to work.

Planning a park museum personnel is not a very serious problem for most of us at this time, because we are extremely fortunate to have a museum specialist at Educational Headquarters with whom we can share all of our museum planning and preparation problems. But, if the conditions were ideal, a park museum should have a curator equipped to handle almost any kind of museum mounting, a librarian, and a care-taker who may also be the cabinet-maker.

References: Coleman, L. V. - Manual for Small Museums.
Gilman, B. I. - Administrative Organization and its Two Perturbations. Proceedings A.A.M. V. 10, 1916.

Following Mr. Been's paper there was a lengthy discussion of museum personnel problems and general personnel problems. One of the main subjects of discussion was whether or not the directorship of a park museum should remain in the hands of the Park Naturalist, or whether it should be relegated to a member of his technical staff. It was agreed that even where a permanent staff is available, the directorship of the park museum should remain in the hands of the park naturalist, not merely because of his general grasp of museum problems, but also because most educational activities center in the museum and the museum exhibits should be correlated with the general educational program.

OFFICE METHODS IN A MUSEUM

By Dr. Geo. C. Ruhle

Behind the current methods of office practice in a museum, promptness and efficiency are as vital, as important as in other business.

Correspondence: All official letters issuing from a park naturalist's office should be typewritten and carbon copies made and filed in alphabetical order of the addressee's name. With these duplicates should be filed letters received. It may be found convenient to keep index cards of organizations listing names of individuals therein with whom correspondence is held. Some follow-up system should be adopted to insure proper disposal of all letters received. This can be greatly facilitated by use of rubber stamps, so that the letter may be routed around the office before it is filed. I personally make marginal checks on all letters to insure answering all items or otherwise designate that the portion checked is important or should be followed up. If on a certain date, a reply to a letter should be on hand, or a letter should receive other attention, the date is jotted in a square in the upper right hand corner. Letters so stamped are recorded on a sheet or pad to receive proper attention.

Memoranda: It is suggested to keep notes on cards or scratch stationery of two sizes, one of letter size for extensive memoranda; one on 3x5 slips for short notes, which can be slipped into file cases if desired.

Devices: Addressograph and mimeograph are all-important for facilitating mailing of Nature Notes, etc.

In all office methods, the importance of written standard practice asserts itself here, as on other parts of a park naturalist's program.

Reference: Coleman, Manual for Small Museums, p. 109.

Following Dr. Ruhle's paper, Chief Naturalist Hall pointed out the necessity of carefully planned management, even where educational activities are just being started. Systematic records are vitally necessary. They not only give permanent records of the current program but are also necessary so that the educational work may be carried on from one year to another and will not suffer because of changes in personnel. Permanent records make it possible for a new man to plan and carry on his work where his predecessor left off without building up a new system of his own which might or might not be correlated to the work as previously carried on.

The point was made that a program of work is vital and that even a daily program of work is important so that each man will know what problems he is personally facing and what problems are being worked

upon by each member of the organization as a whole. It was agreed by all members present that it is advisable to supplement the current "Plan of Administration for the Educational Activities" of each individual park with definite written plans for the ultimate educational development. It was agreed that in so far as possible these development plans would be tentatively drawn up by park naturalists in cooperation with Superintendents and that they would be studied by the headquarters staff of the Educational Division and, when approved, incorporated with general plans of park development.

In another statement regarding museum office methods, Mr. Hall accentuated the fact that the administration of a park museum and of the educational work of a park is essentially a part of the administration of that park as a whole and that, therefore, the park naturalist should make every effort to work out his plans in collaboration with the Superintendent and to keep him informed in matters of current administration. It is also advisable that the park naturalist inform himself about the activities of all branches of park administration, as there are many opportunities for coordinating the educational work with these other activities.

It was pointed out that the park naturalist should be careful to administer the office work of his museum, and of his department as a whole, in line with the policies approved by the park service and the park superintendent. All correspondence, for example, should be routed through the superintendent's office and all matters involving policy should be approved by him before being sent out, unless this regular procedure be modified by his order. In other words, the park naturalist should endeavor to make his particular department a vital factor in the general administration of the park under the superintendent rather than to regard his department as separate from the remainder of the organization.

The point was also stressed that the park naturalist should endeavor in so far as possible to avoid unimportant correspondence. While the stenographic situation at the present time in many parks is extremely unsatisfactory, there is every probability that this situation will be relieved with the development of the educational activities. Even where adequate stenographic assistance is available, however, every effort should be made to limit correspondence to a minimum as each letter written is produced at a definite cost to the government and must be justified by the results obtained.

MUSEUM RECORDS

By C. Frank Brockman

Museum records may be divided into three classes:

1. Records of the internal organization including a catalogue of all public exhibits, stored specimens, accessions, plans and projects contemplated, etc.

2. Records that pertain to outside agencies - such as names and addresses of interested organizations, individuals, etc.

3. Records and catalogue files that make accumulated technical data, books, etc., more readily available. All material should be arranged so that the naturalist can put his hand on it and get the desired information with a minimum of time.

Records, while being partly a stenographic job, are of great importance in the museum as it aids in systematizing the work. In the case of small museums in parks when the work is just getting under way and where the personnel is limited a very simple but basic system should be worked out. This system should be such that it can be enlarged and expanded as the work progresses and as stenographic help becomes available. However, in small museums, where the majority of effort is of necessity confined to collecting and development, the clerical work must assume secondary importance for obviously the matters of prime consideration must be taken care of first.

After the reading of Mr. Brockman's paper, the following points were brought out in a general discussion:

All records should be permanent in nature and should be such that it will not be necessary to copy them at a later date. They should be incorporated in the permanent records, such as the museum accessions book, card files, etc.

Records are indispensable in the labeling of exhibits. Complete data should be obtained and recorded for every specimen secured for the museum. A large permanent accessions book should record the name of the exhibit and all data as to when acquired, the name and address of the donor, etc. Each object should be given a number and numbers should be consecutive as exhibits are received.

To supplement the accessions book there should be a card index of all exhibits, arranged alphabetically by subjects. These cards should

contain all necessary data, the number of the object and its position in the exhibit case or storage case. A duplicate series of cards should be filed in a fireproof vault, and preferably in another building.

A card index of all donors should be kept, and this record should be cross-indexed with the above records so that any exhibit can be immediately located.

A record should also be kept of all possible accessions which may be obtained in the future, where and when they may be available, and under what conditions they may be obtained.

SOME GENERAL POLICIES OF MUSEUM ADMINISTRATION

By Dorr G. Yeager.

The policies governing the administration of a museum, as other policies, should be strictly adhered to. Laxness in the adherence to these policies will result in failure of retaining an efficient museum staff.

Accessions: Among the most important policies are those relating to accessions for it is largely on the accessions that the success or failure of a museum rests. First of all as to the source of the gift. It has been pointed out in preceding papers that one need not be embarrassed in soliciting gifts. Tact must be used, of course, in this procedure. In accepting gifts, discretion must be used as to the type and relation, else the director will soon find himself overburdened with a collection of accessions which he is unable to use. We have pointed out the necessity and advisability of collecting only exhibits pertinent to the park itself. Gifts should be accepted only with the understanding that they are to be used as the director sees fit. The donor should never dictate the use to which a gift shall be put. Upon receipt of a gift, it should immediately be acknowledged in writing and it should then receive its accession number which should be attached. A brief history of the accession should then be made in the accession book with the number. The accession should then be catalogued, preferably in a card file with information similar to that entered in the accession book. It is advisable also to make an index of all donors. If the gift is not placed on display or in the study collection, it should be stored in a place where it will be immediately available when desired. Note of this storage should be made in the catalogue. Unless the above policies are carried out the collected accessions will be a confused mass of stored material with no order and less value.

Study collection: The study collections should be accessioned

as anything else. They should then be made available for study. The policies governing these collections briefly are as follows:

1. Study collections should be orderly and a definite system should be followed in regard to sequence.

2. Study collections of birds, mammals, etc., should be fully labeled as to species, sex, locality, date, collector, etc.

3. Study collections should be open only to those who know how to use them, and should not be indiscriminately thrown open to the public.

Exhibits:

The policies governing the exhibits in a museum have been covered in previous papers. For the sake of convenience, however, they are set down in order.

1. Exhibits should be arranged to tell a definite consecutive story. Each exhibit is a paragraph or a page as it were in the entire book or museum.

2. Exhibits should be well labeled.

3. Exhibits should be so arranged that the effect is pleasing to the eye. They should never be crowded.

Library:

In our park libraries it is important, as in our museum exhibits, that we do not go beyond our scope. Books in the library should have some application to the park or immediate vicinity. It seems to me that all science books should be available for those who desire them. It has been my experience that the ranger naturalists are constantly desiring books during the summer and do much reading along scientific lines. It seems to me of great importance that we make a special effort to obtain all books relative to the park. Many of these are old and are being gathered industriously by collectors. It is a good idea to have all the available book stores send catalogues. These catalogues should be carefully scanned for books relative to the park. In Yellowstone we are constantly on the alert for books and we have built up a very presentable Yellowstone library. Just before I left the park, we sent in an order amounting to over $60 for old books. There are several ways of obtaining these books. A fund of $200 is available for the service which, as Mr. Hall has stated, should be increased. We rely on our income from the sale of publications for the purchase of our books in the park. Another method of obtaining funds is the writing of leaflets on birds, animals, geology, etc., and selling these at our information offices, the proceeds being put into a so-called "book fund." Still another method is the organization of Associations of Natural History as Yosemite has done.

The policy of opening these libraries to the public is a yet disputed point. My personal opinion is that, if a librarian is available, the less valuable books should be at the disposal of the tourists. They should not, however, be permitted to take them out of the library.

Naturally the books should be accessioned, catalogued and filed as in any library. In connection with this a system for the entire service should be adopted and adhered to in each park.

Publications:

Publications are one of the important means by which a tourist can keep in touch with the park after he is out of reach of our naturalists. Certain policies are necessary relative to quality, distribution, etc.

Our publications reflect the standard of our organization. They should, therefore, be of the highest type. The material should be presented in an interesting manner and should be reliable in every detail.

There is one policy concerning Nature Notes which I should like to present. I should like to have the present policy of each park issuing a separate publication continue. If a combination of all Nature Notes is effected, as a whole they will lack local atmosphere and individuality.

Following Mr. Yeager's paper there was an active discussion of whether or not it is ever desirable to accept exhibits "with strings attached." It was concluded that some exhibits are so essential to park museums that they cannot justifiably be refused, even though it may be necessary to accept them under certain definite agreements with the donor. The chief reason for this situation occasionally being warranted is that the field of park museums is exceptionally limited and very often exhibits, especially in the historical field, can never be duplicated. Furthermore, conditions will often later be altered so that such conditions can be readjusted.

It was agreed that gifts are preferable but that exhibits may often have to be accepted as loans --- again, because of the local field of the museum and the scarcity of material. Whether a loan should be accepted or rejected will depend chiefly upon the desirability of such a loan as an exhibit. The purchase of exhibits may be justifiable if such accessions cannot be obtained by gift or loan and if the objects are of sufficient importance.

COOPERATING AGENCIES AND RELATIONSHIP TO OTHER DIVISIONS OF THE NATIONAL PARK SERVICE

By Edwin D. McKee.

In the field of National Park Museums there appears to have developed great opportunities, within recent years, for the obtaining of both assistance and cooperation from outside agencies. Apparently the principal requisite necessary for enlisting such services is the proof of good intentions and of energetic endeavors on the part of an enthusiastic educational staff. More and more an appreciation of the value of park museums is being impressed upon national park officials and outside organizations alike. Once we obtain a sympathetic audience by our demonstration, contributions will follow naturally, and cooperation will be offered by others. The desirability of such a situation is obvious, so should be among our aims.

Cooperation with other institutions may be of varied types. An exchange of literature, of specimens, or even of ideas may be of practical value. Then again in our relation to the country's larger and more purely scientific institutions, a presentation of material in return for some specialist's assistance may also prove of mutual benefit. In brief, there are many possibilities for museum cooperation, and especially among the museums of our various parks ought some system be arranged.

Regarding the relations of park museums to other National Park Service divisions it is already evident in most cases that there other divisions should and do owe their cooperation and assistance whenever possible. Where such an attitude has not yet been obtained, efforts should be made toward its enlistment. The museum is an excellent advertisement for the park as a whole. All park employees, therefore, should consider it their duty to advertise and to boost the museum. Another feature to be considered also is the collection of material. Opportunities for such service frequently come to park employees, especially the rangers, and such work should be considered by them a duty and a privilege. In some places this cooperative spirit is already in evidence, unfortunately not in others. It is up to us, therefore, to do our part towards development of such an attitude.

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NATURE TRAILS

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THE PLACE OF THE NATURE TRAIL IN THE PARK EDUCATIONAL PROGRAM

By George L. Collins.

It occurs to me that experience has already showed that the nature trail is a most useful medium in creating an attitude of attention, interest and respect toward one's surroundings everywhere.

The basic principle of nature trails seems to be informality --- that is, one should be introduced to natural things easily, and in the absolute environment of those natural things. The trails should be relatively short and carefully arranged to show convincingly what is possible of the most important facts pertinent to natural history that any region tapped by such a trail presents.

The trails should be so arranged that the service of any persons functioning as guides is unnecessary. The idea here being to relieve the visitor of any restraint in personal observation or thought, which might be imposed by association with a guide or counsellor. A minimum of descriptive matter, in the form of signs as little repellent to the eye as it is possible to make them, shall give a key to the story of all important objects rather than to have the usual guide to do most of the observing and calling of attention.

The place of nature trails in educational work as carried on by a national park is perhaps only to be shown, like anything else, by results. It is possible that conditions favor the introduction of nature trails in some nationalparks more than in others, at least it appears that in some parks where no museums are established, and educational work is not progressing swiftly, that the comparatively inexpensive procedure of arranging nature trails would be a very good first step. Generally speaking, however, we might say that nature trails are to our educational work what a primary reader is to the educational foundation of the young academic student; it serves as a starter toward more profound understanding and appreciation, and possibly does this fundamental work more happily than would a formal array of exhibits in a museum.

Apparently the first nature trails were designed especially for young people, yet it is true that anything having as much human interest appeal as a nature trail, will attract attention from young and old alike, so the possibilities in answering needs of all classes of park visitors are not to be overlooked.

PLANNING AND RECONNAISSANCE FOR A NATURE TRAIL

By C. A. Harwell

We should classify our so-called self-guiding trails into two kinds, "Nature Trails" and "Labeled Trails". In this paper I will treat them separately.

If possible a "Nature Trail" should be located near the center of activities so that it can be more easily supervised. It perhaps should be a trail through the woods where things of nature to be pointed out are undisturbed, rather than along some well established trail. It should be in the nature of a round trip, telling some fairly complete story with some special point of climax and several rest points. It should not be too long and should be easy to start upon.

Four complete stories in the sense I have in mind might well be told by the four "Nature Trails" which Mr. Hall suggests would start from the Museum at Yosemite. They are: (1) Geology of the Valley; (2) Indians of Yosemite; (3) History of Yosemite; and (4) Ecology of the nearby region. The exhibits along each of these four trails should be limited to objects that logically pertain to the central theme of that trail.

"Labeled Trails" are those trails any place in the park along which a few or many labels have been placed to help the visitor find out for himself some of the most interesting facts concerning phenomena under observation. It seems to me that every trail and our roadsides offer possibilities in this field, but while we are experimenting with the idea the work should be limited to perhaps some one trail.

Following the reading of the above two papers, Chief Naturalist Hall lead a discussion designed to bring out the general principles of planning for nature trails and of correlating them with the other educational activities in the national parks. During the discussions the following memoranda were set down:

1. A nature trail should be a unit in itself. It should be easily accessible. It should, if possible, be located so as to return to the point of beginning. The trail should not be too long nor too difficult for foot travel. Somewhere on the trail there should be a climax of interest.

2. The nature trail should be located in an interesting area and the purpose and plan should be well in mind before it is established.

3. The nature trails should be so planned that visitors will be stimulated to travel over it alone, making their own observations. Occasionally it may be advisable for a ranger naturalist to start a group along a nature trail and then, after having introduced them into the methods of its use, to leave them so that each may enjoy himself in his own way. Sometimes it may be advisable for a ranger naturalist to lead his party over the full length of the trail. In this case, however, he should exercise care to point out features not labeled and to lead discussions which may go more deeply into subjects which are labeled only in an elimentary way. It was agreed that, in general, it is inadvisable to lead guided parties over nature trails.

4. The number of nature trails in each park should be very limited and their locations should be decided upon only after careful study.

5. Nature trails assume great importance in parks where little or no guide service is available.

6. Nature trails should have carefully prepared tread, but evidences of trail construction should be carefully concealed where possible.

7. Trails which are already constructed and in general use can frequently have the most interesting natural features advantageously labelled but these should be recognized by park naturalists as "labeled trails" rather than "nature trails."

8. The number of labels along a nature trail should be limited, as too many labels will detract from the appearance of the trail and may introduce an element of complication and confusion.

9. The effectiveness of a nature trail may be increased by giving it an attractive and catchy name.

ESTABLISHMENT OF A NATURE TRAIL

By Dorr G. Yeager

Principle of Labeling:

The label by the trailside transforms an ordinary mountain trail into so-called nature trail, the features of which can be interpreted

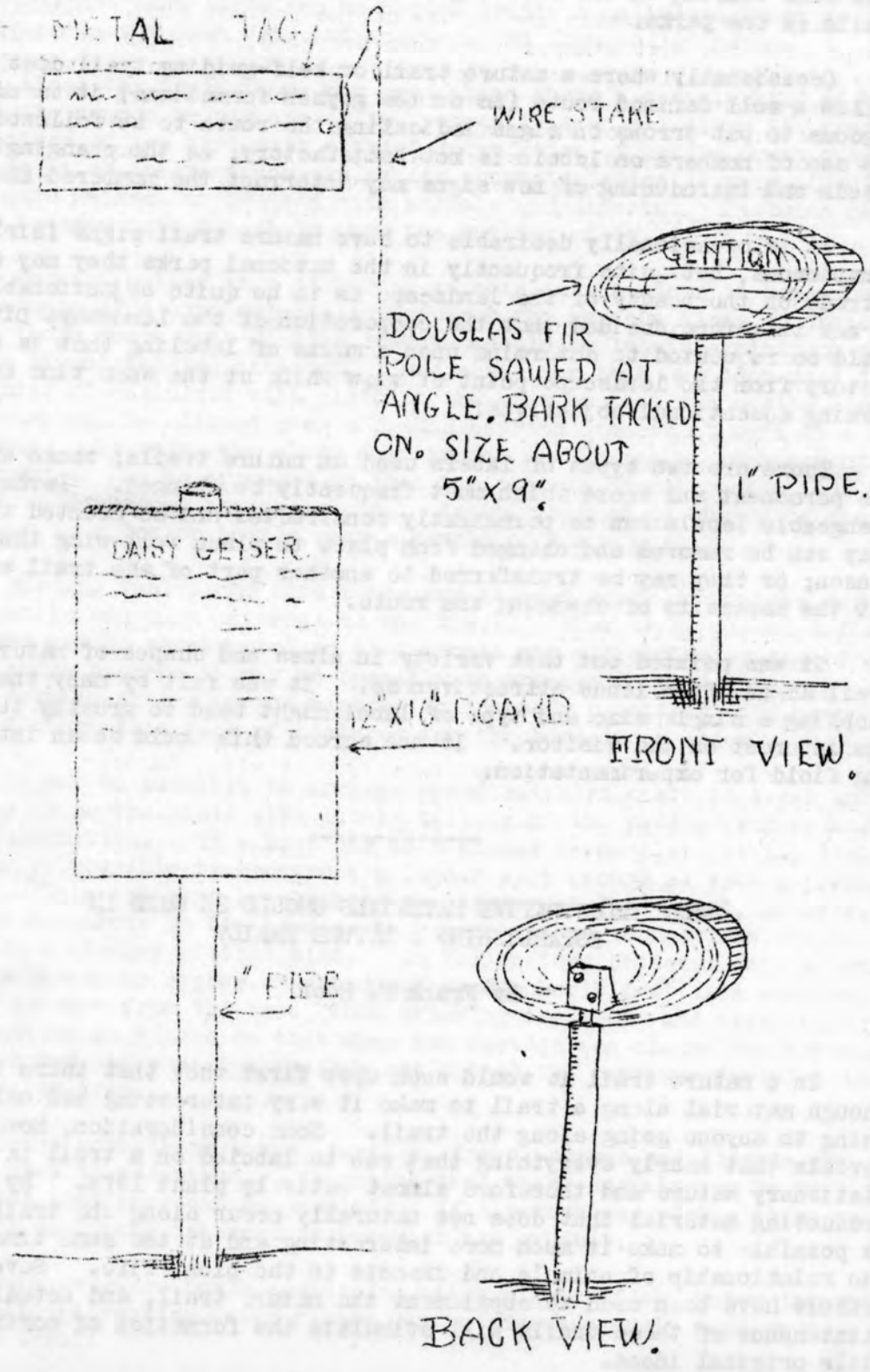
by the tourist. It is, therefore, of vital importance that the labels should perform their function well. In the first place, the label on the nature trail, as in a museum, interprets and tells a story about an exhibit. Certain principles must be carried out if the trail is to be a success. First of all the exhibits should be picked about which a label can tell a story. This is a simple task as there is very little on a nature trail that does not have a story. The labels should be so worded as to create interest and lead the visitor on. In many cases it is a good example to ask a question in one label and answer it in the next. This tends to lead the visitor farther and farther along the trail. The labels should be long enough to convey the story, but short enough not to tire the visitor. Nothing dismays a visitor more than to be confronted with a mass of long labels or signs. The letters should be large enough to be easily read at a short distance. Caution should be used in the number of signs placed on the trail. They should cover the material thoroughly but it should be kept in mind that the visitor is interested in nature, not signs. The trail should not, therefore, be "plastered" with signs.

What Shall be Labeled?

This is a very important point as it is tempting to label everything on the trail and so make a lane in the woods bordered by signs. The pertinent things should be labeled. Each species of tree, for example, should be labeled but it is not necessary to place the name on each Douglas Fir on the trail. It is advisable, however, to repeat in some way the name of the tree two or three times. This may be done by bringing in the name or asking the question "What tree is this? You have seen others like it on the trail." Naturally important pieces of nature lore should receive attention such as squirrel middens, woodpecker holes, bear beds, claw marks on trees, etc. The most important flowers on the trail should be labeled. It is, however, impossible to keep each flower labeled through the summer unless one man is available for frequent work on the trail. It is important that these flower labels receive the strictest attention as the visitor will lose faith if a label for gentians is present and the gentians have disappeared. It is not necessary to confine attentions to objects directly on the trail. A system which has worked well in Yellowstone is that of running strings out to objects off the trail which might be missed by the casual passer-by. Many interesting features are to be found 50 feet from the trail such as nests and these may well be included in the trail itself. Different geological formations can be labeled to good advantage and lend well to treatment. It is not so easy to label birds and animals although this too may be done to a certain extent. For example, if marmots or woodrats are usually seen at a certain point in the trail it is well to construct a sign to that effect. The matter of what should receive attention on the trail is largely one that is up to the park naturalist himself. Sufficient material should receive attention that the visitor, upon completing the trip, has received a well-rounded variety of subjects which have included those things of prime importance on and near his route.

How Should it be Labeled?:

Many types of labels are in use at the present time. Small metal strips with the text stamped upon them are good, although as a rule they are too small to catch the eye and unless they are painted they will be passed unnoticed. Linen tags with the text typewritten upon them are in use to good advantage. These are usually attached to pieces of wire or merely to sticks along the trail. They are white and fluttering in the breeze are very conspicuous. They are affected by weather, however, and are not as substantial as might be wished. On our nature trails in Yellowstone we are using pieces of lodgepole sawed at an angle. I have experimented with several different woods and find Douglas Fir even better than lodgepole for the purpose. The bark is tacked on to prevent pealing and a small piece of specially made wood cut to fit into a pipe is screwed on the back. The text is then printed on the slab and it is inserted in pieces of pipe set at intervals along the trail. This system has several advantages over the other systems mentioned. First, it is permanent; second it is large enough to attract attention; and third, it blends pleasingly with the surroundings. Each spring we go over the entire trail and give the signs a coat of varnish. This protects them from the rain and eliminates the necessity of taking them in each fall and replacing them again in the spring. There are several other systems in use such as pieces of pasteboard covered with a celoiden preparation, labels under glass, etc., but they all have the disadvantage of being affected by the weather. On our trails over the formations we have used for some time "text" signs giving information relative to the pool, geyser or spring. These are about 10 x 14 inches, mounted on pipe. They are painted white and a green text is printed upon them. The action of the steam destroys this type of sign, however, and it is necessary to re-do them at least once every three years. We are attempting this winter to obtain metal enamel signs of the same size upon which the text will appear in raised letters. These are more expensive, but they will last indefinitely and I believe that they will be cheaper in the end.


METAL TAG
WIRE STAKE
GENTIAN
DOUGLAS FIR POLE SAWED AT ANGLE. BARK TACKED ON. SIZE ABOUT 5" X 9".
1" PIPE.
DAISY GEYSER.
12" X 16" BOARD
FRONT VIEW.
1" PIPE
BACK VIEW.

In the discussion following Mr. Yeager's paper, the following suggestions were brought out. These are here recorded since they may have some bearing on the labeling of nature trails and self-guiding trails in the parks.

Occasionally where a nature trail or self-guiding trail does not follow a well defined route (as on the geyser formations) it is advantageous to put arrows on signs indicating the route to be followed. The use of numbers on labels is not satisfactory, as the changing of labels and introducing of new signs may interrupt the numbered sequence.

It is occasionally desirable to have nature trail signs fairly conspicuous, but quite frequently in the national parks they may so intrude on the beauty of the landscape as to be quite objectionable. It was therefore decided that the cooperation of the Landscape Division would be requested to determine upon a means of labeling that is satisfactory from the landscape point of view while at the same time accomplishing educational objectives.

There are two types of labels used on nature trails; those which are permanent and those which must frequently be changed. Perhaps the changeable labels can be permanently constructed and so mounted that they can be removed and changed from place to place following the season; or they may be transferred to another part of the trail without the necessity of changing the route.

It was pointed out that variety in sizes and shapes of nature trail signs often lends attractiveness. It was felt by many that adopting a single size and type of label might tend to greatly lessen the interest on the visitor. It was agreed this would be an interesting field for experimentation.

WHAT ILLUSTRATIVE MATERIALS SHOULD BE USED IN ESTABLISHING A NATURE TRAIL?

By Frank T. Been

In a nature trail it would seem upon first thot that there is enough material along a trail to make it very interesting and enlightening to anyone going along the trail. Some consideration, however, reveals that nearly everything that can be labeled on a trail is of a stationary nature and therefore almost entirely plant life. By introducting material that does not naturally occur along the trail, it is possible to make it much more interesting and at the same time show the relationship of animals and insects to the plant life. Several methods have been used to supplement the nature trail, and actual maintenance of these trails will stimulate the formation of worth while original ideas.

Perhaps the simplest means of introducing illustrative material is with pictures of animals, birds, or insects. Pictures in color that are not very large can be placed inside a celluloid frame so that it is protected from dirt and moisture and from soiled hands.

Along the trail there may be a place where a certain kind of bird is quite common or perhaps it is frequently seen all along the trail. A picture of the bird with a brief description of habits or an outstanding point of interest concerning its characteristics is very effective. The same method can be used with animals and insects. Pictures can also be used near a nest to show the builder of it.

Perhaps better than pictures, insects can be shown in boxes or containers of a type especially prepared for various kinds of insects. With these containers of live insects should be labels explaining anything of outstanding interest. One container that has been used is cylinder of celluloid with cloth at the ends so that the entire contrivance can be slipped over a branch bearing insects at work at a nest of them. By tying the cloth down around the branch at each end of cylinder it can be arranged so that the insects cannot escape, but may be watched through the celluloid. Another method is enclosing the insects in a box or bottle near a sample of their work.

Feeding tables and bird baths may attract birds in numbers sufficient to add much interest to the trail. Near these places a few benches may be constructed so that people may sit and watch the birds. Near these benches it may be possible to arrange bird pictures in book form so that a person wishing to identify a certain bird, can look through this rack of pictures for the bird in question.

It may be possible to arrange abandoned bird nests in trees and bushes along the trail with labels telling of the builder and method of construction. If a nest has been placed naturally near the trail, it may be possible to construct a ladder high enough so that a person may see into the next by climbing the ladder. This stunt, however, may be dangerous to the bird as there are always thoughtless people to ruin a display of that kind. In Yellowstone National Park a rather unique method to expose an abandoned woodpecker's nest in a snag was to cut a section from the tree, thus exposing the nest, and then replacing the section on hinges so that when the section was closed the entrance hole showed and when the section was opened the nest was revealed in the hollow tree.

Boxes containing toads, turtles, frogs, snakes and lizards are often used to advantage. It may be that these animals can be so enclosed that they can be handled. If a person can pick a thing up, a great deal more interest is taken in the exhibit.

Tubs or glass bowls containing water plants, fish, water insects, or small interesting water plants may be advantageously used on a nature trail.

It may be possible that animals frequent a certain part of trail quite regularly at certain times of day. If these animals leave tracks, it may be worth while to smooth down a dusty part of the trail frequently so that the animal stepping on the unmarked soil leaves a distinct track. This method can also be used with birds. It may be possible to make the footprints with mounted specimens, also.

Another contrivance that has been used is pivoted arrow mounted on a horizontal dial upon which are marked different species of trees that are some distance away with a description of the main tree characteristics. By placing the arrow over these marks, the observer can study the trees from a distance.

There are other means of adding to nature trails, but the above have already been successfully tried.

MAINTENANCE AND USE OF NATURE TRAILS

By C. Frank Brockman

The nature trail may develop into one of the major features of the educational system for it first serves as a sort of index of what may be found in the region (as the location should obviously be charted through the best areas); secondly, it will act as an incentive to get people out on the trails and see things for themselves; third, it is a means of popular instruction as all features of interest are labeled; fourth, it has a great appeal for people who for one reason or another cannot hike for long distances; and fifth, it will implant a love for the outdoors and a greater appreciation of nature in transient visitors - those who spend but a short time in the park.

One of the principal features of the nature trail is timeliness. It should tie in directly with the museum but, unlike that activity, which is more immobile than the nature trail, should, if it is utilized to the utmost, be constantly changing with the trend of natural conditions. During the season it must be constantly patrolled and gone over at regular intervals so that all labels, etc., can be kept up to date --- new things brought to the attention of the visitor and obsolete things being erased from his view. For instance, in the case of a fern; when the fronds begin to unfold this should be pointed out and explained and when they reach a later stage of development this requires a totally different type of story, while when completely mature a third label is necessary. This same principle applies to flora, fauna, and all features except possibly geologic exhibits which are not subject to rapid change.

Of course the primary step in the development of this activity is to have a trail --- one that can be easily followed and is easily discernable. If this is done and a suitable sign is artistically placed at the start it has been my experience that very little difficulty will be had in getting the people to use it. Each trail should, if possible, have some feature of major popular interest that will serve to headline or attract the purlic along the initial stages --- then the other points of natural history should be presented in a sufficiently interesting manner to hold this created interest.

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EXHIBITS IN PLACE

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PURPOSE AND SCOPE OF EXHIBITS IN PLACE

By Edwin D. McKee.

The value of an exhibit in place as compared to that of the same specimen in a museum collection is many fold. It has only been within rather recent years, however, that this important principle in educational work has been fully appreciated. Many prominent American scientists and educators today --- principal among whom is Dr. John C. Merriam of the Carnegie Institution --- believe that the opportunities afforded by the National Parks for the use of such methods give them the finest opportunity of any American institution for education development.

Geological exhibits are, perhaps, among the most important of those which should be preserved and presented wherever possible as found. Glacial scratches and grooves as seen on the rock walls of Yosemite, for instance, mean infinitely more if left in place to demonstrate their story and relationship to the region, than if removed for exhibition some place where perhaps not even the original location may be seen. A still more significant example probably is found in the giant reptile tracks of the Grand Canyon where they pass beneath the rock cliff of the canyon walls. In place, even the most casual observer will note that while they were undoubtedly formed in the sediments when soft, they have since been covered by thousands of feet of various materials. If, on the other hand, the same tracks are presented as hand specimens, these factors and even the idea of their genuineness may be questionable in the minds of many people. In locating a trailside museum, therefore, a very important factor is to have the location with as many as possible of such exhibits "in situ" and then to make full use of these.

It may readily be seen that the principle of exhibits in place will apply to many other fields besides geology. An archeological ruin has far more significance to the average person when restored with its exhibits left where found, than when they are scattered to various other localities. Plants and animals are also important "in place" as demonstrating such things as life zones, and in this case extreme care should be taken not to introduce the living species to other regions than their native, since much confusion to the student might result.

POTENTIAL EXHIBITS IN PLACE

By Dr. Geo. C. Ruhle.

In seeking exhibits for labeling along self-guiding and "nature" trails, it must constantly be borne in mind to choose only such that carry a message of interest to the layman. To stimulate this interest variety and character of story is foremost. Among potential exhibits for a nature trail within a national park, objects such as the following might be listed:

GEOLOGICAL EXHIBITS

Surface features of individual rocks, such as striations, glacial grooves, slickenslides, ripple marks, character of fracture, mineral constituents, petrographic characters.

Scenic features visible along trail - their origin and nature.

Illustrations of geological processes such as examples of diastropram, aggradation and degradation.

Character of Outcrops. Fossils.

BOTANICAL EXHIBITS

Trees, shrubs and flowers, either whole or in part (as the cross section of a tree).

Cryptogamous plants, especially those playing an easily comprehensible important role --- plant societies, such as parasitic fungi with conspicuous fruiting bodies, lichens, etc.

ZOOLOGICAL EXHIBITS

Naturally very limited, except if one cares to substitute lifeless models, which I consider quite out of good taste. Such things as birds' nests, animals' burrows and homes, work of animal life are excellent.

ECOLOGICAL EXHIBITS.

Among those not falling under botanical and zoological exhibits mentioned above are such examples as soil characteristics and its effect on life, plant and animal colonies or units and the factors involved on their composition and history. Interrelationships always are of primary interest.

ETHNOLOGICAL

The works of man such as mortar rocks, traces of aboriginal habitations and accupations.

HISTORICAL

Sites of historical events, features constructed by pioneers and historical personages.

PLANNING, DEVELOPMENT AND USE OF EXHIBITS IN PLACE

By Dorr G. Yeager.

Planning:

In planning an exhibit in place several things should be kept in mind. If it is far from a road or if it requires exertion on the part of the tourist to reach it, the subject should be of sufficient interest to warrant that exertion. If several exhibits occur in the same locality it is obvious that they should be connected by a single trail. The topography should be studied in order to ascertain the easiest approach. The permanency of the exhibit should govern the amount of work expended on its development. The geysers of Yellowstone are a good example. Often a new geyser breaks out but no definite steps are taken to development of it until it is assured that it is permanent.

Development:

First in the development of an exhibit in place comes the factor of making it accessible. If it is a major attraction which will attract thousands it may be well to build a road, keeping in mind, of course, the policy of keeping roads out of wilderness areas. Otherwise a trail will suffice. A good system of trail markings with distances & directions are necessary. The exhibit should be fully labeled. The value of the exhibit will determine the amount of development necessary. A shelter may be needed to keep it intact, if so, this shelter should be built. It may be necessary to keep tourists at a distance from it, either to protect the object or to protect the tourists. Rails may have to be installed. If the subject warrants, a miniature trailside museum may be built up around it.

Maintenance and Use:

The upkeep of such an exhibit is important. Broken signs should be replaced with new ones; railings, etc. repaired as occasion demands.

An exhibit in place should receive the same attention as far as orderliness as a museum itself. Papers should be picked up and debris should be removed, keeping the area as much as possible in the state in which it was originally discovered. The subject of use resolves itself into the problem of getting tourists to visit the exhibit. Many times such an exhibit may either be included in a field trip or may be the objective of the trip. If it is too far for trail trips the object can be given as much publicity as possible through signs, lectures, leaflets, etc., and persons urged to pay it a visit.

GUIDING IN THE NATIONAL PARKS

November 16, 1929

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THE FIELD TRIP AS A METHOD IN EDUCATION

By H. C. Bryant

The national parks have several millions of visitors annually. What do these visitors seek when they go to a national park? Though there may be many answers to this question, certainly an answer in general terms might be: Self-improvement.

Many park visitors would be satisfied with a jazz program and with no urge to improve themselves mentally. Should an educational program in the parks meet this low ideal, or should it choose to have a program planned by experts? In other words "what they should get" while they are in a park is not merely what they want.

The aims of educational work have already been discussed in this conference. Now is a good time to discuss how these aims are to be attained. In other words, what methods are most effective in actually teaching the visitor about the outstanding phenomena of a park and so stimulating his interest that he will continue to study nature? In general, we have used the following as methods: lectures, museums, field trips. Personally, I believe that the field trip constitutes one of the very best methods of attaining the objectives toward which we are working.

Originally an educated man was judged by the number of books he had read. A well read man was the educated man. During the last generation, the lecture method has been heavily stressed in our universities. The man who had attended enough lectures and showed he had assimilated what was said, was considered the educated man. Now there is a turn to an emphasis on experience, on doing or seeing rather than reading or hearing. Personally I think this is a splendid step in advance. The man with first-hand information is most useful to himself and to others. A study of the field trip as a method in education shows that here we have the finest opportunity to emphasize a study of the real thing rather than a study of printed or spoken descriptions of it.

Let us line up some of the advantages to be found in this particular method. They may be summarized as follows:

1. Opportunity to get a first-hand acquaintance with the thing itself.

2. Opportunity to study environment unchanged.

3. Personal contact between instructor and student is of the best because of informality. The student is not afraid to ask questions.

4. Facts regarding the living things most forcefully presented by field study.

5. Interest of the student easily secured.

6. Great concepts more readily explained and assimilated.

7. A method to which people are unaccustomed has advantages and arouses curiosity and therefore draws crowds.

Among the disadvantages which may be listed are:

1. Some people with physical handicap are unable to attend.

2. Number that can be reached limited.

3. Subject is more or less limited by material at hand.

4. There is danger of dissipation of interest.

5. Inclement weather decreases effectiveness.

I am sure there are several geologists who are willing to say that two weeks of direct study at Grand Canyon will furnish a better understanding of geology than a year spent in university class rooms. To be able to utilize all five senses in comprehending a subject establishes usable concepts in the brain which cannot be secured by any one of the senses, particularly when the information is second-hand. In my opinion, the field trip constitutes the best method of attaining the ideals set in connection with educational work in national parks.

A round table discussion on the general principles of guiding followed the presentation of Dr. Bryant's paper.

PRINCIPLES OF GUIDING IN THE NATIONAL PARKS AND NOTES ON THE INTENSITY OF SERVICE OFFERED

By Dorr G. Yeager

Principles of Guiding:

The principles of nature guiding are many and books could be written on the subject. In an article which I recently wrote for the 1929 Ranger Naturalists Manual under the title "Elements of Nature Guiding" I summed them up as follows:

1. The love for nature and the ability to stimulate an interest and corresponding love for living things to members of your party.

2. A thorough knowledge of your subject, and the ability to pass that knowledge on in simple, interesting terms.

3. Courtesy and a level head.

4. A character big enough to say "I don't know"

5. Originality and a sense of humor.

Unless one has led trips in the field the importance of these principles can scarcely be appreciated; but they are all-important to successful guiding.

I will treat each principle briefly. It is obvious that it is necessary for a successful guide to love his work. The most successful guide I ever knew loved it so much that he radiated that love to his entire party. That was the secret of his success. A thorough knowledge of the subject is essential if the attention and faith of the party in their guide be maintained. I realize that it is impossible for any one man to know everything about a subject; though and, as I have pointed out in "4" above, he should be able to say "I don't know." He should, however, offer to look up the answer to the question. The third principle is self-evident and so, I believe, is the last.

In guiding, one of the biggest assets is a knowledge of psychology and the ability to apply its principles. If the crowd is tired a story at the psychological moment will do wonders to put new life into them. If they are in receptive mood this should be taken advantage of by the guide. If they are not, then it is up to him to get them into that mood.

Naturally certain other elements would come under this head --- such as the speed of walking, force of the voice, etc. --- which must be regulated from time to time as the crowd dictates. All of these things are better handled by the guide himself, and it is impossible to set down any definite rules.

Intensiveness of Service Offered:

This is a very important problem because a tourist who is "over-educated" is worse than one who has not received sufficient education at our hands. There is much criticism that the tourist is "lectured to death", as I have heard it expressed. Other criticisms , as I have pointed out in a former paper, have reached me that the tourists have time to do nothing but attend our activities. There is a happy medium in which the visitor is satisfied but is not over-burdened with facts. Briefly, the core of the situation is this: The tourist should receive as much instruction at our hands as he is able to assimilate easily. Those who wish to go farther are at liberty to do so and we are happy to aid them in their search, but we should not insist that people take the hikes or attend our lectures for the sake of saying we served so many thousand people during the season.

References: 1929 Ranger Naturalist Manual (Yellowstone)
"Elements of Nature Guiding."

Yosemite Ranger Naturalist Manual - Several articles on guiding.

During the session which followed the presentation of Mr. Yeager's paper, there was a long discussion on the principles of guiding as applied in the national parks.

All present agreed that the standards must be of the very highest, both as regards the scientific data presented and the method of presentation.

The question was raised as to whether or not it may be possible to limit the number of persons taken on guided trips on the premise that it is better to serve a few with outstanding success than to serve a great number poorly. The suggestion was made that the size of guided trips could be limited by not advertising the trips extensively; then only those who are especially interested in the trip would inquire about it. Several objections were raised to this plan, chief among which was that many persons to whom the guided trips would mean most would never learn about them, and would therefore not have the opportunity of taking advantage of this type of service. It was agreed that park naturalists should carry on to the best of their ability, even though inadequate assistance makes it necessary to serve larger numbers than the ideal size group.

The point was brought out that the very fact that large numbers of visitors are being served will ultimately give justification for increasing the personnel. Even in view of this condition, emphasis was placed upon the basic principle that quality of work should be our objective and not quantity. It was agreed that emphasis should not be

placed on numbers served but rather on the effectiveness with which the work is carried out. The fact was brought out that the effectiveness of the educational activities in the individual parks is at present largely judged by reports of numbers served --- particularly when these reports are being examined in Washington or elsewhere by persons not thoroughly familiar with the educational activities. Mr. Hall stated that when an educational officer is added to the headquarters staff in the Washington office this situation will be remedied. It was agreed that as the educational activities expand the park naturalists will continue to lay emphasis on quality of work.

SCOPE AND FIELD OF GUIDING ACTIVITIES IN THE NATIONAL PARKS

By George L. Collins

Although the trend in our work seems to be always toward more effective means of giving people a fundamental understanding of the things they see in national parks, we have never doubted the worth of guiding and it still seems to be the most important means of imparting our ideas of national park significance.

Before there was a systematic guide organization in any of the national parks, they, as educational institutions, were generally accepted, perhaps, but were not wholly proved and consequently of little importance in the minds of a great percent of visitors. The inception of extended guide service, with its many personal contacts, was probably as much responsible as any other agency in creating in the public mind the more comprehensive attitude toward parks which we see flourishing in greater measure each season. The guide has become better qualified to keep his very important place right along as other developments have taken form.

It seems that other departments of the National Park Service work to develop physical means of getting people into national parks and have come to rely pretty much on the educational department, of which the guide is a member, to keep them there. In some cases this educational department is represented only by rangers or other workers who have many other things to do. But, when in the field, they act as guides and counsellors whenever they can, and in so doing they assure us a great many more satisfied visitors to these parks where specific educational organizations are entirely things of the future. I picture the time when visitors will be so numerous that the problem of their entertainment and edification will constitute an emergency in the ranks of any individual park educational group, and it would seem that in such a case that the guide would be of the very greatest value for his ability to care for large groups at a time.

I believe that one of the greatest problems to us that has been brought about by physical development is suggested in the thought that it is being made easier for people to get into national parks and get right out again, than it is being made easy for them to understand once they do arrive --- in other words, it is much easier to build roads to care for a large number of people than it is to administer to their educational needs; and we are bound to be behind for a long while. But here again, guiding fills in the breach most admirably.

The guide should not fail to operate in regions of any park where the most complex features are present, that is, those features that require the most explanation and are most apt to be overlooked. Briefly, his scope and field should embody the business of personally directing visitors along the several routes of his park in a manner calculated to arouse the greatest and most wholesome interest in their surroundings according to the time they have to spend with him.

Intensity of Service Offered:

This brings up the interesting matter of a declaration of just how far guiding should go in park educational work, where the line of distinction is between guiding and other methods, some of the mistakes made in guiding methods, etc. I have often wondered whether or not the majority of the public follows the guide just because someone else is following him, and they think it is the thing to do, or whether it is an actual fact that the majority of visitors accompany guides because they really do feel benefitted.

In the discussion following Mr. Collins' paper it was agreed that the primary consideration in planning guided trips should be to interest the visitors in the natural features of the park and to give them a general sympathetic understanding of a natural phenomena. This principle is already understood by the park naturalists but it is frequently important to impress upon newly appointed ranger naturalists that their duty is not merely to disseminate scientific information.

It was agreed that it would be advisable to draft a concise statement, giving the primary objectives to be striven for in the guiding activities in the park; if this could be approved by the Director as a matter of policy then the objectives would be greatly clarified.

QUALIFICATIONS OF A NATURE GUIDE

By Geo. C. Ruhle

A brilliant array and rare combination of qualities are those of the guide who successfully leads forth his group into the fields to inspire them with the beauty and harmony of Nature, who leaves with them a burning desire to learn more of her secrets, who awakens a love for the living world that makes life and the whole universe friendlier.

The good guide must first of all be a true scientist, personifying the virtues of his class; a love of truth for its own worth, a tolerance for the sincere beliefs of others, a natural and decorous humility. Without the slightest attempt at equivocation, he must be able to utter a straight forward "I don't know" when confronted by unanswerable questions, but at the same time show a willingness to help find the correct answer. He must not only be a good observer and correlator of facts, he must show proper ability to learn in fields of natural science with which he is unacquainted, and must possess industry which will aid him in obtaining mastery of those fields. He must be thoroughly reliable in all of his exposition, and must under no circumstances whatsoever sacrifice truth for the dramatic or the sensational.

No guide can hope to rise to heights unless he possess a magnetic personality and contagious enthusiasm. It is necessary that he be an ardent devotee at Nature's shrine, possessed with full capacity for appreciation of the aesthetic, and the beautiful. He must embody a coutesy and dignity lofty indeed, but never to the extent of stiffness or artificiality.

Tact and levelheadedness are important traits of one who must daily have close contact with a motley crowd, with people from all walks of life. Discretion must be shown at all times, especially in choice of subjects and material presented on trips. The grave danger of being too technical or of otherwise being incomprehensible, unintelligible to the average park visitor, must carefully be guarded against.

The poet, artist, and story teller must be combined with the teacher who can transfix in indelible characters the great truths of nature.

The best nature guide can not be too careful or fastidious about his appearance. A well-groomed guide always has a better chance to create a favorable reaction with his parties. Slovenliness and carelessness not only tend to draw personal criticism, but reflect on the general qualities of the whole ranger naturalist service.

Public attitude seems to register against female guides. Even though a woman possess a wealth of information, coupled with qualities enumerated above, she will not be as well received, will not be as successful, as the male guide.

To summarize: a guide must be thoroughly acquainted with the natural history of the park in which he works and with the peculiarities of the public with which he deals and he must be able to approach that public in a pleasing, worth while fashion.

In the discussions following Dr. Ruhle's paper all were agreed as to the importance of technical qualifications. Considerable time was devoted to discussion of the personal qualifications of ranger naturalists as affecting the selection of members of the field staff and the administration of personnel during the field season. Several of the park naturalists related their personal experiences of meeting problems in this field which apparently can be handled only in a personal and tactful way.

TRAINING THE GUIDE IN THE PARK

By C. Frank Brockman

Regardless of what technical training or experience a ranger naturalist may have before he begins his work in a given park a certain amount of instruction is necessary to orient him and to acquaint him with the purpose of the educational work. It should be our purpose to manage in every way possible to allow for individuality on the part of ranger naturalists in their handling of the public and in their dissemination of information; but there are, of course, limitations in the various parks that must be observed.

The first thing that a new ranger naturalist must do is to acquaint himself with the features of the park in general. To this aim the Information Manual is prepared, but perhaps another good idea would be to loan or present each new man with a set of the government "for sale" booklets. These he could keep and have for reference. This, as far as I know, is not the practice in the parks; certainly it is not in Mount Rainier, but I believe the two dollars or so per man that this would cost would be a good investment in making available to the public pertinent information.

Another feature of training is to detail a new man with one of those who have already had experience in the park, and if possible continue this sort of arrangement throughout the season. In this manner new men will be given the benefit of the past experience of others.

In the discussions following Mr. Brockman's paper, the following suggestions were listed:

Newly appointed ranger naturalists may be prepared by,

(1) General reading of references before entering the service.

(2) Personal acquaintance with park by means of a tour guided by the park naturalist and other officers at the beginning of the field season.

(3) Reference to published data, information manual, manuscript material, etc., during the period of service in the park.

(4) Training under experienced guide and lecturer during period of service.

(5) Frequent staff meetings, during which methods of presentation and sources of information can be discussed.

(6) Ranger naturalists weekly news letter in larger parks such as Yellowstone, where educational centers are widely scattered.

(7) Oral examination of ranger naturalists after period of preliminary training in park.

Emphasis was placed upon the necessity of developing in ranger naturalists a perspective of the park as a whole, even in parks such as Yellowstone, where ranger naturalists must specialize in certain subjects depending upon their station.

PLANNING, ORGANIZING AND CONDUCTING GUIDED TRIPS

By Edwin D. McKee

If guided trips or nature walks are to maintain a standard which is on a par with their importance as indicated by past experience and by popular demand, then their planning and organization are of extreme importance. It should be the duty of the Park Naturalist to personally draw up a schedule of service for his staff. This schedule to be most effective ought to definitely state the program to be followed well in advance, since then can the ranger naturalists not only better arrange their time, but also a definite advertising scheme can be put into operation. Since a stiff and mechanical presentation of the subject is one of the greatest dangers in nature guiding, it is suggested that in attempting to make out such a schedule, the alternation of guides

be kept in mind. If this proves impractical, or for other reasons is undesirable, then at least the number of trips over the same course by any individual should be definitely limited.

The number and length of trips to be made from any section will necessarily depend on the tourist demand and on the staff available at that place. It is probable that in general a fairly short walk --- one with a minimum of physical exertion --- is preferable to longer ones. This is especially true where the weather is hot. It is also true, however, that there is always a certain percentage of the tourists, though usually small, that does not hesitate at, or even desires, longer trips. For this reason, it is sometimes advisable to alternate between long and short walks on a schedule of nature trips. Under the head of long walks might also come trips of a full day or even several days.

The time and place of guided trips will also vary extremely with the conditions of different places so that no set rule or principle for governing them can satisfactorily be adhered to. The time factor will hinge in large part on the park operator's schedule by which the visitors come and go. So far as possible the temperature and other climatic conditions should also be considered. Regarding place: some center, such as the park museum, seems to be a logical and practical point from which to start. The course then will depend upon the concentration and the quality of exhibits and the accessibility of various regions.

The handling of visitors is a problem deserving much serious consideration. The arousing of their curiosity and interest is of primary importance in this work. Presentation should be stimulating, not stilted. It should involve a definite and a related story, not a heterogeneous group of observations. Scientific terms should be eliminated but at the same time the speaker should be very careful not to "talk down" to his followers. In brief there are many such fine points which should be ever kept in mind and applied. Questions should be encouraged. Once a guide has secured confidence on the part of his followers, he will experience an easy time having them keep in a group and eagerly maintain the spirit of the trip.

It seems to be generally considered a good practice to keep some definite objective in mind on any nature walk. By so doing, all of the miscellaneous material explained enroute will connect to form a unified story. Wherever possible, also, it is well to have some especially fine exhibit along the route to serve as a climax.

Following Mr. McKee's paper there was a long discussion on the subject of the effectiveness of the work performed by the various ranger naturalists. An attempt was made to devise some means of personnel ratings. At the present time ranger naturalists are rated in personnel reports at the end of the season only, but the point was brought out that if similar ratings were available during the season the park naturalist might be aided in increasing the effectiveness of the educational personnel. It was concluded that more study should be given to this problem and a rating chart ultimately should be developed.

PHYSICAL ASPECTS OF GUIDING

By Frank Been

The size of party: A nature hike is generally conceded to be most advantageously conducted if composed of about 25 to 30 people. However, a party about twice this size can be quite well taken care of if the guide keeps them close together. A group of over 50 persons becomes cumbersome and a guide is unable to reach the ones in the rear effectively. The ideal conditions in nature guiding may never be attained, because the parties are so large in some of the parks that a tremendous force of rangers would be required to reduce the numbers to the ideal size party. In a party of a hundred or more, the guide may reach the first fifty satisfactorily, and by the people usually changing their position in the line as t e party progresses, the guide can contact the most interested of the party who will make efforts to be near the front.

Fatigue: Perhaps in guiding, there is no more difficult or important feature than keeping the party fresh and receptive. If the day is very warm or the trail is over rough ground, the people are apt to show the results of walking much more quickly than they would on a cool day or over an easy trail. Some parties naturally feel the effects more than others. Where there is the same trail to cover in either case, the guide must work harder to keep up the interest of the lagging group. Usually branching off from the main trail are other trails leading back to camp. The guides can direct those who are very tired over these trails. This may be urgently necessary where there are small children or elderly people in the party. Also, although the loop trail is the best, the trail may cross over upon itself and at these intersections the most tired may wait until the party returns to that point.

The kind of fatigue most difficult to cope with is mental fatigue, but perhaps we may usually consider that the mental reaction may be contributed to be the physical reaction. By watching his party, a

guide can tell when the trip is beginning to drag and when he must inject something especially interesting or call a general halt at some spot where all may rest and perhaps have a general session of discussion.

Length of trip: The length of the trip to be covered in a limited amount of time may establish the factor of fatigue to a considerable degree. A generally accepted short trail may offer no problem of fatigue but on an all-day hike, it is almost certain to enter into the problem. However, the people embarking upon an all-day trip usually seem better qualified mentally, if not physically, to surmount the strain of tramping all day.

On a trail of any consequence it may be generally accepted that a party should be out half a day, starting about 9 a.m. and returning at noon. A three hour trip can quite easily include about four miles and give the guide adequate time to discuss the natural features along the trail. A round trip of this duration also makes possible the inclusion of some special feature of the park; and a goal seems to inject definite interest in the trip.

All-day trips must be varied according to the topography of the trail. An average round trip might quite easily be close to ten miles, but if there is lack of interest along the route as well as at the terminus, it may be advantageous to shorten the distance.

Miles covered daily on a week's trip also depend upon above factors.

Incidental Accessories: If a guide carries a knap-sack, he may have with him binoculars, magnifying glass, geologist's hammer, and test tubes of testing solutions. The use to which these accessories may be put need no explanation. It may also be advantageous to carry a small hand ax. There may be added material which a man may take along to assist in putting over the stories along the trail.

THE ATTITUDE AND REACTIONS OF THE PUBLIC TOWARD GUIDED TRIPS

By C. A. Harwell

My knowledge of this subject is largely from observation and experience in Yosemite during the past four summers. Educational work is very new in our parks and guided trips are not too well established in principle or practice. We must consider all our work as in the formative stage and proceed carefully in order that we may build up a good attitude and favorable reaction on the part of the public toward our service. We should never forget service. In some way every guide should radiate pride in being in the department.

Guiding should be kept on a very personal basis. It is important to consider human nature. The guide should announce his own trip in a clear voice from a vantage point. The announcement is more than a statement of time and place. It is a sales talk. I have created an attitude of interest which has resulted in a favorable reaction to my invitation on the part of the guests at Camp Curry, for example, by use of this announcement:

"Each morning at 8 o'clock and each afternoon at 4 a party goes on a short walk from Camp Curry under the direction of a ranger-naturalist of the National Park Service. I will start with such a party in five minutes and will be glad to have you join me in this walk. Yesterday morning we walked up the inner trail toward the fish hatchery and had a wonderful chance to study the birds, the flowers, and the trees by the trailside. This morning I plan to walk out across the meadow toward the Indian caves. There is no charge for this guide service. It is furnished by the government with hope that we can help you know your Yosemite better. By the way, you should visit our Yosemite Museum . . . . . etc. . . . . ." (to call attention to other types of service).

After answering questions I again announce, "I am starting now on a walk out across the meadow. We will be back by eleven o'clock. Of course, you may return any time you want."

I give this sample of complete announcement for the purpose of suggesting the importance of this phase of our public contact. We make our announcements to ten times the number of people we actually take on our trips. To many of them this may be their only contact with our service. First impressions are lasting. Announcements are important in creating favorable attitudes.

I think we are justified at times in encouraging appreciative friends we have made on our trips to express their opinion of our service to those in charge. Those who have a grouch are quite apt to let their opinion be known. Favorable opinion also needs to be expressed and recorded.

LECTURES IN NATIONAL PARKS

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SOME PRINCIPLES OF LECTURING IN NATIONAL PARKS

By Dr. George C. Ruhle

This outline sets forth briefly some of the basic principles and characteristics of successful lectures by members of the Educational Division in various National Parks. It has been based on analyses of many lectures, and their reception by the public, rather than by digest of current opinion of experts as expressed in various texts on Public Address.

Purpose of Educational Lecture:

Any person bringing a message to an audience should have a definite purpose in doing so. If he himself understands clearly what that purpose is, he should be able to state it in words. No man should appear on any speaking platform unless he has a definite message. The most general purpose of educational lectures in national parks is to impart enlightenment as to facts and interest in the subject material; this should be the beacon guide which every park lecturer should follow. Every lecturer should have something to say - not just "have to say something." No lecture should be attempted unless it possesses a genuine value.

Points of a Lecture:

The lecturer must furnish ideas which should be of general interest, bright, and alive. He must express these in effective words, possessing a logical, naturally unfolding arrangement which is forceful, climacteric. The style of delivery must be pleasing or the whole structure collapses.

No person can lecture on a subject satisfactorily unless he posesses a well-rounded special knowledge of his subject. This must be of such a nature that it is of itself of general interest to a mixed audience or, through the effectiveness of the lecturer, can quickly arouse the interest of such audience.

A public address should be rhetorically and eloquently beautiful. Literary excellence is of such power that it can impart even immortality to words spoken. A popular lecturer should be pleasing not only to the intellect but to the ear. Intelligent people use reasonably pure English, and if that of the speaker's falls below that general level, he merely disgusts. He may be tolerated if speaking on the general level, but in order to inspire, his speech must sparkle; must rise in superior excellence. This statement must not convey the idea of advocacy of use of lengthy or technical words for such practice will only tire, or publish the asininity or affectation of the speaker. Intellectural snobbery (talking down), born of a feeling of superiority (superiority complex) and an endeavor to shine in eyes of the audience is absolutely taboo.

The arrangement of a lecture should be logical, scientific. A speaker is essentially a guide showing the way through a labyrinth of thoughts, ideas, and facts. Many of our lectures are extremely limited in time, and come on such occasions where it is necessary to awaken the enthusiasm of the hearers. A smashing, tingling first sentence often accomplishes this --- sometimes this must tie together the events or atmosphere preceding the lecture with what the lecturer has to say. It is well to summarize what one has said in a lecture at the close. The last sentence ought to leave the audience in an elevated state of mind --- must be sufficiently sweeping to leave the hearers exuberant, exhilarated, and effervescent.

Delivery is as important as the message itself, for it is the medium which conveys the message to the audience. Enunciation, voice, gesture, appearance - all must be given due consideration. If the audience labors to catch words, all effect is lost. The voice must have proper volume, pitch, cadence, tempered with burning earnestness. No meaningless gesture should be permitted to creep in lest it mar the performance. A speaker should appear natural and relaxed, except where tension is needed. The eye is quicker than the ear, the presence of the speaker should set the audience at ease so it is not swept away in sympathy for his timidity or weakness of endeavor, but is unafraid to follow his guidance everywhere. The beginnings of communication lie in a command of the whole body; alertness of body is an exterior expression of mental alertness. The whole general attitude of the speaker is revealed in delivery. Quality, force, time, and pitch are the elements of delivery. In general, a public speaker must use a slow rate of speech to be clearly comprehended.

How can one acquire effectiveness of speech?

Mostly by labor, the fountain head, the mother of oratory. We cannot all be great lecturers, men that speak "pure fire", but we can all be good lecturers, the constant endeavor to improve one's ability is necessary. Analysis of successful lectures is always helpful. Why is a certain lecture pleasing, excellent, inspiring? Daily reading, especially oral, is broadening as well as essential to better lecturing. Listening to the sound of one's voice by oral reading leads to more distinct and effective pronunciation. If lecture material is solely derived from science the lecture will lack gloss and excellence, so familiarity with poetry, drama, history, and the fine arts is invaluable. Thorough preparation of a speech is necessary for a speaker at best cannot rise above his own accomplishments; it is an insult to the intelligence of an audience to appear before it without thorough preparation. Too much cannot be said for written preparation of a speech, as it steeps the speaker with accurate familiarity with what he has to say. There is less danger of omission of something important, while the superfluous is carefully pruned away. Things that require further investigation are revealed, and a clearer, more complete conception is imparted. It adds confidence and aggressiveness, makes for clearer presentation in more eloquent language. Should a written speech be learned or read? - Emphatically, no!

The characteristics of a good speech are clearness - brevity - smoothness - rhythm. The speaker should impart ample knowledge with conclusive facts in a style of great fervor - making every effort towards exquisite arrangement, elegance of language, and high finish. The success of his endeavor is tested by its effect on his audience. The lecturer is more than a sign post - he must furnish atmosphere, background, decoration, and must stimulate and keep alive a desire to hear more of what he has to say.

Reference: C. H. Woolbert - Fundamentals of Public Speaking.

Following Dr. Ruhle's paper, Mr. Gerald Marsh, formerly head ranger naturalist at Yellowstone, and now instructor in public speaking at the University of California, spoke informally on the principles of lecturing. Mr. Marsh took active part in the round table discussion following this and the other papers presented during the day's session.

A few memoranda on points brought out during discussions:

The lecturer must have a very comprehensive background of knowledge; certainly we should not have on our staff any ranger naturalists who can be "drained" in a ten-minute talk. Any ranger naturalist should be able to preside at group discussions after his lecture and should be competent to answer most questions asked. No matter how well a man has learned his lecture, he cannot successfully fool the audience if he has not the scientific knowledge with which to support his lecture. The man who is well equipped with scientific knowledge does not have to exert himself to "put over" the subject, because he has a good fund from which to draw even if it becomes necessary at times to speak extemporaneously.

Spencer, in "The Philosophy of Style", says that paying attention is fatiguing to the audience. The lecturer should always endeavor to make it easy for the audience to listen and comprehend. The subject matter must be made easy for the audience to grasp, and the method of presentation is extremely important.

Before attempting lectures, a ranger naturalist should be given the opportunity of becoming well acquainted with the park, particularly in the fields in which he is to lecture. To have a well rounded background for his talks the man should be given an opportunity of participating in the activities of the park and should also have adequate time to study.

It is important that each lecture should be formulated with a view to the effect or response that is desired upon the audience.

THE PLACE OF LECTURES IN THE PARK EDUCATIONAL PROGRAM

By Edwin D. McKee

The lecture is an admittedly good method of teaching in schools and universities --- possibly the best that we have today for instruction in such places. It undoubtedly is also valuable as a method of educational work in our national parks, though in this case to a far less degree since conditions are vastly different. To what extent the lecture should be employed in the national park's program, therefore is a question deserving much study and consideration. In the university lectures are nearly always applicable since the courses deal usually with subjects which are not and can not be seen close by. In the national parks, on the other hand, the educational work deals principally with interpreting the wonders of the immediate region. For this reason, unless a talk is given out-of-doors and in sight of the subject so that it can be pointed out, the appropriateness of the talk is often doubtful.

Perhaps the best way in which to reach a conclusion as to this desirability, is to survey both the advantages and the disadvantages. Upon examining this problem as applied to the national parks, I find that it has at least three definite advantages. In the first place, it is a method for reaching many people at the same time and with about the same amount of success. Secondly, it is a means of assisting elderly people, invalids, and others, who are extremely interested but are unable to undertake field trips or nature walks, and thirdly, still another great advantage is that it may put to good use the time after dark when people wish entertainment but cannot go a-field.

As contrasted to the advantages listed above, it seems that lectures have also certain definite disadvantages. First and foremost, comes the fact that any talk which is given indoors loses what is undoubtedly the greatest educational opportunity of a park --- namely, the use of original material in place. If, then, the talk is given in the open it encroaches on the field of nature trips --- though this is perhaps desirable where possible. Another distinct disadvantage of a lecture is that it does not usually assume the impersonal attitude which is reached on a field trip --- in other words, people are not free to ask questions as the story proceeds.

To summarize, it seems evident that national park lectures when given in the day time should be so far as possible in the open, or rather, in sight of the natural exhibits about which it deals. It is also evident, however, that to a less extent, museum lectures with the use of hand specimens and exhibits may be desirable. In the evenings at both camp-fires and hotels, the centers of population, are found logical places for talks, and because of a more appropriate environment the former seems to be the better of these.

In the discussions following Mr. McKee's paper, the general advantages and disadvantages of lectures in the park were listed as follows:

ADVANTAGES:

1. Reach many people
2. Reach many who are unable to follow trails.
3. Given at night when the people want entertainment.
4. Specialists made available on subjects with which they are thoroughly familiar.
5. Subject material not limited.
6. Gives visitor a perspective of the park and its story.
7. Provides opportunity for announcements.

DISADVANTAGES:

1. Unable to use natural illustrative material in place.
2. Lecture more formal than guide trips.

It is important that announcements be separated from the lecture, as otherwise they would detract from the effectiveness of the latter. Where possible, announcements should be made by a ranger, by the park naturalist or by some other person than the one giving the lecture.

It is important that the lecturer be formally introduced by some other person wherever possible. This tends to add prestige to the lecture and to concentrate the attention of the audience before the lecture is started.

PARK AUDIENCES

By C. A. Harwell

The typical park visitor at Yosemite is the auto camper. The family has saved up enough to come for a few days or few weeks camping. The camp grounds, located along the banks of the river in just one section of the valley floor, during June, July and August, constitute a tent city with a population varying from one thousand to four thousand persons. The average stay is one week. The average social, economic, or intellectual level of these campers is above that of the average outside the park. If that were not so they would not have surmounted the difficulties necessary to come.

The typical visitor determines the typical park audience. This makes several things necessary in considering audiences.

1. Where audiences should be assembled.

2. At what hours and how frequently they should be assembled at these places.

3. Under whose auspices they should be assembled.

4. General nature of assembly program.

5. Total length of program.

6. Physical comfort of audience.

7. General arrangements of staging, lighting, and mechanics of program.

Most certainly programs should be arranged in a place or in places convenient to campers. In Yosemite last summer we established two "Camp Fire" locations to take care of five public camp grounds. We made them as central as possible so that all could easily walk to the camp fire bringing their own camp chairs. We wanted no problem of parking cars nor did we want the disturbance of running motors. We assembled these audiences each evening except Sunday at 8 o'clock, with rangers in general charge, and the park naturalist in charge of all that was said. The camp fire was lighted at about 7:30; community singing from 7:50 to 8:05; vaudeville type of program by campers 8:05 to 8:15; ranger naturalist lecture 8:15 to 8:45; program by campers 8:45 to 9:00; fire-fall closing program at 9:00.

Some logs were provided but in general the audience brought their own chairs. Electric lights made assembling and dispersal easier. A camp fire kept those warm who wanted.

Raised platforms 15' x 20' were constructed with improvised foot-lights. A curtain was in place for showing slides and wiring arranged for lantern.

These audiences were very friendly and appreciative of this service so we were happy to serve them.

Other audience situations are provided at company hotels and camps where we are allowed a few minutes on a more highly organized program of entertainment which uses paid talent. We appreciate these opportunities but feel our work goes over better in audience situations where we ourselves are in charge and as ranger naturalists and rangers act as hosts on the part of the government to our park visitors.

Of course there are other lectures given at museum and specially arranged places, but the above two types of audiences are our main problems.

PARK AUDIENCES

By C. Frank Brockman

In preparing and presenting to the public (through the medium of lectures) the features of interest in the park, a consideration of the audience is obviously of vital importance. The material included in such talks, the method of presentation and the previous interest of the group in question depends largely upon the group itself, and the ranger naturalist must learn to apply his talk to the conditions which are thus encountered. Obviously a talk aimed to interest and instruct a group of botany students must be of a different type than a talk to an average camp ground audience whose interests are vaied and who are more or less "at sea" regarding the features of the park.

So in planning a talk or a series of talks on the natural features of the park the speaker must keep in mind several factors.

1. Major interest of the audience. Whether it be any special interest on any subject, on natural history, and in general whether there isn't any chief interest, etc.

2. Type of audience. Often times certain holidays, week ends, etc. will attract large numbers of people of certain general types for a very limited stay.

3. "Class" of audience. Hotel and camp ground audiences differ widely in interest and understanding of natural features.

4. Conditions under which the talk is given. Presentation of the program varies with the condition --- is it at a camp fire, hotel lobby, community building or auditorium.

If the ranger naturalist is familiar with these features he can thus plan his talk to suit the group; that is, he can utilize their information in giving an interesting lecture which will serve to arouse appreciation and understanding for natural history.

As to method of approach and purpose of the lecture. I do not believe that it is the purpose to tell all about the park or all about a particular feature of the park --- rather it should serve as a sort of "sales talk" that will encourage the audience to get out and see things for themselves. The interesting features must be brought to the audience's attention but in a manner that will not drain them dry of interest.

Following the presentation of the two papers on park audiences the following points were brought out in general discussion:

Mr. Hall introduced the question of whether or not a lecture should be planned primarily to suit the interests of the audience. It was brought out that a general audience, not knowing of the educational service offered, might desire a vaudeville entertainment and that it is the function of the park naturalist and members of his staff to determine what material should be presented. The program should be suited to the audience but should be on a plane high enough to accomplish our objective of interpreting to the public the major features of the park.

Owing to the fact that in some parks the average stay of visitors is likely to be prolonged over several days, effort should be made to provide variety in lectures by presenting a new lecturer every night where that is possible, or when only one lecturer is available, a new subject. Where the latter is necessary there should be a series of at least three or four talks.

SUBJECT MATTER

By Frank T. Been and George L. Collins

Before we may enter into any discussion in this field we should have an understanding or definition of subject matter. We have decided that subject matter may be any definite feature or features of a park or features associated with a park, and may occasionally be in part supporting material for the main topic.

Subject matter would necessarily be historical, biological, botanical, geological, and zoological; broadly, these classifications probably cover our entire field.

Each park has ample material from which to select and arrange lectures embodying elements of any of these studies, but certain parks have a larger field for some one study, as for instance, Grand Canyon has a particularly wide geological field; Sequoia offers more of biology, and Hawaii offers volcanology. As long as each park is supposed to be known for, or at least owes its creation to, some great natural feature, it would be a good plan to stress that individual identity by accentuating in lectures those subjects mentioned above as they apply in our separate cases rather than to be too general. This suggestion of course would apply only to regular, more or less formal lectures, certainly not in nature guide work, etc., (where generalities have a first place) any more than limitations impose.

Subject matter relative to features in place would best be introduced interestingly, easily, and effectively by dividing it into groups of subjects which particularly apply according to the season of the year.

The use of subject matter in a lecture in an easily followed sequence is probably one of the most important points to bear in mind for it is sometimes easy to transpose or to digress too far and thus shade an otherwise good presentation.

Experience has pointed out that the average visitor to a national park may have come to relax and not to study, so consequently one must not be too technical or too profound. The informal atmosphere of the nature guide's party cannot, perhaps, be duplicated on the lecture platform but a happy medium must obtain or loss of interest will be the result.

In the discussion following the paper on subject matter, the following ideas were brought out:

The lecture should be planned so as to leave the audience with some central idea or concept of one of the great phenomena of nature, such as plant evolution, mountain making, natural communities, etc. The lecturer should guard against leaving the impression that he has presented merely a jumble of facts. The hearer should be inspired to a greater appreciation of the bigness of great concepts, and local materials should be used in presenting these concepts. The lecturer has a splendid opportunity of presenting his material in such a manner as to build up a beautiful philosophy of life in the people with whom he comes in contact.

Anecdotes and short descriptions of personal experience add greatly to the effective presentation of a topic.

Because the lecture program should be so arranged that where possible it will give a broad conception of the main features of the park, it is important that the lecturer himself have this material well in hand.

USE OF VISUAL AND OTHER MATERIAL TO AUGMENT PARK LECTURES

By Dorr G. Yeager

I believe it is generally agreed that a more effective lecture can be given with slides and other illustrative material than when the lecturer depends wholly upon his personality to put it across. The trend is more and more toward the illustrated type in our National Parks. Last year we established two in Yellowstone and next year we hope to add three more.

The advantages of an illustrated lecture are many fold. It enables the lecturer to better illustrate his point. A picture on the screen is remembered much longer by the audience than a word picture. By means of slides, a man can give a comprehensive bird lecture where a mere description of the different birds would fail utterly.

In placing illustrated lectures in a national park several things should be considered. The ideal situation is, of course, to place the lecture in a special room for the purpose. We are encountering difficulty in Yellowstone in finding a suitable place at several lodges to give these lectures. The lights must be turned out and in the lobby many tourists, not interested in the lecture, complain at being forced to sit in the dark throughout the talk. If size permits, the lights may be turned off in one section of the lobby and burned in the other section. We have had great success in holding the lectures in the recreation room of the lodge before the evening program. This enables those who do not wish to attend the talk to remain in the main lobby until after it is over.

The subject matter in one of these talks is vitally important and the treatment will vary with the different parks. In Yosemite it is possible to give different lectures each evening. In Yellowstone, however, care must be exercised that the lectures do not overlap or repeat in order that the visitor may get fresh material each evening. As a rule, about 20 slides are necessary for a talk of 30 minutes. Slides should be available on all subjects relating to the park. These slides should eventually be stored in Moler cabinets similar to the one in Mr. Hall's office. The type of machine is not so important, although several features should be insisted upon. A double dissolving effect is desired. This may be obtained by purchasing two machines and hooking them up in series.* This not only gives the double dissolving effect, but it also makes two machines immediately available in case of emergency. A water cell should be in the equipment.**

* Bausch and Lomb Optical Co. makes a fine portable double dissolving lantern which is more convenient and lower in price than two machines. It is the Balloptican Model BB.

A.F.H.

** Not necessary for double dissolving lanterns.

A.F.H.

It is also necessary to study the conditions before deciding on the type to purchase. If the lecture is to be given out of doors with semi-light conditions, especially if there is a long throw, an arc machine should be obtained. If, on the other hand, it is to be given in a hall where darkness is available, a bulb machine is best suited. An arc throws the stronger light but it is not always necessary to have such strength. It is advisable also to have in the equipment a small portable projector ready for instant use. Many of these are on the market at present.

Another important medium of visual education is the moving picture. Here we have many of the advantages of the still projector and the added advantage of having the objects moving. These are best for wild life pictures, advertising guide trips, etc. There is no special advantage in using them for simply scening showings. In all probability the moving picture will replace the still within a few years in our lecture work, but at present we have no skilled photographers available and I feel that our efforts should be concentrated on the still projection.

There are many other mechanical devices to aid a lecturer. Just as the hand specimens augment museum display, so do hand specimens augment a lecture. In a tree lecture it is much more instructive to have the cones and leaves of the tree at hand than simply to tell about them. In explaining obsidian, for example, it is a simple matter to pass a small piece around the group, providing it is a medium sized audience. Another method which I have seen worked with great success is a display table. Here the lecturer has many of the objects upon which he is lecturing. He is not only able to show the audience the real thing but they are priviledged at the end of the talk to come forward and examine them at their leisure. One of the best methods of lecturing to a small group, at least, is the time-honored "chalk talk." It is a simple matter to rig up a blackboard. Chalk is cheap and provides a medium that will go far in putting over the story.

In summing up the mechanical methods to augment a talk we have, then:

1. Still projectors
2. Moving pictures
3. Chalk talks
4. Natural objects such as cones, leaves, etc.
5. Experiments such as deposition of carbonate (applicable to small group)
6. Microscopes and lenses.

Following Mr. Yeager's presentation of his paper on the use of visual materials, the following points were brought out in discussion:

Visual material used should be of the highest possible type; inferior material or illustrations greatly detract from the lecture and are worth less than nothing. Occasionally it may be necessary to use a lantern slide which has no great artistic merit but is important for a certain definite scientific purpose. There is never an excuse for using an inferior slide when an effort is being made to present an inspirational subject; and in this case, it is better to use no slide at all.

There are certain places where lantern slides might introduce an undesired formality into the program; in a natural setting an illustrated talk may be out of place. This, however, is a matter in which the judgment of the individual park naturalist must be exercised.

Notes on the arrangement of visual equipment:

(1) Visual equipment should be quickly and easily handled.

(2) In using visual materials, stand near the pictures, but not close enough to interfere with the view of the audience. Do not stand near the lantern.

(3) The signal for change of picture should be simple. A visual signal is much better than an audible one. A competent operator can easily watch the lecturer for some movement of the hand or for a partially concealed flash from an electric torch.

(4) Motion pictures can seldom be used effectively <u>during</u> a talk. Usually they are better when used as a review of the subject after the lecture.

(5) When possible use slides from the beginning of the lecture. Frequently, however, it will be desirable to present only a small series of slides at the end of the lecture in order to accentuate the main points brought out during the talk.

The principle of variety is important in selecting the slides to be used in illustrating a lecture. The lecturer should study his illustrative material; some pictures require explanation, while others are most effective when viewed in silence. Frequently it is necessary to talk for a few minutes without slides.

PARK NATURALISTS' CRITICISMS OF PRESENT LECTURES IN THEIR INDIVIDUAL PARKS

Criticism of Lectures in Mount Rainier National Park - By C. Frank Brockman:

Advantages of present lectures:

1. Serves as a means of acquainting the visitor with park features, where to go and how to get there.

2. Is the chief agency of acquainting the visitor with the park educational activities and our serve, nature walks, etc.

Disadvantages of present lectures:

1. Not sufficient illustrative and visual material.

2. No centralized point of contact on a par with operator's auditorium (Paradise Valley)

3. Not adequate physical needs (Paradise Valley)

4. Not sufficient cooperation with park operators - and possibly at one or two points with rangers.

Changes suggested:

1. That good movies be added to lecture equipment.

2. That more and varied slides be given us to allow a wider field of instruction at each point of lecturing in park. At present one ranger naturalist brings a set of slides from School Board (Seattle)

3. That an adequate system of advertising be disseminated through hotels, etc.

Criticism of Yosemite Lectures - By C. A. Harwell:

Advantages of lectures in Yosemite at present are several:

1. They are given at good locations.

2. They are wanted.

3. They are given by a group of fairly well trained men.

4. They are informal.

5. They are not prescribed as to subject so that initiative of man is brought into play and man is trained in several subjects.

There are a few disadvantages:

1. Not all subjects that should be covered are chosen by man under our scheme.

2. There is no logical sequence of subjects covered.

3. Time is wasted by some men in working up new lectures just because he feels he should do something new.

Changes suggested:

1. Work out more of a "Course of Study" for lecture subjects at some stations and as far as possible fit men available into the scheme so that proper emphasis is given major features which should be stressed in Yosemite.

Criticism of Yellowstone Lectures - By Dorr G. Yeager.

Probably the most severe criticism of the lecture system in Yellowstone at the present time is the distribution of subject matter. We aim to give each visitor who comes to the park a well rounded story of the park in the proper sequence. That is, Geology, Human History and Indians, Animals, Birds and Flowers. With tourists pouring in from five entrances, and with those driving their own cars not taking a standard trip it is next to impossible to so distribute the lecture material as to reach all of the people on all of the subjects, without duplicating at some points and so obliging the visitor to hear a part of a lecture twice at two different points. It is a difficult problem and one that requires considerable study and time to remedy.

Another criticism is that of too many lectures. At Mammoth, for example, three lectures are given each evening. In my opinion this is a duplication of effort. We should tend toward larger audiences and fewer lecturers, thereby raising the standard of each lecture. Government auditoriums should be established at each point where the centers (lodges, camps, hotels, etc.) are reasonably close together, and lectures should be delivered in these. It might be wise to schedule several lectures during an evening on different subjects, permitting the visitor to attend the one which he desired.

A criticism which we are working hard to remedy is that of the lack of illustrated talks. Of the eleven evening talks in Yellowstone, only two were illustrated last year. This is, of course, a gain of two over the preceding year. We are hoping to add several illustrated talks next season.

Advantages:

1. Great many people.

2. More men lecturing means more qualified lecturers.

Disadvantages:

1. Lectures not properly correlated.

2. Problems arise from illustrated lectures.

3. Problems arising through cooperation with public operators

Changes suggested:

1. More illustrated lectures.

2. Better places to deliver lectures.

Criticism of Present Park Lectures in Lassen National Park - By Geo. L. Collins:

There is as yet no organization in this park which has as its major duty the business of effecting educational work. Because of this, our efforts are very limited as we must at present use our entire force in administrative and constructive work. The field for educational work in Lassen is open and ready for cultivation now. I think that Lassen presents one of the very finest opportunities that the naturalist could wish, but I shall not of course attempt to criticize something that is as yet entirely out of my province.

The nearest thing to a lecture ever given in Lassen Park was rendered to, or rather at, some fifty people gathered at the summit of Lassen Peak one day during 1926. It was requested on the spot, was entirely extemporaneous, was based principally on ignorance, and went practically unnoticed. It might stand out prominently in the annals of lecturing, if given a chance, as the most complete failure ever made. Yet it proved one thing - namely, that I had possibilities as a lecturer that might sometime be developed.

Criticism of Present Lectures in Glacier National Park - By Geo. C. Ruhle:

Advantages:

I. There are few forms of entertainment for park visitors during evening hours.

2. The possibilities for entertainment are increased by the giving of lectures.

3. The lectures help the visitor interpret and enjoy the natural features.

4. They serve to inform the people what is to be observed and enjoyed, what can be done.

5. They are a vehicle for transmitting the National Park message.

Disadvantages:

1. In some centers, like Going-to-the-Sun, the lecture is inflicted on the audience.

2. If given under adverse conditions, the lecturer cannot give a full measure to his subject.

3. Because of shortage of naturalists, certain classes of tourists, especially the automobile tourist, is slighted.

Changes Suggested:

1. Increased personnel with extension of lectures to include auto camps.

Criticism of present Park Lectures in Sequoia Park - By Frank Been:

Advantages:

1. Large group of receptive people.

2. Evening around camp fire prevents detraction of audience.

3. Inspires interest of people to park.

4. Reaches people not touched by other means

5. Places Park Service in eyes and attention of visitor.

Disadvantages:

1. No illustrative material

2. Lectures limited mostly to one man.

3. Under park operator's program.

Changes suggested:

1. Start programs under direct charge of ranger
2. Use slides to illustrate
3. Make available outsiders who have subjects pertinent to the park.

Criticism of Present System of Lecturing at Grand Canyon - By E. D. McKee:

Advantages:

A. Yavapai

1. First hand information. Subjects "in situ"

2. Hand specimens easily used.

3. Considerable informality

4. Favorable natural setting and "atmosphere"

B. Camp Fire - South Rim

1. Reaches a large part of park visitors, especially auto travelers.

2. Favorable natural setting and "atmosphere"

C. Hotel - North Rim

1. Reaches a majority of tourists, both car and hotel.

2. Assistance from hotel employees and manager helps materially.

3. Opportunities for slides and other visual education.

Disadvantages:

A. Yavapai

1. Sometimes unfavorable weather conditions

2. Distance from centers of population

3. Occasional interference by museum visitors not interested.

B. Camp Fire - South Rim

1. Few opportunities for first-hand or visual education.

2. Bad weather conditions sometimes

3. Uncomfortable seating arrangement

C. Hotel - North Rim

1. Away from first-hand information

2. Very little informality - not even questions following.

Changes: I am not prepared to definitely state or determine at present, though this problem will be carefully worked out before spring.

SCIENTIFIC ASPECTS OF THE PARK PROTECTION PROGRAM

November 19, 1929

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PARTICIPATION OF THE EDUCATIONAL DIVISION IN THE PLANNING OF ROADS, TRAILS AND OTHER IMPROVEMENTS TO PROTECT SCIENTIFIC ASSETS.

By C. Frank Brockman

The features of scientific interest are one of the major factors to be considered in the parks, and it is obviously our duty to protect such features so that this significance shall not be destroyed. In the development of physical needs in the parks this factor should be pre-eminent; and although roads, trails and other improvements are absolutely necessary to a certain extent in making the public acquainted with the natural history of the region it must be a part of the work of the educational division to aid wherever possible in making such developments as unobtrusive as possible. As an example, the engineering consideration of road construction should be tempered with an understanding of the scientific features of the region, for one of the scientific (as well as educational) values is the natural condition of the park.

In every park there are certain outstanding features of scientific value, glaciers, animal life, forests, etc., which are of such calibre that they are worthy of study and a contribution to scientific knowledge. A study of these features should be made; they should be listed and catalogued; their relative value should be ascertained and then tied in with the development proceedings in order that all factors of the administration may be satisfied. It may be necessary to give and take on some points, but at any rate all scientific assets should be thoroughly studied and then fitted into the future plans so that their value for scientific investigation will not be destroyed.

Discussion: In past years the Engineering Division and the Landscape Division have been primarily active in park development. Just at the present time the Educational Division is beginning to be consulted on the more important projects. This is an extremely important advance because first, in the construction of park improvements scientifically valuable specimens may be destroyed, and secondly, the naturalist is in a position to determine the relative value of each of these scientific assets.

PARTICIPATION OF THE EDUCATIONAL DIVISION IN THE GENERAL PLANNING AND PROTECTION PROGRAM OF INDIVIDUAL PARKS TO ASSURE FULL UTILIZATION OF EDUCATIONAL ASSETS.

By Geo. L. Collins

I should say that the fullest possible utilization of educational assets contained within any national park could not be obtained until the Educational Division had played the very fundamental part of classifying them according to comparative value, and furthermore, in an orderly manner of sequence. As an illustration let me say that if one were to be possessed of a very wonderful stock of diamonds he would better explain and show those diamonds one after another according to their comparative value and beauty rather than to lay out the whole stock and say "here are some stones, enjoy them as you will."

Our national parks are but aggregations of wonderful jewels that are casually enjoyed easy enough just as one would casually enjoy a few diamonds in his hand. But if a fullest utilization of them is to be realized if they are to mean anything, then fullest beauty to inspire must be brought out by a certain manner of our showing them.

Now our roads and trails and other physical improvements simply contribute to our manner of showing off our national park jewels. And it seems that the Division of Education should naturally have the broadest ideas of all when it comes to the location of such physical helps as roads and trails.

If a road is being considered on the basis that a certain feature needs to be made more accessible, the Department of Education should know just where that road should terminate in order to allow visitors a certain amount of time in walking, to divorce themselves from the atmosphere of the conveyances in order that they may be keenly alert to the feature before them.

The Department of Education should have suggestions to make concerning the psychology of having a certain type of building in one place and perhaps a different type in another.

In short, this division should participate in national park development plans as an authority on what should be seen and in an advisory capacity regarding how best to see it. I stress the point that the Educational Division should keep well ahead of the other divisions in the matter of presenting reports, and plans for the next season's work, that other divisions may be guided in their cooperation.

Discussion: Quite frequently the officers of the Educational Division can suggest new trails that will open to visitors areas which are particularly valuable from the educational standpoint, as well as scenic areas of inspriational value. It was pointed out that the park naturalist should take the initiative and should make suggestions in advance of study by other divisions. His proposed plans should be submitted in writing and will thus be much more effective than if made orally. Caution must be exercised, however, as the park naturalist should consider his function in road or trail location as being primarily advisory in nature. It is very important from the educational standpoint that the park naturalist be on the ground ahead of time because it is exceedingly difficult to change a plan already made even though it may have been drafted without the assistance or advice of a naturalist. When taking part in examinations to determine road or trail locations the park naturalist should go only as far as his ability and experience permits; when confronted with exceptionally important problems he should suggest bringing in an expert advisor. Such assistance may possibly be obtained from members of the Secretary's Advisory Committee on Educational Problems in the National Parks and arrangements should be made by the park superintendent through the Director or through Educational Headquarters. Occasionally members of the Headquarters staff of the Educational Division can cooperate in problems of this sort.

It is very important that opinions and advice be submitted in written form so that they will be avail ble for future reference.

DEFINITION OF A BALANCE OF NATURE

By C. A. Harwell

Nature has through the course of time maintained a balance between various forms of life, both animal and vegetable, and their environment (climate, exposure, soil, etc.). This is a dynamic balance, events travelling in cycles, rather than establishing a static equilibrium.

Actually there is no fixed balance or cycle of events, for otherwise there would be no permanent evolutionary or other biological major changes.

Through the agency of geological changes, climatic changes, biological changes, man and natural catastrophe, the balance of nature may be disturbed, changes taking place such that eventually a new life cycle is established.

Bibliography: Chas. C. Adams - Guide to the study of animal ecology.

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IS IT POSSIBLE TO PRESERVE NATURAL BALANCE? IF SO, HOW?

By Dorr G. Yeager

So little attention has been directed toward this subject in the past by park officials that it is, at the present time, impossible to preserve the natural balance in the true sense of the phrase. This balance was broken long ago and in most of the parks it was so broken that it can never again be reestablished. It is a very serious question whether or not we should attempt to maintain this balance. If it is maintained strictly it will mean that insect epidemics will be allowed to run rampant; and that no steps will be taken in combating forest fires, other than those caused by man. In answering the title of this paper, therefore, I will say it is not possible to preserve the natural balance because that balance has already been broken.

There is, I believe, a chance in our National Parks not to preserve the original natural balance, but rather to see that the present state is interfered with as little as possible. If left alone, I believe that the pendulum of nature will partially return to its original place. There are, however, several species that are either extinct or doomed to extinction.

It is our duty as park naturalists to carefully study this situation in our respective parks and to play an important part in formulating any policies which affect the balance.

Every new road and trail plays its part in endangering the balance of nature due to potential fire hazards, etc. Everything in a national park that is in any way foreign to its original wilderness state tends to more and more throw nature out of balance.

There are those who go so far as to foresee the ultimate downfall of civilization because of a disregard for the original balance of nature. I do not go so far, but I firmly believe that this theory should be carefully studied and certain portions of it adhered to if we are to maintain our wilderness areas in anything approaching their original state.

Discussion: It was brought out that the areas of the national parks are very seldom large enough to permit the maintenance of a natural balance, and that park boundaries almost always introduce an element of artificiality.

Although the natural balance of national parks may be already greatly altered, care should be exercised to maintain conditions in as nearly as possible a natural state. Exotic species should not be introduced. Where an effort is made to re-establish species native to the park they should be placed in areas where these species once existed.

It was generally agreed that intelligent human assistance is necessary in establishing or maintaining a natural balance.

THE PREDATORY ANIMAL PROBLEM

By E. D. McKee

There was a time when many of the large predatory animals such as the wolf, the coyote, and the bobcat, were considered as being entirely harmful and injurious to the interests of man, and on this premise, bounties and other inducements were offered for their destruction. Within recent years, their numbers appear to have been diminished to a negligible amount in many places, and to have been lessened to the point of extinction in others. In brief, conditions involving the maintenance and preservation of American wild life have so changed recently that it is now not only desirable but imperative that those interested study these new conditions and take necessary steps immediately.

Then arises the question - How do predatory animals affect the balance of Nature? Obviously they have for untold ages performed the task of thinning out and keeping down the numbers of herbivorous and other animals. In places they have done a far better jub than man would like to see. As a result, man in turn has cut down their numbers until now in many places a natural balance is lost. The

result of this has in some cases given results which are entirely satisfactory to our desires, but in others have brought about new problems such as we now face with the Kaibab deer herd - the result of killing off the Cougar of that region.

From a national park standpoint it seems that the popular value of having many deer, antelope, and other such animals which are readily seen by park visitors is vastly superior to owning a group of predators such as lions, cats, and wolves which are seldom even seen. At the same time, however, I feel that as biologists we must agree with Mr. Vernon Bailey, United States Biological Survey, in his statement that no animal should be entirely exterminated. A middle course, then, should be to control the numbers of predatory animals in any region, and to do this requires a study of what conditions are desirable and then steps taken toward the necessary work of hunting or trapping. In both of these undertakings I feel that the park naturalist or members of his staff should take definite parts - at least share the work with the rangers. They are definitely Park Service projects and should be handled as such.

References: Predatory animals of Western United States.
Vernon Bailey Bulletin of U.S.Biolggical Survey.

Vermin Published by "Amer.Game" and "California Fish and Game Commission."

THE PREDATORY ANIMAL PROBLEM AND ITS BEARING ON THE NATURAL BALANCE

By Frank Been

Because of the entrance of man into the natural scheme, the balance of nature, which perhaps has never been perfect, is completely overthrown. The best that we can hope to do is to arrange a balance of nature according to our ideas. These ideas are apt to be influenced by analysis no matter how much we try to avoid it. By looking forward into the future, we cannot help but see that the pressure of the demands for unutilized natural resources and the struggle for food may result in the complete destruction of the balance of nature. The only chance of preserving predatory animals which are necessary to the balance of nature is by creating preserves where these animals are protected. Our national parks are the logically and most advantageously situated to afford this protection. The world of science is becoming more generally respected. If science decrees that certain areas should remain untouched by man, it is quite likely that these areas will withstand the pressure of economic progress demanding that the areas be used industrially.

In protecting the predatory animal, we must consider the effect upon the territory bordering the park where there may be live stock

ranches of some description. It is easily possible that animals protected in the park may cause serious losses to the ranger, who would be justified in killing the predator. Our effort to maintain a balance of nature is destroyed at that point, and we are helpless to change the situation because we cannot expect a ranger to support a scientific project to the extent of losing much of his stock.

If, however, this problem does not enter, to what extent will we go to maintain the natural balance? This history of this nation shows that certain kinds of game were at one time less plentiful than now because predatory animals were more numerous than before the appearance of man; he decreased the numbers of predators, thus permitting the increase in non-predators. In our national parks we shall determine the number of predators by their effect upon the non-predator, but that is not very likely to be a true balance of nature. Again the predator may become so numerous as to be dangerous, or at least a serious nuisance, to the people of the park. If this occurs, steps must be taken to reduce the numbers, because the parks must be kept safe for the people, but such steps would not support a balance of nature.

Should predatory animals be protected in our national parks? They must be protected if we are to support our policy of education, not to mention the balance of nature. C. C. Adams presented three reasons why predators should be protected:

1. Scientific value - necessary in study of anatomy, ecology, evolutionary problems, and other scientific studies.

2. Educational and social values - people are generally greatly interested in animals which are needed to complete zoological gardens, and examples are often taken from animals in human social conduct.

3. Economic value - prevents over-population of herbivorous animals and rodents; source of fur and medicines.

These three reasons were presented to support the protection of predatory animals in general, but they are particularly applicable to the situation in our national parks as our parks are considered the most important sanctuaries for the protection of predators. To date there has been no comprehensive study of the animal situation in the national parks, but in Yellowstone and Yosemite, where the most work has been done, results indicate that the predators are far from safe in those parks. In many instances, the animals are exposed to an open season all around the park. With such a condition existing, it may only be a matter of time until the animal becomes extinct, even in the protected area because of the steady outside drain on the species.

Predatory animals are apt to be affected by the contacts with people so that the natural balance is destroyed by the change in the

animal itself besides the change in its relation to the other animals. This does not apply only to predatory animals. Allan Brooks of British Columbia stated this when he said, "The garbage-can grizzlies of our parks can have little value in the study of the life-history of the animal."

References: Journal of Mammology, Vol. 9, p. 354; Vol. 7, p. 37; Vol. 6, p. 83; Vol. 6, p. 25, 28.

Discussion: It is generally accepted that if we are to maintain the natural balance it is necessary to keep predators as well as representatives of non-predatory species.

Intelligent planning should govern the extent to which man will attempt to influence the natural balance.

Mr. Dixon's statement that poisons should not be used in the control of predatory animals in any of the national parks was endorsed by all present.

The following statements relative to the maintenance of the natural balance were recorded:

1. Even in national parks it is practically impossible to maintain a natural balance because boundaries produce an element of artificiality.
2. The natural balance is never a static condition. Natural communities are constantly changing. It is impossible to maintain a static condition in a natural area.
3. Participation by man in the protection of park fauna or flora (including insect control, tree disease control, predatory animal control, and control of fires caused by natural conditions) introduces an artificial element.
4. In endeavoring to maintain as nearly as possible a natural balance a definite administrative plan should be formulated which should be based upon the studies by specialists.
5. No exotic species of plants or animals should be introduced in the national parks. Any contemplated introduction of native species should be referred to Educational Headquarters for study by experts before action is taken.
6. Every reasonable effort should be made to prevent the extermination of native species, even though some measure of artificial control may be necessary.
7. Any control measures, designed to influence the natural balance (including control of predatory animals), should be based upon careful scientific study and a definite predetermined plan of action.

THE RESEARCH PROGRAM IN THE NATIONAL PARKS

November 20, 1929

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IMPORTANCE OF SCIENTIFIC RESEARCH IN THE NATIONAL PARKS

By Geo. C. Ruhle

Definition: - Research embodies the careful and critical inquiry or examination in seeking facts and principles. It employs a systematic investigation by means of experimental methods, augmented with generalizations, laws, and hypotheses to discover new facts, and to correlate them with other facts.

The General (Direct) Value of Research: - The part played by research in the development of science and industry is common knowledge to mankind. Large industrial enterprises have been developed by it as frequently as by the labors of organizing departments. The recognition of the national essentiality of science is practically unanimous.

The Importance of Research to the Educational Program in a National Park: - Granting the general importance of research, since no argument should be necessary as to its utility in increasing production, eliminating disease, or enhancing comfort and security, does or can research play a vital part in the Educational Development of a National Park? Is it an Educational Asset? Yes. Conservation and Development being considered as the first two purposes of our national parks, the third purpose is their maximum utilization along appropriate lines. No argument should be necessary for the use of our parks in the cause of advancing knowledge, especially since the wonderful possibilities of scientific discovery are so manifest everywhere. It is a cardinal purpose to supplement the recreational utility of these pleasure areas with higher investigations of a type by which our mastery over nature is derived. A wholly materialistic gain for the parks through research is prestige and decorous advertisement. Without basic information supplied by research, intelligent procedure along any line is impossible.

What is the Importance of Research to the Park Naturalist: - Chiefly through the training received and the mental attitude developed. It is obvious that one works with a great handicap if one conducts activities along emperical lines without the advantages which the scientific method entails. Research is extremely valuable as an intellectual stimulus, developing an ability to think clearly and independently, to analyze complicated problems, and put factors in their proper relationship and value. It prevents mental stagnation by its inducivenoss to creative thought, by eliminating passive acceptance. It fosters a sense of obligation, mental alertness, self-reliance, a responsibility of taking part in investigation of unsolved problems, an answered challenge. It keeps the mind fresh by contact with superior brains, either directly or through current literature.

Pure vs applied research:- Even great business corporations with research programs are beginning to recognize the promotion of pure science as a sound business policy. The goal of research is dis-

covery of all truth. Research is valuable whether capable of immediate application or not. The smallest discovery may lead to unexpected and far reaching results, as has often been proven. In our national parks, both pure and applied research should not be found wanting.

Besides the Chief Naturalist, the Park Naturalists and Mr. Russell, there were present as visitors Mr. John Coffman, Dr. Joseph Grinnell, Mr. Joseph Dixon, Mr. Charles Kraebel, Mr. A. Everett Wieslander, Mr. Duncan Dunning and Professor Horne, all of whom took part in the round table discussions during this session of the conference.

Following the presentation of Dr. Ruhle's paper on the importance of research, the fact was brought out that the present scientific knowledge of the natural features of the park is almost infinitesimal compared with what will ultimately be known through intensive research. Much investigation will be necessary before we can in any measure round out the park story.

Dr. Grinnell pointed out that scientific research is of practical value to the park naturalist because he is best equipped to transmit this knowledge to the park visitor.

It is advisable that the naturalist work upon scientific problems in order that he may continue to remain alert; it is equally important that he bring these problems to conclusion, as the successful completion of the projects will be an asset not only to him, but also to the public.

Dr. Grinnell pointed out that some men are able teachers while others are primarily concerned with research and that seldom are both faculties combined in one man. For this reason it was pointed out that it might be well to have two types of naturalists. The suggestion was made by others that the specialists in research might best be members of the headquarters staff rather than members of the educational staff in the individual parks --- at least until the work is further developed.

Discussion was reopened on the question of the maintenance of a natural balance in the national parks.

The question arose concerning the control or extermination of animals which are dangerous to human life, such as the rattlesnake. It was maintained by several present that such control would upset the natural balance, but it was recognized as inevitable that some such control be introduced in areas widely used by the public. It

was recommended that the problem be given special scientific study with a view to developing a practical solution of the problem.

Mr. Kraebel suggested that specialists concentrate upon the study of problems of this sort in the individual parks, and it was pointed out by other members present that such study might fall within the scope of the investigations to be conducted by Messrs. Wright and Dixon.

Dr. Grinnell pointed out the danger of officially permitting "reasonable" control of any species because the interpretation of this term will depend entirely upon the ideas of the individual. There is bound to be a difference between opinions of different individuals and also in a single individual's opinion at different times.

Mr. Dixon pointed out that absence of control measures will not result in absolutely natural conditions and that an agreement based on the result of careful scientific investigation would be the best means of determining upon what should be a natural balance.

The question was brought up as to whether any species should be allowed to disappear from a national park. Dr. Grinnell and Mr. Kraebel maintained that artificial means should not be introduced to preserve the species if that species exists in other national parks. Mr. Hall pointed out that it was dangerous to make such a generalization and that the course of action should depend, rather, upon careful investigation and pre-determined plan of action. Dr. Grinnell pointed out the danger of allowing human ideas to interfere with the natural balance. He said that as years progress it is likely that the pyramiding of ideas may divert us from the original park objective of undisturbed preservation. He pointed out that we may start with a minor artificial change but that following artificial changes must continually be made in order to make or check natural changes and that thus there will eventually be built up a condition which is entirely artificial.

After a long discussion by the delegates and visitors present it was agreed that park areas should be kept as nearly "natural" as possible, but that the use of the park by the people introduces an artificial element which is inevitably an element in the situation and should be considered in any administrative plan.

MAKING AN INVENTORY OF OUR SCIENTIFIC ASSETS

By Dorr G. Yeager

In preparing this paper I am assuming that a scientific asset in a park is any feature which is of interest to the casual visitor as well as to the scientist. I believe that a bear or a waterfall may be a scientific asset as well as a geological fault.

Now, as to an inventory of scientific assets --- it seems to me that in order to better fit a ranger naturalist for his summer work it is necessary that we have a complete inventory of the floral, faunal, archeological, historical and geological features contained within our respective parks. The lists, especially of birds, animals and plants, are of vital importance to the lecturer and guide if he is to carry on a really presentable piece of work.

Again these lists are of vital importance to agencies within and without the park who attempt to carry on research. A mammologist or ornithologist coming into the park for the purpose of study, wastes no time in obtaining a list of the species contained therein, and it is of vital importance that these lists be made available.

I realize that in a park where no systematic work has been done along this line, it seems a tremendous task. It is, however, not as difficult as it may first appear. There are, naturally, two ways in which this information may be obtained. First, by interesting outside agencies in the problem and encouraging them to undertake a systematic study of the species, There are many scientists who would welcome the opportunity to work in this virgin field in many of the parks if only their subsistence could be paid. The second method of obtaining this information is by means of our own educational staff. I have found it very advantageous to interest members of the staff in this type of work. If men collect and observe in many sections of the park, and the results of their individual work compiled, a pretty representative list of species will be the result. We are constantly enlarging our lists in Yellowstone, due to the findings of the different ranger naturalists during the summer months.

In summation, therefore, let us emphasize the importance of complete lists of floral, faunal, and geological assets, both for our own use and for the use of visiting scientists. The compilation of such lists can be executed by interesting outside individuals and the ranger naturalists on our own staff.

Discussion: An inventory of the natural assets of a park is important in order that they may be protected during the construction of park improvements and during current administration.

It was pointed out that ranger naturalists are often in a position to report upon the most important natural assets in the individual branches of science in which they are specialists.

The park naturalists should undertake the task of compiling a list of the natural features of his park in each branch of science. These lists can be added to as new features and new species are reported. The lists should be included in the Ranger Naturalist Information Manual in loose-leaf form so that additional information can be added from time to time.

Mr. A. Everett Wieslander, in charge of cover-type mapping for District #5, United States Forest Service, discussed the making of forest type maps in the national parks. This work was discussed in detail but is not presented in these minutes on account of its having been mimeographed at Educational and Forestry Field Headquarters and sent out to the individual parks.

SURVEYS OF PARK SCIENTIFIC PROBLEMS

By Frank T. Been and Geo.L. Collins

A survey of park scientific problems may be necessary in order that the best method of their solution can be decided upon.

The term Surveys, expressed here, in relation to a research program, would suggest the matter of keeping in touch with or investigating current problems that a visual picture of them may be drawn from reports, etc. at any time. It suggests particularly, however, preparation for problems of the future.

For instance, if a survey is made at a certain time of each season of all the forest areas within a park with reference to insects, it is pretty certain to result in our having a knowledge or picture of what a normal condition of insect infection in that forest is, and we could judge the necessity and means of control accordingly.

Surveys of various important features, not greatly accessible, could be made with special reference to the value of those features to the public, and their consequent influence on forthcoming road or trail systems.

Surveys of public opinion by means of contacts with various groups outside of National Park Service organization should be made as public opinion of course is important to consider in the science of functioning as good public servants.

A survey of the general history of a park region should be made in order that the relationship of various historical happenings can be known and lined up with park exhibits

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Discussion: The main reason why the above topic was introduced was in order to give Park Naturalists a broad perspective of possible fields of investigation which might be correlated under their general supervision.

It was brought out that the naturalist should list as many as possible of the unsolved scientific problems in his individual park. This will give a perspective of the field of possible investigations and will lead to a determination of what are the most important problems and which are the problems requiring immediate attention. If the unsolved problems are recognized it will then quite often be possible to call in outside help to assist in their solution.

SOLVING SCIENTIFIC PROBLEMS THROUGH COOPERATION OF ORGANIZATIONS AND INDIVIDUALS FROM OUTSIDE THE PARK.

By Edwin D. McKee

In every one of the national parks there undoubtedly arises from time to time either the necessity or the desirability of finding certain definite scientific facts. This requirement may be in conjunction with park development or it may be related to material used in the educational program, or indeed it may be for any of several other possible uses. Frequently some member of the Park Educational Service's personnel may be qualified and able to solve the problem. It is important, however, with such a number and variety of fields as are likely to offer problems, that the cooperation and assistance of outside organizations frequently be sought.

Outside assistance and cooperation may be obtained in numerous ways. When scientists of note are among the park visitors it is usually possible to enlist their expert advice or to obtain the benefits of their experience. They are for the most part very glad to help. Unfortunately, however, these visits do not often come at the times of greatest need, so that the park naturalist must necessarily go outside and bring in assistance. For this reason, it seems advisable that every park naturalist should arrange for some kind of cooperative service with representatives of outside organizations in practically every field. There are today splendid opportunities for such work - usually it is chiefly a matter of making personal contacts and of enlisting interest.

Discussion: It is advisable for the park naturalist to maintain a file of addresses of men and organizations best qualified to assist in solving scientific problems. Frequently these investigators can be called upon for personal help.

It was recognized as important that ultimately there be a group of scientific advisors for each park. These men could frequently be called upon by the park naturalist for advice in their individual fields and could assist in planning research problems. Also they might be in a position to further efforts to secure outside help in individual parks.

THE PLACE OF THE PARK NATURALIST IN THE RESEARCH PROGRAM

By C. Frank Brockman

While it is almost impossible at the present time, it is my opinion that the Park Naturalist should take an active part in the research program of the park in which he is stationed, when the Educational Department has been developed to such an extent that such is possible.

He cannot, of course, be expected to be an authority on all subjects of scientific interest, nor can he be expected to carry on experiments in all branches of science, but he must have some special training that is applicable to the park that will be sufficient to enable him to carry out work in his own line. In addition to that he must have a general understanding of other fields of science that will enable him to appreciate the needs for research along other lines besides his own and sufficient to enable him to recognize scientific problems and plan for their being carried out by specialists. In short, where he does not find himself equipped to carry out work in a subject, he must be qualified to recognize the need and, if a specialist is not available for full time, he must be scientifically minded enough to work along lines suggested by some university professor, carrying the problem to its successful completion in that manner. Oftentimes it is not necessary to have a specialist, but a man with a scientifically trained mind is indispensable.

It is my opinion that at least one major technical problem should be undertaken by the Park Naturalist each year, and if such problem requires a greater period or if its continuance cannot be carried out after it has been launched, his time should be devoted to the problem as part of his duties until its completion or until something else can be undertaken.

Such a program is necessary because original observations are the best stimulus to personal endeavor and a development of a fund

of knowledge that will command respect among scientific men. Also many of the problems undertaken will have a very definite bearing upon the park administration --- as for example, the insect problem, predatory animals, etc.

The Park Naturalists are recruited from colleges and universities. The requirements of the job are clearly defined upon the examination announcement and very rarely does anyone enter this work without the desire to do original work. If this is rendered impossible by the press of detailed duties that do not draw from his original training, or if such work is not encouraged to some extent, the work loses its stimulus.

The Park Naturalist should take a very decided, definite part in the research program, for in that way he affiliates himself with science and broadens along that line; he accumulates knowledge of the park from personal study and by working with others; this knowledge can be passed on to ranger naturalists and rangers to be disseminated to the public.

An effort on the part of all Park Naturalists should be made to fit himself to carry on other, and more advanced, projects as they are undertaken. It should be necessary to continue studies along advanced lines for we cannot go ahead and raise the respect of the education division in the minds of the public and scientific men by resting on our oars and relegating ourselves merely as detailed workers who gain information about the region in which we are placed through the writings of others. That is necessary, but a definite research program should be undertaken by every park naturalist -- our knowledge of conditions and park features (from a first hand point of view) is the soundest kind of a foundation upon which to build the superstructure of the educational work in the national parks.

Discussion:

It was recognized that, under the present circumstances, the research program which may be carried on by park naturalists may be extremely limited due to lack of personnel sufficient to handle current administrative problems. It was recognized as necessary, however, that the naturalist enter into <u>some</u> research activity; the extent to which this can be accomplished will depend, of course, upon the existing circumstances.

It was agreed by all present that the desirability for some research by the individual Park Naturalists be recognized by the Director and that as soon as possible provision be made for such activities as a part of the naturalists regular program of work.

USE OF RECORDED SCIENTIFIC DATA

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SOURCES OF RECORDED INFORMATION

By Geo. C. Ruhle and Edwin D. McKee

Poore's Index to Periodical Literature

Abstract and Index Serials

Technical periodicals and other current literature

Bulletins and Professional papers U.S.G.S.; also monographs

Bulletins of Department of Agriculture

Reports of Scientific institutions and other societies

University papers, theses, etc.

Official publications of foreign governments

Reports of State Surveys

Communication with scientists

Museum records

Pre-prints and Reprints from authors and manuscripts

Information manuals and other park publications

Book lists

Methods of Obtaining Information:

1. Practice of asking ranger naturalists and visiting scientists for copy of information gained by work on materials collected in National Park.

2. Write to probable or likely sources as lited above.

Dr. Ruhle and Mr. McKee spoke from notes on the above subject outlining in detail in each case how publications could be obtained.

It was brought out in discussion that rare scientific publications can occasionally be obtained through loan from certain of the larger

libraries. The John Crerar Library in Chicao will lend rare or out of print publications when they are needed for research or for special problems. In California arrangements can be made by the park naturalists through the State Librarian to borrow publications specially needed for reference.

Advertisement in publishers' trade magazines asking for references on a certain subject will bring in by mail great amounts of information in the form of book catalogues and individual quotations from dealers. Probably the best publication in which to advertise is the Publisher's Weekly.

UTILIZATION OF RECORDED SCIENTIFIC DATA IN THE PARK PROGRAM OF CURRENT SERVICE TO THE PUBLIC.

By C. A. Harwell, Frank T. Been, C. Frank Brockman.

There is a mass of scientific data recorded in books, pamphlets, magazines, separates, papers, photographs, maps, drawings, charts, tables, manuscripts, etc., pertinent to a particular park or the National Park system, but to be effectively utilized the material containing these data involves:

(1) Availability
(2) Systematic filing
(3) Interpretation

Our parks are situated considerable distances from libraries in which there are great stores of information and it is usually very difficult for us to leave our parks to use this material.

A library budget from which our educational departments can draw when we wish to make purchases of books or other library material is exceedingly important. We should build up a very complete library on our own parks and adjoining regions.

Colleges, scientific organizations, state and federal governments, and publishing companies have lists of their publications, reference to which may inform us of useful available data.

When this material comes into the possession of the park, it must be systemattically filed in order that it can be readily found and used. Good library method needs to be employed. This of course involves the creation of a library in each national park -- a library so divided that there is a well kept department for use of our park visitors and a research collection for the special use of the staff.

When these scientific data are on hand in our parks and filed and indexed systematically, their use depends of course on problems at hand. The following are suggestive:

1. Preparation or revision of Ranger-Naturalist Manual.

2. Preparation and editing Nature Notes.

3. Building up lectures.

4. Planning and carrying out scientific surveys within the park.

5. Interpreting researches of others within the park.

6. Self-improvement of self and staff.

7. Use by our interested park visitors.

Discussion:

In order to record references which might otherwise become lost or buried in the files it was agreed that all important references be listed by the park naturalists in the Park Information Manuals, each reference being placed where it will be of greatest use to support the subject treated.

UTILIZATION OF RECORDED SCIENTIFIC INFORMATION IN THE GENERAL PARK ADMINISTRATIVE PROGRAM

By Geo. L. Collins.

The park administrative program is formed as a guide or calendar which states what is to be done within a given length of time. They are made up well in advance of the time of their actual functioning. If a well rounded program is thought out well in advance, a harmonious condition should obtain during the season of work covered by that program.

In establishing new projects, recorded scientific information has the great value of saving time and money to the operators. For instance, if a road contractor is bidding on a large job in a national park he can refer to meteorological records and have something tangible on which to judge the length of a working season.

The chief administrator of a national park is of course the Superintendent. Plans of administration are his big job, and we do not expect him to be a scientist but a good, sound business man. If he is a good business man he will look with favor upon recorded scientific facts as proof of the justice of any proposed projects.

The peculiar situation of a park naturalist in telling the public scientific truths in a simple yet interesting manner, might very well prove extremely difficult if he wishes to make the most of all his opportunities, unless he can fortify himself with recorded scientific data. For instance, if the naturalist wishes to have a nature trail, that wish comes through having seen an aggregation of things that could be displayed nicely by a nature trail. If one of those things happened to be a fossil bone, in place the naturalist could only justify the expense of running his trail to the locality of that bone by referring to recorded scientific information as proof of its significance and value. The superintendent and others would be guided entirely by scientific data in such a case.

Recorded scientific data is obviously, and of eminent value, in the training of personnel which is always an important part of any administrative program.

One of the largest problems confronting the National Park Service today lies in the acquisition of private property holdings. It is such a sizable factor as to effect the administrative program of the entire National Parks System. Obviously, recorded scientific data is of indispensable aid in estimating actual values of such property.

RECORDED SCIENTIFIC INFORMATION AND ITS BEARING ON THE GENERAL PARK ADMINISTRATIVE PROGRAM

By Dorr G. Yeager

Establishing new projects: It has been brought up several times during the conference that the park naturalist should take an active part in an advisory capacity when new projects are being undertaken, such as roads, trails, etc. Two educational features should be kept in mind when a road or trail is constructed.

(1) The utilization of scenic features
(2) The protection of scenic features

Had a list of scientific assets been made in Yosemite the glacial polish on the Wawona road would have been utilized instead of destroyed.

It is highly important that we utilize our scientific information of the park in the establishment of new projects. This includes not only roads and trails, but educational projects such as museums, shrines, etc., which can only be placed at advantageous points when we utilize to the fullest extent our recorded scientific information.

Care for Park fauna and flora:

If our park fauna and flora are to be maintained in the best possible conditions we must utilize our scientific information concerning them. For example, if a certain animal is on the decrease in a national park, certain definite information must be known before relief measures can be undertaken.

1. Is the animal native to the region?

2. What was the original status of the animal in terms of numbers?

3. What was his original range?

4. How does that range compare with the present range?

All of these things must be carefully considered and in answering them we naturally turn to our recorded scientific information.

Before beginning work on a predatory animal problem it is necessary that all the known scientific data concerning its life history, natural enemies, natural food, etc., be carefully accumulated. I think it is easily seen from the above brief statements how important it is to accumulate all the known scientific information in order that it may be immediately utilized when a problem arises.

Discussion:

In the discussion following Mr. Yeager's paper, it was brought out that the Park Information Manual offers park naturalists an opportunity of preparing a digest of information obtained through reference to scientific publications. The importance of definitely recording references was again stressed. These digests in the Manual of Information are particularly valuable where the original publications are rare or out of print and not available in the park library.

The Information Manual makes readily available in accurate and condenses form data on subjects related to the park. When once mimeographed this information is not only available to the educational staff,

but to other park employees as well. The suggestion was made that bound copies be available in the museum libraries for reference for specially interested visitors.

The Park Information Manual may contain discussions of methods used in educational activities, check lists of birds, trees, flowers, etc., bibliographies pertaining to the parks, and if possible, maps, diagrams and illustrations. The Manual is a key or encyclopedia to the information available about the park.

The Information Manual is especially valuable to the new men on our educational staff and lightens the task of the park naturalist in the field of instruction at the beginning of the season.

There are some articles, especially those pertaining to history and archeology, which may be more complete than are the cumulative records of the natural sciences. Perhaps these may be advantageously filed separately from the Manual, but reference should be made to them in the Manual.

The Manual of Information should briefly describe types of natural phenomena and it is also important that it refer to the places in the park where such phenomena can be found.

Under the present circumstances there does not seem to be any way of making this material available to the public, but it is hoped that as the Manuals are brought closer to completion the most important sections can be published.

Methods of preparation of the Information Manual will be discussed in detail at a later session.

RESEARCH RESERVES

November 22 and 23, 1929.

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THE RESEARCH RESERVE AND ITS PART IN THE PARK EDUCATIONAL PROGRAM

By Dorr G. Yeager

To my way of thinking there is a vital necessity for areas in our parks which are absolutely undisturbed by man. This need may or may not be fulfilled by the so-called Research Reserve.

These areas might well play an important part in our nature studies. This would be, of course, the primary use to which they would be put. This study can be divided up into several parts:

(1) As ecological study areas - where as near a natural state as possible has been maintained.

(2) As an animal and bird reserve - where animals and birds may be studied in their natural conditions. In Yellowstone there is practically no such thing as a grizzly in his natural state. This is the result of too many bear feeding grounds and road camps where the obtaining of food is a simple and unnatural function.

(3) As natural botanical gardens - where plant succession can be studied without the elements of man or exotic species entering in.

I realize that the above three points are comparable to those which will probably be listed under "Uses". They are, however, ways in which they will function to aid our work.

The information which they will enable us to procure will be of service in many ways:

(1) In working up wild life observations.

(2) In animal research when comparison between natural and unnatural conditions must be made.

(3) In making records as to the influx or disappearance of animals from this area.

SOME GENERAL CONSIDERATIONS OF RESEARCH RESERVES

By C. Frank Brockman

The research reserve is the junction of the scientific and educational phases of the park program and as such it may or may not necessarily be areas that are totally obscured from contact of the public. In some cases this divorcing of the area from the public -- particularly in the case of forestry or botanical study areas -- but in the case of, say study areas which are related to glacial movement and recession, this may not be necessary if adequate and permanent points of observation are erected and maintained. Likewise, the size of such study areas or research reserves depends upon the project. Glacial studies may require but a number of established cairns or points from which to make observations; one to five acres may be sufficient in observing phenological and forestry data while wild life observations may require vast areas -- possibly in some cases embodying the entire park.

It is suggested that each park naturalist in making out his list of possible projects for future study, include in such enumeration his suggestions for the establishment of research reserves, if they are required, or the manner in which such studies that will be of value to the educational and administrative activities of the park as well as to science, may be carried on. This will no doubt require collaberation with recognized authorities in the various fields, but at any rate, an effort should be made to place this feature of the park work on a sound, continuous and valuable basis. I do not believe that any definite requirements can be laid down as to the size and method of handling these areas, but they should be established, maintained and utilized with a scientific purpose in mind. They are primarily experimental projects and their method of handling depends entirely upon the project itself.

Following the papers by Messrs. Yeager and Brockman, introducing the subject of Research Reserves, the discussions centered upon some of the general aspects of such research areas. Besides the park naturalists, the following visitors were also present:

Mr. John D. Coffman, Fire Control Expert, National Park Service
Mr. Stephen N. Wyckoff, in charge of Blister-Rust Control in the West
Mr. Fred J. Foster, Bureau of Fisheries
Mr. L. A. Barrett, Assistant District Forester, United States Forest Service.

Discussion:

All research problems need not be confined to research reserves. There are many field problems, such as the study of nesting habits of birds, study of food habits of animals, etc., which can be solved in various localities other than established research reserves. Only areas should be set aside where the balance of nature would be upset by human intrusion.

The point was brought out that the first area set aside primarily for research in Yosemite National Park was established several years ago and has been called a "wilderness reserve." It was agreed that such research areas should hereafter be called "research reserves" in order that the designation coincide with that in current use by the Forest Service, the Forest Experiment Stations, and other institutions.

The term "wilderness area" is applied by the above organizations to primitive areas penetrated only by trail and guarded against other physical development. It was agreed that it would be advisable to use the same term for similar areas in the national parks which will be reserved for pack train and knapsack campers and where roads and buildings will be excluded.

WHAT IS A RESEARCH RESERVE?

Discussion by all members of the Conference:

Considerable time was devoted to an analyses of the purposes, characteristics, uses, and other features of research reserves in an effort to clarify the subject and coordinate the ideas of those present. Following the discussion, each member of the group was asked to draft a concise definition of the term "research reserve." The definitions are as follows:

> A research reserve in a national park is a biotic unit which is definitely set aside from its surroundings for purposes of experiment or study.
>
> Edwin D. McKee

> A research reserve is an area which will henceforth be maintained in its natural condition, for the purpose of research along one or several scientific lines.
>
> Dorr G. Yeager

> A research reserve is an area set aside for scientific study and experimentation to be maintained in (as near as possible) primitive condition which serves as a meeting ground for the scientific and educational phases of national park work.
>
> C. Frank Brockman

A research reserve is a tract or tracts of considerable enough extent within our parks which offer in their present condition natural phenomena for strictly research purposes. They are not to be fenced, trailed, planted to fish, etc.

C. A. Harwell

A research reserve must be a certain area embodying as nearly as possible ideal natural qualifications for the permission of continued observation of natural history.

Geo. L. Collins

Research reserves are areas of adequate size that are set aside permanently, free from human influence, for study of natural sciences.

Frank T. Been

By research reserves we understand representative portions of national parks of particular biotic interest which have been heretofore and shall continue to be kept unchanged as far as possible by human or other external factors.

Geo. C. Ruhle

Research Reserve: An area comprising a logical biotic unit either typical of the locality or exhibiting special or unique features, set aside (either temporary or permanently) for scientific observation and research, with the understanding that it shall be as little influenced by human use and occupation as circumstances permit or research necessitates.

John D. Coffman

A research reserve is an area permanently set aside exclusively for scientific study.

Ansel F. Hall

Discussion following consideration of the various definitions:

The areas selected as research reserves should be of particular interest and should be selected with great care and after proper consideration of the types of natural phenomena which they will exemplify.

The areas must be biotic units and not merely sample plots.

It will seldom be possible to select an area ideal for the study of all floral and faunal features, but an effort should be made to select an area which presentsoptimum conditions for the most important species.

Objection was raised to the use of the term "natural" in the definition of the research reserve, since no agreement could be reached as to the definite meaning of this term.

It was agreed that, where possible, areas should be selected where conditions have not been modified by human influence. It was the consensus of opinion that previous modification by human influence should not preclude establishment of research reserves in case virgin areas cannot be found.

The research reserve should be set aside for special study and its specific purpose should be recognized at the time of establishment.

It was agreed that in research reserves no experiment should be carried on which will modify the natural balance.

There was a long discussion on the subject of the determination of size of research areas. The conclusion reached was that size will be determined by natural topographic boundaries and that the area should be large enough to include as nearly as possible a biotic unit, especially for the most important species under consideration.

Following these discussions a committee, composed of Geo. C. Ruhle, (chairman), C. Frank Brockman, and J. D. Coffman, drafted the following definition for a research reserve:

> A research reserve is an area comprising a logical biotic unit, representative of virgin growth or exhibiting special or unique features, permanently set aside for scientific observation and research, with the understanding that it shall be as little influenced by human use and occupation as conditions permit.

ESTABLISHMENT OF RESEARCH RESERVES

By Geo. L. Collins

The proposition of research reserves seems to have arisen as a direct result of abnormal human invasion of our national park areas with a consequent disturbance of things natural to them. So it is essential in locating research reserves to bear in mind that an absolute minimum of human visitors is desirable.

Whether the ultimate value to the public of these proposed reserves is great enough to warrant their being set aside as such would seem to be the question. Granted that it is, we must then find out how to

actually establish them, which is more a problem of administration than of anything else. It would seem to me that the greatest value of such reserves would be in safe-guarding the parks in spite of the public.

I have an idea that in this connection different areas in national parks could be definitely closed to the bulk of visitors at different times more profitably than would result if just one special tract were to remain closed indefinitely. Perhaps, however, if one rather inaccessible tract in a park presented ideal range conditions, natural boundaries and other qualifications making it a natural game preserve; perhaps in that case it would be fairly easy to establish and maintain it from the general public. But would that be good business? Would it be right to exclude even the bulk of visitors from any part of any park if they wanted to go? Are we not still possessed of great areas of forest land wherein nature works as nearly unhampered by man as conditions we might create in national parks would allow?

As suggested above, the practical application of the idea of research reserves lies, to me at least, in closing certain areas in each national park say for two years, then reopening those and closing others, (where such a thing is possible) just as a careful farmer changes his crops or actually lets a plot of ground go for a while in order to maintain its fertility.

I believe that in fifty years time the public itself will regret exceedingly that all national parks at the outset were not made into reserves in which the flow of human travel could be controlled through lack of physical development. Would they not then be ideal research reserves? And lastly, would they not then be the most ideal national parks?

Discussion:

A lively discussion followed Mr. Collins' proposal that research reserves be set aside for only a short period. The conclusion reached was that research reserves should almost invariably be set aside permanently.

It was agreed that before research reserves are established their scientific value should be carefully determined and consideration should be given to the correlation of their administration with the general development and administrative plan of the park as a whole. Research reserves should be located, where possible, in out-of-the-way places, which are seldom visited and their existence and location should be kept from general knowledge of the public.

Present day observations may have extreme importance in the future and therefore careful records should be kept on the fauna and flora of the research reserve areas, even though the data is not immediately applicable to current problems. New problems will open up as the years pass and it is important that the research reserves be set aside <u>now</u> so that they will be available for study in the future.

THE USE AND ADMINISTRATION OF WILDERNESS RESERVES

By C. A. Harwell and G. C. Ruhle

The establishment of wilderness areas in our national parks is either firmly believed to be a wise proceeding or is looked upon with indifference. Their use is indeed a moot question. It might be wise to let them alone, unused, say for one hundred years, as examples for study of the influences of factors from the outside. Certainly we cannot expect them to remain immutable in a surrounding that is rapidly changing.

Wilderness areas should serve as a refuge for game and wild life, especially such that apparently has no safe retreat elsewhere; for example, mountain lions and wolverenes. How to keep it inviolable to poachers and yet keep out protectors is a nice question.

It certainly is advisable, at least for the time being (say 100 years) to try to keep everyone out of such preserves. Fire control, disease and insect epidemics may cause a rupture of inviolability, but despite these, it is important that they be set aside.

Research (wilderness) areas as such should not be used, hence no internal administration is necessary. To remove as far as possible the external factors, these areas should be in unused portions of the park as far as is feasible.

SOME NOTES ON RESEARCH RESERVES AND WILDERNESS AREAS IN THE NATIONAL FORESTS

By L. A. Barrett
Assistant District Forester, U. S. Forest Service

Wilderness areas are being set aside by the Forest Service in high mountain areas which are exceedingly important from the scenic and recreational point of view. These areas are being reserved in virgin condition for campers who travel by horseback or afoot. No roads or buildings are to be permitted in these areas and we hope to maintain as closely as possible the "natural" conditions. Seventeen of these areas, varying from 25,000 to 750,000 acres, are being set aside in California.

We class as "research areas" reservations which are set aside purely for scientific study in their natural state. We aim to have these represent all of the characteristic types of forest cover. In this we are faced with many practical problems, for, as you know, a

typical forest of sugar pine or western yellow pine has enormous commercial value, and in order to have the area representative, it must be sufficiently large to cover an entire water shed. Perhaps by carefully correlating the research reserves set aside by the Forest Service and the National Park Service we can arrange for cooperative use of certain research reserves and thus prevent duplication of effort and expense.

Research reserves may be included within the wilderness areas or outside; they must be located wherever the most suitable area can be found.

In deciding upon the size of a research area, the type of problem involved will, to a large extent, determine the area -- occasionally research areas may not be more than 1,000 acres, but usually they will be of much greater extent.

As contrasted to research areas, the "wilderness areas" are a type of recreational reserve. They are open for the free use of packing parties and knapsackers and are not specifically set aside for scientific observation. On the other hand, no camping will be allowed in research areas and every effort will be made to exclude the public.

We should recognize as exceedingly important the fact that we must set aside research areas at once. They must be reserved immediately because conditions are changing so fast that in a few years it will be impossible to establish these reserves. If set aside at the present time, then they will find a place in the permanent administrative plans, and arrangements can be made to protect them from encroachment by physical development or by commercial or recreational use.

WILD LIFE PROBLEMS

By Frank T. Been

Wild life problems in the national parks may involve any one or all of the following:

(1) Extermination
(2) Controlling increase in numbers
(3) Effect upon vegetation
(4) Predatory animal control

Predatory animal control was quite thoroughly covered during a previous meeting so that the first three only need be dealt with here.

The problem of preventing the extermination of a species is a problem that may come up at any time. At the present time in Yellowstone the trumpeter swan is thought to be on the verge of extinction. To prevent this from happening is a big problem. Mr. Dixon said that during a recent survey he found one pair that was reproducing. Will it be possible to protect this pair and their young which may be able to reproduce to save the species? If that is possible, it should be done even though it may not be "natural."

Similar problems will occur in other parks. If a species is becoming extinct in one park, but there are abundant representatives of the species in another park or parks, should steps be taken to save them in the first park? Opinions may differ, and I should like to hear this question discussed.

Control of increasing numbers is a problem already facing more than one park where the balance of nature has been disturbed. For the benefit of the park flora and other animals the number of these animals should perhaps be reduced, but what are the most feasible or practical methods by which this can be accomplished?

The effect upon vegetation may be included in control of numbers but not necessarily so. In Sequoia National Park the deer are so numerous to be a serious problem, but they are numerous enough that in limited areas the browsing of the deer is reducing vegetation to a very noticeable extent. In a case like this the solution may be in devising a method to save plants from feeding deer rather than decreasing numbers of deer. But how? That is a question we would like to see answered.

The control of bear in the parks is a real problem because these animals can make themselves such a nuisance with park visitors. Undoubtedly "something must be done" -- but what? The problem will have to be studied intensively before we can make intelligent management plans.

SOME WILD LIFE PROBLEMS IN THE NATIONAL PARKS

By Edwin D. McKee

Those dealing with predatory animals:

Decision as to control -- If agreed, then the method to be used.
Determination of numbers desirable for any species.

Those dealing with larger grazing animals:

Determination of number limit through study of range conditions, etc.
Necessity of rendering assistance through park feeding, disease measures.

Methods of live trapping and removal to other areas.
Boundary patrols for poachers.
Advisability of corrals or other fencing limitations.

Those dealing with small mammals, especially rodents:

The necessity of control methods
Live trapping and removal to other areas as for Beaver, etc.
The policy of taming, and assisting by the establishment of bird baths, feeding boxes, and bird or squirrel houses.

General:

The advisability of zoos.
Careful surveys of all species and numbers of animals, and of their condition -- also surveys of food conditions, range, etc.

Discussion:

In the discussions following the presentation of the above two papers, the importance of wild life problems in the national parks was stressed. It was recognized that several days might be devoted to consideration of investigations and administration of wild life problems. Since detailed investigations along these lines are now being started by Messrs. Dixon and Wright, it was thought advisable to postpone extensive discussion in this field until some future conference when more data would be available.

CONTROL OF THE WHITE PINE BLISTER-RUST

By Stephen N. Wyckoff

(Note: Mr. Wyckoff spoke extemporaneously. The following paragraphs present a brief of his remarks.)

The white pine blister-rust was introduced in the United States from Europe many years ago on nursery stock imported from Germany. The disease escaped and spread rapidly throughout the East, where it has practically exterminated the white pine. At present it is such a great menace that it is now practically impossible to raise plantations of white pine, even though economic conditions are such that these plantations would otherwise be profitable.

The white pine blister-rust has spread rapidly across the continent and is now found in northern Idaho. It has reached the Pacific Coast and has turned southward toward the immensely valuable stands of 5-needle pines in California. At the present time it is known to be at Port Orford, Oregon, which is only fifty miles north of the California line and in all probability the disease is present in California, although we do not know it. I feel quite certain that the disease is already in Mount Rainier National Park, and that Crater and Glacier National Parks will soon be infected, if indeed, they have not already been.

An area infected with white pine blister-rust is a most unsightly place. Unfortunately the disease gains headway without our knowledge and practically never can its presence be detected on trees until three or four years after the initial infection has taken place.

The disease lives on two host plants. The first stage it must live on the Ribes -- currents and gooseberries. The spores are carried from these plants to the 5-needle pines. These spores are seldom carried more than 1500 to 2000 feet; therefore, the pines can be protected by eradicating all the Ribes plants from the surrounding area. This, however, is extremely costly.

In the second stage of the disease it lives only on the white pines -- pines of the 5-needle group, including western white pine, sugar pine, and their relatives. In this stage the tiny spores travel for vast distances, sometimes being carried as far as 150 miles before infecting gooseberries or currents and thus starting a new cycle. The tiny spores from the pines spread especially well in wet weather.

When it is known that the white pine blister rust is approaching a park or a forest, the best plan is to prevent infection by eradication of Ribes. If control is delayed until after some of the pines are infected then eradication of Ribes will prevent infection of other pines, but will not prevent the disease from passing on to infect the currents and gooseberries in other areas beyond.

Millions of dollars have been spent by the federal government in attempting to eradicate this terrible disease. Time after time our battle front has shifted; and now you might say we have our backs to the wall and are making a last stand to protect the enormously valuable white pine forests of the Pacific Coast.

Discussion:

In the discussion following Mr. Wyckoff's address, details were given relative to methods of control of the white pine blister-rust. Mr. Wyckoff distributed pamphlets telling about the disease and suggested that the park naturalists be alert to detect infection in their individual parks.

Mr. Wycloff stressed the need for cooperation between the park naturalists and the field officers and control crews of the Blister-Rust Control when once the disease has become established.

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GENERAL PUBLICATIONS OF THE NATIONAL PARK SERVICE

By Geo. L. Collins

Under this heading we have at present publications of a rather popular nature -- that is, park information circulars, the National parks Portfolio and various maps; all of which embody good information, have a general appeal and are either distributed free or at as small a cost as is possible.

The Circulars of General Information probably have a wider distribution and possibly a greater indirect advertising value than any other of the park publications. They are necessarily small, as contents must be concise; their free distribution imposes restrictions in printing costs. Yet this same smallness in size is a contributing factor to their popularity as handbooks. I have noticed that a large percentage of Lassen visitors actually do read these little circulars for the interesting information contained therein.

I would suggest that the introduction of a little more variety in the text of these circulars could be done to their added interest - I have in mind here brief lessons in woodsmanship.

In the case of the Lassen Circular there have been some minor mistakes which have slightly shaded its value.

The park naturalist works closer to his park than most other employees and his particular qualifications fit him well for the job of submitting to the editor authentic data suitable for this publication. But this, I believe, has seldom actually been done in the past.

It has been my experience that the National Parks Portfolio moves rather slowly for the value offered. This is probably because not enough advertising or salesmanship is used in its disposal. The Portfolio subject matter could be better arranged in order that each park should be given an almost equal amount of space, to be filled with illustrations and type matter according to what would be necessary in order to make each separate park appear of about the same value. As it is at present, a discrimination is rather pronounced which does not help the smaller parks that are struggling to get ahead.

Good maps, of course, always are indispensable to the interested visitor. Their value, sale and use are assured.

Discussion:

Chairman Hall brought up the question of who should be reached by the General Park Information Circulars.

Conclusions:

(1) The circular of information provides an introduction to the park, possibly even before visitors enter.

(2) The information circular aids the visitor to become oriented while in the park.

(3) The general information circular serves as a key to further references.

After discussion, it was agreed that it would be advisable for the park naturalists to study the general information circulars for their individual parks and to write or rewrite sections pertaining to the interpretation of park features.

It was agreed that each park information circular should have a section devoted to brief descriptions of the park flora, fauna, geology, and other scientific features.

The chairman stressed the importance of revising the reference lists in the circulars of information. These circulars should contain a complete list of all publications now in print; obsolete items should be removed from the list.

The question was brought up as to whether or not the present Geological Survey maps are suitable. Three points brought out were:

(1) Park maps cannot always be correlated with maps of the surrounding territory.

(2) The difference in scale in maps of different parks sometimes lends to confusion. It is recognized that large scale maps are exceedingly valuable in cases where the topography is intricate, such as the Grand Canyon and Yosemite Valley. It was suggested, however, that these large scale maps be supplemented by comprehensive and accurate small scale maps (1/2" to the mile); thus the maps of different parks could be compared.

(3) Some means will sooner or later have to be devised so as to change the contour maps so that they can be more readily understood by the public.

ANNOUNCEMENTS, PROGRAMS, POSTERS, ETC.

By C. A. Harwell

The park naturalist is responsible for making a schedule of all educational activities to be carried on by his department. The schedule is the connecting link between personnel and programs. It should be well planned. A good program needs to be more than planned. It needs to be "put over" to park visitors. Here the park naturalist must function as director of a sales campaign. Perhaps the staff themselves are the first ones to be convinced regarding some service projected. A careful program of advertising must be worked out. The park naturalist needs ingenuity to produce attractive yet accurate announcements and publications necessary. Typewriter, mimeograph, inks and materials for making posters are essentials. Access to a printing plant is desirable. The following represent some of the material to be presented:

1. A schedule covering the regular trips, lectures, Museum hours and other service should be made in advance for the entire summer and posted at all points where such information would be desirable.

2. A weekly schedule for staff, noting special features and variations from the season schedule is essential.

3. A weekly announcement of service in attractive setup for interested park visitors is desirable. These should be handed to visitors at checking stations and should be marked "take one" at all information desks.

4. Posters for bulletin boards, hotels, camps and museum display setting forth some particular service from time to time are most desirable. Photographs of activities with suitable titles and inscriptions make good posters.

Whatever we put out needs to be carefully done. Our work is judged by the way we advertise it. Time should be set aside for this important work. Bulletin boards must be kept up to date and all notices circulated systematically and regularly.

NATURE NOTES

By C. Frank Brockman
and Dorr G. Yeager

Purpose: The purpose of Nature Notes is to disseminate authentic information in a periodic record of interesting events relative to natural and human history, as well as extraordinary developments in the park -- particularly in the educational work. It should be presented primarily in a popular manner.

Circulation: It should be mailed to all who are interested or who are in a position to make use of it including libraries, schools, newspapers, periodicals, museums, outdoor and nature organizations and individuals prominent in conservation activities. We realize that there is a danger of too great a circulation, and we believe that care should be exercised in placing these notes where they will do the most good.

Scope and Content Material: Nature Notes is primarily a popular record of natural history notes. It should also include anything of interest along educational, scientific or park development lines that will aid in bringing the park closer to the public. To further illustrate, such items as accession records, trips or interesting experiences, future plans, poetry, interesting visitors, etc., anything which has a direct bearing to the park or is related to the region something in the same manner as a museum.

Format: Not less than six pages and not more than 10; mimeographed on 8 x 10½" size and illustrated by sketches -- on one side of paper only. Possibly a regulation Nature Notes envelope would help the appearance.

Printed or Mimeographed: Nature Notes should be mimeographed until such time as sufficient funds are available to develop and print it in a professional manner including first class layout, illustration, paper, and printing technique.

Single publications: Nature Notes should be continued as an individual park publication, but their development should be kept on a uniform plan in all parks. As to printing; should this be possible, all parks should be allowed equal leeway and financial help, none being favored in this respect.

Discussion:

It was pointed out that the number of copies of Nature Notes which can now be produced is limited by the equipment and supplies available to the Educational Division.

It was agreed that Nature Notes should be produced in standard size and format for the various parks.

Nature Notes justify their cost because:

(1) Items are copied by newspapers and magazines throughout the country.
(2) They present an excellent educational medium.
(3) By exchange, they help us to secure magazines, books, etc.

The park naturalists are of the unanimous opinion that "taking into consideration the labor and cost involved, and the benefits derived by the public, Nature Notes more than justify their existence and an effort should be made to extend their field where possible."

The park naturalists expressed themselves as being of the opinion that it will be highly advisable to have a general park publication which would cover the field of Nature Notes for all the parks. It was suggested that this publication might also be a house organ for the Park Service and that it should be made available to the public.

NATURAL HISTORY LEAFLETS, POPULAR BULLETINS, AND TECHNICAL BULLETINS

By Edwin D. McKee

The publications of this group are all important means of presenting natural history subjects to the park visitors, yet they differ from one another greatly in both the manner of presentation and in the subject matter included. The Natural History Leaflets and the Popular Bulletins are made to reach the average visitor -- the person who for one reason or another "must be given science in small doses." The Technical Bulletins on the other hand are means of presenting newly found facts or, indeed, any interesting scientific data, to the visiting scientist or naturalist, or any other person interested.

Natural History Leaflets should be prepared for the purpose of explaining certain especially fine or worthwhile features along various trails or roads which are frequented by park visitors. These leaflets should carefully discriminate between the major features and those of lesser importance, and they should be worded briefly and concisely. Illustrations by both pictures and diagrams are excellent additions wherever possible. In brief, a series of publications covering the principal natural history exhibits along every advertised bus route, horseback, or foot trail in the various parks should be worked up and made available to the public. Neat printed leaflets are naturally the most preferable type, however it is probable that in most places

the first step must be the distribution of mimeographed sheets. It is conceivable that in many parks, the operators will be willing to get out such leaflets for distribution in connection with their bus trips and saddle parties. This will, of course, partly do away with poor information by untrained drivers or guides.

Popular bulletins should deal with the various fields of Natural History in an elementary, interesting and instructive way. There should be one for mammals, one for birds, trees, flowers, and for any of several other subjects which might be present. Only the most obvious or the most significant features should be presented and these with careful omission of technical detail. Their purpose is to point out certain fundamental truths and to stimulate interest. The publications should be printed and illustrated, but in most cases they will probably have to be mimeographed under present conditions. They should be easily available, well advertised, and either free or for a small sum.

Technical Bulletins, while they will undoubtedly have a far smaller circulation than will the popular ones, are nevertheless, extremely important as the basis for all other publications. They are also an outlet for interesting and new scientific data discovered, and a means of giving the visiting scientiest the type of material which he usually desires. Some of these bulletins might be in the form of check-lists with bibliographies, others as more complete papers. Their importance in either case is essential to real scientific progress.

Discussion:

It was brought out that natural history leaflets should be short, preferably a single page; that they are most valuable when used along nature trails or at points of special interest; that they should be dated and signed by the author.

THE PARK INFORMATION MANUAL AND OTHER MANUALS.

By Geo. C. Ruhle

Definition: The park information manual is a compilation of articles and other data largely in cyclopedic form and systematic arrangement. It makes readily available a great variety of information, and is intended for use not only among members of the Educational Division, but for other park employees as well.

Purpose: Its purpose is to make available in simple form a great amount of important information. It must be thoroughly accurate and reliable as far as possible. Without sacrifice of utility, its contents must be concise. It should always be kept up to date, It is not intended that it should supplant technical bulletins, books, and other sources of information, but is complimentary to such sources.

Arrangement: The park manual is divided into three main sections.

(1) The plan of administration of educational activities.
(2) A manual of instruction.
(3) A manual of information.

The plan of administration is a brief statement of principle of current operation to serve as a guide for immediate use and as a basis for further expansion. It is subject to official revision as far as practical experience and changing conditions demand. Its adoption through official channels makesit the official plan of operative procedure.

The Manual of Instruction contains articles and outlines describing the work at various centers. Descriptions of various Nature walks, method of procedure, division of time, etc.

The Manual of Information is subdivided into a score of divisions each pertaining to a certain branch of science. Each of these divisions should contain a general survey of the subject within the park, complete but concise descriptions of various forms and species and their distributions within the park. All space will vary with importance. Complete references must always be included, as well as information as to the identity of the person who prepared articles in the manual. Each manual should contain as complete a bibliography as possible on all subjects related to the park.

Format of the Manual: Manuals should be mimeographed on standard government letter-size paper (8 x 10½). The lines should be single spaced unless expediency demands otherwise. The contents should be bound or otherwise kept in some position so that the number of pages is flexible, to permit revisions as often as necessary without undue expense.

A Manual of Information for Employees: Some parks are planning or preparing informative manuals for employees. These must be written in more popular style than the information manuals, but must be just as accurate and reliable. Their purpose is to acquaint employees in the park with authentic information which can be imparted to the visiting tourist.

Other Manuals: Other manuals such as park ranger manuals, fire fighting manuals, etc., are prepared by various parks. Park naturalists can often assist in preparation of these, but editorship is out of their hands.

Discussion:

It was proposed that a glossary be included as part of the Information Manual because, although these manuals are supposed to be non-technical in nature, certain technical terms are unavoidable. Park naturalists and ranger naturalists should be expected to understand these terms or to know how to look them up, but when the manual is placed in the hands of other park employees this will probably not be done. Therefore, the above suggestion.

The suggestion was made that it would be interesting to include in the manual brief accounts of the derivation of scientific and popular names of plants, animals, and other natural phenomena. Place names should also receive detailed consideration.

It was agreed that there should be an exchange of information manuals between all the parks.

WRITING FOR PRIVATE PUBLICATIONS

By C. Frank Brockman

By private publications is meant all books, articles, fiction stories, etc., that may be undertaken by a park naturalist as a personal enterprise. This sort of thing, I believe, when tempered with an understanding of the importance of the job for which he is paid -- that of park naturalist -- should be encouraged; for under proper conditions such activities can do a lot of good for the Park Service, particularly if the writing is along the lines relating to the individual's park. This is particularly true of the educational phases of the park activities and it is here that ability along journalistic lines might be encouraged. The general public has not been awakened to the fullest extent as yet to the educational and inspirational value of these regions. If this phase of the parks can be "sold" to the public through printer's ink, then the work of this division will be greatly simplified.

There is a possibility and even a danger that such personal activities may be carried to extremes, but if the naturalist does this on his own time there should be no conflict of interests. The question is, what is his "own time?" The answer to that depends largely upon the progress of the nature work, for if it is making headway in conformance to the facilities provided (financial and otherwise) then whatever free lance work the naturalist does should not be questioned.

Within certain limits, then, free lance writing should be encouraged wherever there seems to be ability and talent; and the limits should be regulated by the progress of the nature work which the naturalist has undertaken, considering, of course, the facilities that are provided for the development of that work.

Discussion:

It was brought out that in searching through references in preparation for private writing, data is often found which is of great use in the educational activities of the park.

Chairman Hall pointed out the danger of letting private activities interfere with official work, and it was agreed that when writing is undertaken privately, great care must be exercised to avoid this interference.

Mr. Davis, (Manager of Stanford University Press) pointed out that sale publications must necessarily be more thorough than the Circulars distributed free in the parks. He stated that books are especially valuable as they are practically never thrown away and their effect is more lasting than that of lectures or guided trips. They should be supplementary to the educational work of the Park Service and should serve for reference after the individual's experiences in the parks are practically forgotten.

SALE OF PUBLICATIONS

By Frank T. Been

Although the advantages of selling publications in the national parks is acknowledged, the sales involve three factors:

(1) Kind of publications to be sold,
(2) Value of publications to purchaser, and
(3) Recipient of sales receipts.

The publications usually sold in the parks are those available from the Superintendent of Public Documents. The pamphlets describing each park are usually given away rather freely. There are also the publications describing or explaining features of the park -- also issued by Superintendent of Documents. Privately published books and magazines are also sold in the parks if these are pertinent to the park or park system.

Occasionally Nature Notes are sold, but as the individual parks have not adequate facilities to do this, it is not usually done. If arrangements could be made whereby the Nature Notes and Information Manuals could be prepared for sale within each park, this would be a great advantage, as these publications are in demand by park visitors. The Nature Notes would be issued once a month and contain items on current interest, whereas the Natural History Leaflets would treat a subject of lasting interest, such as the result of an experiment, the discovery of a new natural feature or phenomenon, or a lecture.

In determining the publications to be sold, we should not consider the possible monetary return, but the value to the public or park visitor. The publications should always be supplementary to the educational activities and they may be articles which go into more detail on subjects we have mentioned on hikes and during lectures or they may be writings which tell of educational activities and stimulate people to seek the services of the park naturalist. These publications may be both technical and non-technical or popular, but as our work involves almost entirely enlightening people with small knowledge of natural sciences the sales may be advantageously limited to non-technical; those interested in the technical writings usually apply to the Superintendent of Documents.

On the nature hikes it is often possible to advise people about the availability of the publications, but it may not be practical to mention them during lectures as the digression will detract from the effect of the presentation.

The disposal of the receipts from the sales made within the national parks seems to be a sore problem because the money taken in from any source is supposed to go to the United States Treasury. Although the naturalists are anxious to make publications available to the park visitors, they are at the same time anxious to apply the receipts from these sales toward naturalist work for which there usually seems to be inadequate funds.

The contention is generally made that the write-ups prepared in the parks are generally of interest to the visitors of that particular park and are prepared by that particular park; consequently the receipts should go directly to the park which has expended the time and material rather than to the United States Treasury.

In accordance with the present set-up of park administration, it seems impossible for the park to keep the receipts to itself. To avoid losing this income which can be so well used by the naturalist service, it may be possible to organize an association which is independent of the Park Service, but possibly managed by the park naturalist. This association could print the write-ups and sell them and make the receipts available to the park. This procedure seems entirely ethical in view of the fact that suitable private publications can be sold within the parks.

There seems to be a common opinion among the park naturalists that publications should be sold as a means of obtaining money, which is generally used in obtaining books and making additions to the museum. If a library and a museum are accepted by the National Park Service as necessary to complete the educational work, why should it be necessary for the naturalist to obtain money from private sources? It is usually necessary that museum exhibits come from a private source and books are often presented by individuals or outside organizations, but these contributions do not entail any monetary outlay except in their preparation. We have gone on record for the preparation of a resolution requesting a budget for naturalist work in each park. If real effort is made to put this budget through, there will be no need of private support, hence no need of sales of publications in the parks as a source of income. If a naturalist must apply thought and energy to sales effort in order to raise money to carry on the work of his department, he cannot accomplish the maximum result from his efforts toward educational ends.

Other governmental departments submit a great deal of written material concerning the work of those departments but this material is printed by the Government Printing Office and distributed by the Superintendent of Documents. The departments preparing these write-ups could no doubt use the money from their sale but they are apparently glad to contribute their efforts toward the good which may be done through them. It seems that as long as our work is educational, we would be working along much higher principles if we prepared publications for the good they would do rather than the money they would bring to us. Eventually we shall receive adequate funds from the government to carry on our work, so that it may be to our advantage to expend our efforts in hastening that eventuality rather than trying to raise money on our own account.

The most important thing to be considered from the sale of literature in each park lies in the field of the methods used. A real service can be rendered to the public if sale publications are properly presented -- and a very real damage can be done to the reputation of the Park Service if this work is mishandled.

The question was raised as to whether or not it would be possible to have a "book fund" deposited with the National Park Service under the heading "Contributions", which could be accepted by the park and disposed of for the purchase of books or for some other equally worthwhile objective.

I - LIBRARIES IN THE NATIONAL PARKS

November 26, 1929.

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II - COOPERATING ORGANIZATIONS (popular)

1. Park Natural History Associations and other popular cooperating organizations
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Besides the park naturalists, the following visitors were present:

Mrs. Rose Taylor, formerly Librarian at Yosemite Library.
Mr. George Grant, Photographer, National Park Service.
Mr. H. M. Holmes, Chief Clerk, National Park Service
Professor Walter Mulford, Chairman, Division of Forestry, University of California.
Dr. and Mrs. Frederick E. Clements.

THE PARK LIBRARY

By C. A. Harwell and G. C. Ruhle

Purpose:

The purpose of the park library should be that of furnishing readily available information to the park naturalist and his staff, as well as for members of the other departments of the park administrative staff. It should serve also for general and recreative use not only to these but to park visitors as well. It should aim to be an asset for visiting scientists engaged in research.

Scope:

The park library ought to be limited in its general scope. The library should take special pains to collect all works pertaining to the park and immediate regions, especially those of historical value. It should endeavor to build up as complete sections as possible of literature on the sciences of special interest to the park (example; Mesa Verde, Archeology; Canyon, Geology; Hawaiian, Volcanology), as well as all National Park Service literature. It is advisable to include as far as available such periodicals as Nature Magazines, Forests and Forest Life, American Museums, etc. It is well to choose fiction with great care, using only the highest type of literature.

Housing:

It is well to associate the library with the museum, if possible, since it essentially is a portion of the Educational Division of the park and augments information imparted to the tourist by the division through the staff members or the museum.

Staff:

The park naturalist should serve as chief librarian, making such appointments for library service as he sees fit. In larger libraries, it may be possible to have a permanent librarian during the park season.

Discussion:

Most of the park naturalists were of the opinion that park libraries were chiefly for the use of the educational staff. Mrs. Taylor said that in her experience in Yosemite the greatest value seemed to be to persons outside the Service who were carrying out research work or looking up matters of special interest. She stated that the ranger naturalists used the library occasionally, but only seemed to do so to become familiar with the park.

Probably the use of the Yosemite library by ranger naturalists was not apparent because of the fact that certain of the books were removed to the upper offices for their work. Also, it was noted that a number of ranger naturalists had their own reference books.

After a discussion of the purposes of the park library, these were set down as follows:

(1) Basic reference material for use of staff
(2) Material for use of public
    (a) Casual
    (b) Research

Mrs. Taylor said that her experience in Yosemite indicated that the most frequent demands by the public were for (1) Indian legends; (2) Hand books.

She stated that visitors seemed to want short articles on history, Indians and geology, and that there is very little demand for "popular" literature.

It was agreed that all books in the park library should be directly or indirectly related to the park. This includes not only the field of science, but also fiction and poetry. It has been found by experience that the books most needed are first general informatory works on history, ethnological, and scientific studies directly related to the park; secondly, technical books; and thirdly, books on subjects more distantly related to the parks.

It was agreed that it was most advantageous to house the library within the museum building.

ESTABLISHING PARK LIBRARIES

By Dorr G. Yeager

In establishing a park library several things should be considered. What scope shall it include? Where shall it be housed? How should it be administered? How shall the books be obtained? All but the last subject are being treated in other papers. I shall, therefore, confine myself to the matter of obtaining the books.

The books naturally fall into two classes -- second-hand books and new ones. The first step in building up a library is to make a list of the subjects covered. These will, for example, fall into botany, zoology, history, etc. Bibliographies are always available and a list of representative books should be made up from these. If there is sufficient money it is a simple matter to procure the desired

books from a book store or from the publishers. If, on the other hand, the funds are limited, as they usually are, second hand books must be relied upon to a great extent. Bookstores and dealers are always glad to send catalogues of second hand books and many can be obtained by a careful study of these catalogues.

One thing should be kept in mind. A library, like a museum, is never completed. It should be added to constantly. All book sources should be scanned for new and applicable books on the park or on the different phases of science. As new books come out they should be purchased. In many cases, let us say, there are gaps to be filled in the books on a subject. Careful attention should be paid to the catalogues in order to procure the book at once when it comes to light. If you are near a city, by all means spend considerable time in the bookstores on each visit. A mass of material relative to your region which you do not dream exists, will be found and brought to light by such visits.

In summation, therefore, let us say that the library is composed of old books and new and that bookstores, catalogues and lists should be studied often in order to round out your park library.

Discussion:

Care must be exercised in accepting books which come to the park through contributions. Donated books are of three classes:

(1) Applicable to park and desirable for library,
(2) Not applicable to park but possessing a trade value, and
(3) No value.

Needless to say, those volumes which fall in the latter class should not be accepted, as they have no use and simply take up valuable space.

Current literature as applicable to the park should be made a part of the library.

There followed a discussion relative to the purchase of books, and the statutory limitation of $200 on the annual purchase of books in all parks. It was agreed that the present $200 limitation should be eliminated entirely so that books may be purchased from the park budget as are any other supplies. If this is not possible, then the limitation should be raised so that an adequate supply of the most important reference books can be obtained through purchase.

It was brought out that periodicals can often be obtained through exchange for Nature Notes.

It was recognized as advantageous that the Park Service maintain a library at Educational Headquarters at Berkeley, California, to collect books for all the parks. Records should be available at these Headquarters showing what books are on hand in the individual parks and what titles are lacking.

Government publications can be obtained free by writing to the heads of the various Bureaus under which the material is published. Lists can be obtained from these Bureaus indicating the literature available.

Authors are frequently willing to contribute their works and occasionally after their death relatives of the author may arrange for such contributions.

ADMINISTRATION OF PARK LIBRARY

By Frank T. Been

In the administration of the library, the proper and most advantageous disposal of funds which the library may acquire requires considerable thought as the amount of money is likely to be quite limited. This money will probably be most usefully used in paying for subscriptions to magazines and memberships to scientific organizations which put out publications. This money may be a part of museum finances, as the library is considered a part of the museum. There will have to be an outlay also for the purchase of books. Finances for employees has not been considered here as that is taken care of in general park appropriation.

The library material should be divided into two distinct parts -- one part for the use of the public and another part for the use of employees and outsiders to whom the material may be valuable in preparing worthwhile works. To accomplish this division there must be too rooms -- one of which will probably be the naturalist's office or the conference room of the museum where the most valuable material is filed.

As the park library may not be very extensive at best, the publications in it, in order to be used by the most people, may have to be limited to use in the library only -- that is, no loans may be possible. The park library, therefore, may be considered a reading room and reference room as the publications therein must be used in the library.

As the building up of the park library depends largely upon acquisitions made from private sources, there will accumulate a mass of material irrelevent to the park. There may also be duplicates of books. This foreign material, the duplicate books, and the park

publications, can be used in exchanging with other institutions, individuals, and other parks for books which are desired. It is quite possible also that books contributed may be sold for high prices because they are rare. Because of the possibility of increasing the library through exchange, it may be advantageous to accept any kind of books with the understanding that they can be disposed of. This miscellaneous material should be indexed and filed, as it should be readily available in case of requests for it.

ADMINISTRATION OF THE PARK LIBRARY

By Edwin D. McKee

The actual administration of a park natural history library should be designated to an appointed librarian who has entire charge, subject to approval by the park naturalist. Whether this position is held by a specially trained person under regular pay, by an outsider who contributes his services, or by a ranger naturalist given the additional title, is a question which can be decided only by individual circumstances such as the state of development of the library and the demand for its services. In most cases it will be possible to have it open to the public only part time each day, but in any case regular hours and regular service should be maintained.

The duties of the librarian should include not only the arranging, distributing, and loaning of books, but also such details as the filing of book records, the maintenance of a memorandum of desirable literature to be obtained, and the acknowledgment and recording of accessions. Records of the literature available to the public should be carefully kept up to date and placed where available to all. Several lists of the complete library collection should also be maintained. As regards the second point mentioned above -- the listing of important books which should be obtained -- an advantage is readily seen when the sudden and unexpected ways of obtaining most of our books are considered. The recording of information relative to the donors of certain literature is also important and should not be neglected. This should be just as carefully attended to as the personal acknowledgments themselves.

Discussion:

The various systems of library classification were discussed. It was brought out that of the systems now in use, the Library of Congress system is apparently becoming standard, especially for scientific libraries. Library cards already prepared can be obtained with L.C. classification numbers and all other necessary data completely recorded.

PARK NATURAL HISTORY ASSOCIATIONS AND OTHER POPULAR COOPERATING ORGANIZATIONS

By Geo. L. Collins and Frank C. Brockman

We cite as an example of cooperation between organizations of this type and the National Park Service the splendid work carried on by the Yosemite Natural History Association. The fine record of this association gives us a basis of actual practice as an example for similar organizations in other parks.

The field of such organizations in respect to the national park lies in unified support of park educational programs where such support can be utilized to the best advantage in working out problems which could otherwise not be handled officially. Besides being a very real assistance to the park naturalist in some of his perplexing problems, the organization can also assimilate information, collect objects of historical and scientific value in relation to the park, and acquaint the public with the park's most interesting scientific and historical features.

The plan of organization will, of course, depend entirely upon local conditions. It is important that the organization be carefully planned so as to fit in with the general administrative set-up and the administrative activities.

Some of the points to be considered are:

(1) What kind of an organization is desired?
(2) Should it be entirely unofficial, or should the park naturalist officially participate?
(3) How much of the park naturalist's time would it take and is this justifiable from the Park Service point of view?
(4) What should be the "set-up" of the organization? Its officers? Its machinery? Its legal form? Its property?
(5) How does it tie in with the educational program? Does it supplement or supplant?
(6) In what case might it concievably conflict with Government policy? How can this be avoided beforehand?
(7) What should its activities be:
    (a) Within the park?
    (b) Outside the park?
(8) Can the organization function as a possible means of "extension service" outside of the park?

COOPERATION OF PARK NATURALISTS REQUESTED IN PREPARATION OF BOTANICAL REFERENCE BOOKS

Dr. and Mrs. Frederick E. Clements outlined to the members of the conference their ideas relative to the preparation of flower books with color illustrations for the national parks in conformance with the approval of the Director.

Dr. and Mrs. Clements requested the following help from park naturalists:

(1) Judgment on illustrated species to supplement those which appear in their regular books.

(2) Fresh flower material sent in from the national parks for study and illustration.

(3) Information to provide data for text.

(4) Personally conducted trips through parks where possible.

PHOTOGRAPHY AND VISUAL EDUCATION

November 27, 1929.

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Principles of Photography

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Visual Education and Its Place in the National Park Educational Program

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The Production of Photographic Material for Use in the Parks

Discussion led by — George A. Grant — 204

Field Demonstration - Conducted by Mr. Grant

Besides the park naturalists, the following visitors were present:

George A. Grant, Photographer, National Park Service
Joseph Dixon, Field Naturalist, National Park Service
Gerald Marsh, Instructor in Public Speaking, University of California, (formerly Head Ranger Naturalist, Yellowstone National Park)
Professor S. May, Director, Bureau of Public Administration, University of California.

PRINCIPLES OF PHOTOGRAPHY

By George A. Grant

It had been known for many years that certain substances containing silver were blackened when exposed to light for some time. Later on it was found that when some of these substances were exposed for a very short time, so short in fact that no blackening could be noticed, nevertheless a change took place which caused them to darken when treated with certain chemicals. The whole art of photography is based on these observations. If we should prepare one of these silver compounds, mix it with gelatine so as to form a thick paste, spread it on a glass plate or film today, what we would have would be practically the ordinary dry plate or film.

A camera must have three elements: A light proof box, a lens to project the image, and a plate holder. We will take up the lens later. But assuming that an image has been projected through the lens from the reflected lights on an object outside the camera and thrown on the sensitive plate, this is what happens. The parts of the image containing the strongest light will make the greatest impression on the sensitive silver plate or film. The weaker lights will make a weaker impression, and so on down to the shadows which will hardly make any impression at all. If we examine the plate after this exposure is made, there will be no apparent change in it. But if we put the plate in a photographic developer we find that in a short time the image as described before will slowly make its appearance. The parts affected by light have been reduced to metallic silver. But it is not yet a negative. If we examine the film after development we will notice that the shadows or weaker parts of the image still possess a creamy-like appearance like the whole plate had before it was developed. This we must remove by fixing, which is done by immersing the plate in a solution of hypo, or more properly, thiosulphate of soda, which dissolves out the unaffected silver salts that gave the creamy appearance to the plate. The plate is now in all respects, a negative, except that all traces of hypo must be removed by washing. It is then hung up to dry.

This image does not necessarily have to be projected by a lens. If we could imagine a pinhole about 1/1500 of an inch in diameter that would admit plenty of light as well, we would have a perfect lens of any focal length, and a covering power nearly up to 180 degrees. Incidentally, pin holes up to 1/20 of an inch are sometimes used with very pleasing results.

We all know how light rays can be bent through a prism. The ordinary double convex lens is nothing but a series of an infinite number of such prisms. If the surfaces are cut to perfect spheres, the light rays will cross, or come to a focus, a certain distance from the lens, depending on the radius of the curved surfaces and the refractive index of the glass used. The trouble with this lens

is that all of the light rays will not cross or come to a focus at the same point. The blues will not converge at the same place with the reds. The main fault with this lens is color or chromatic abberation, although it still suffers from many others.

This fault is removed by the so-called achromatic or meniscus achromatic lens found on the cheaper cameras by combining two different lenses, and cementing them together. This lens has very little speed or light admitting power. And besides this, it will project a square shaped image in a barrel or pincushion form on the plate depending on whether the diaphragm is in front or behind it. This is known as curvilinear distortion. It can be removed by combining two lenses of this type opposing each other with the diaphragm between, which gives us the so-called rectilinear or rapid rectilinear lens. This lens is hard to surpass as an all round pictorial lens, and is usually supplied in speeds up to F8. It still has its faults, technically. It has not the needle definition of the anastigmat. It has a saucer shaped field, i.e., objects in focus in the center of the plate will not be in focus at the edges or corners; and it sometimes has astigmatism. Also, its covering power is limited.

The good anastigmat lens is supposed to be free from all the foregoing optical defects. It has remarkable definition -- too much in fact. It gives a flat field, is corrected for color, and besides, has more speed. It is an outgrowth of the discovery that glass of different composition has a different refractive index. Quartz glass will not bend the light rays the same as crown and flint glass. By combining lenses made of the different glasses and properly setting them together we get the modern anastigmat. They are made over many different formulas and are necessarily expensive. The best I have found are the Carl Ziess Tessar, the Bausch & Lomb Tessar, and the Goertz Dagor. It is also a fact worth remembering that the slower anastigmats are the freest from optical defects, i.e., those working at F 6.3 and F.77 have more covering power and cut sharper than those working at F 4.5 and F 2.9, etc.

This brings us down to the important meaning of the diaphragm markings found on every good lens. What do we mean when we say we have an F 4.5 lens? It means that the lens works at F 4.5 when the diaphragm is wide open. What does this mean? It means that when the lens is focussed on some distant object or infinity, the diameter of the diaphragm opening is 1 over 4.5 or 2/9 of distance from the lens to the plate. What good is it to know this? It indicates that F 4.5 represents the angle subtended by the diaphragm when it is wide open, or in other words, gives us a clue to the amount of light that will pass through it. Some system of marking the diaphragm stops had to be adopted by the lens manufacturers in order for everybody to compare the speed of any lens with another, and to be able to use any lens. If you stop any lens down to 11, 16 or 22, they are all supposed to admit the same amount of light at that particular opening, irrespective of make or size. This is very important in figuring exposures. There must be some standard of comparison, otherwise it would be impossible to take out a battery

of different lenses and use them with any degree of accuracy. It might be well here to say that the light admitting power of these diaphragm stops can be compared, one with the other, inversely as the squares of the numbers themselves. That is to say that F 8 passes twice as much light, or is twice as fast as F 11, which in turn is twice as fast as F 16 and so on down the line to the end, which is usually F 45 or 64. Now supposing we figure our exposure should be 1/50 of a second at F 8, you can see that the plate will be hit with exactly the same amount of light if we stop the diaphragm down to F 11 and give it 1/25 of a second. Here we must do some figuring. If we stop it down one more, to F 16, we must increase the exposure to 1/12 or 1/10 of a second. We cannot hold the camera in the hand at such a slow shutter speed without the danger of vibration, which will ruin the picture. To overcome this we must resort to a tripod or rigid support together with a cable release, It is oftimes necessary in pictorial work, especially when filters are used, to give an exposure of from three to ten seconds. This is where the graflex and kodak usually fall down. They are essentially hand and speed cameras and should be used as such.

What is the advantage of stopping a lens down, under its maximum speed? If my lens works at F 4.5, why not always use it at F 4.5? I can stop a tennis ball at F 4.5 in good sunlight in 1/1000 of a second. The tennis ball will be in sharp focus, but everything on the near or far side of it will be fuzzy or out of focus. I have speed and have stopped fast motion, but I have sacrificed depth in my picture. If one were photographing a field of flowers he would have a different problem. You want the flowers near to the camera as well as those further away to be in sharp focus. This is accomplished by stopping down the lens, sometimes to 32 or 45. Your lens passes very little light at these openings, so you can't stop motion. And be careful that motion stops and the wind is not blowing, or you'll blur your picture. Any ordinary kodak below post card size set at 25 feet, diaphragm at 32, will give almost universal focus. In this connection, it is well to state that the depth increases as the focal length of the lens decreases. It is the main reason why such marvelous effects are obtained with the small motion picture lenses. These diaphragm markings and their use should be thoroughly understood before taking up photography at all.

One of the best all round cameras is the 5 x 7 or 4 x 5 or $3\frac{1}{4}$ x $4\frac{1}{4}$ view with a rigid tripod. I mean by this that more results can be accomplished with this type of camera than any other, but I would not care to carry one to the top of Mt. Rainier or across the Grand Canyon. A good portable kodak of $3\frac{1}{2}$x$4\frac{1}{4}$ size would be better for this. The Graflex is too heavy, also, and its use is too restricted. For wild animal photographs it is indispensible. It would be well for us all to adopt the $3\frac{1}{4}$x$4\frac{1}{2}$ size, because it makes a fair sized print; because it will stand enlargement up to 8 x 10 or 11 x 14", and last but not least, because the subject matter on a negative this size can usually be printed on a lantern slide by contact. It is economical, and the lens equipment small enough to insure a high percentage of good results.

I do not advise the use of film packs or glass plates. Use either roll film, or preferably, cut film. The advantage of cut film is the variety of emulsions now available, such as commercial ortho, par speed, super speed, commercial panchromatic and portrait panchromatic. I would suggest that we adopt this size $3\frac{1}{4}x4\frac{1}{4}$. right now, for the use of field naturalists. The type of camera can be decided upon by the individual who uses it. From what I can gather, Yeager, Ruhle and Collins could get along very well with a graflex, while Brockman, McKee, Been and Harwell should have a more portable camera for climbing. A graflex is always handy to have around if you can afford one. Been and Harwell, I know, could use one to advantage.

Now a word about composition. The best suggestion I can make is for you to study pictures and get in the habit of seeing pictures. You fellows are living in the most beautiful parts of our country. You have pictures almost anywhere you look. If you haven't already adopted photography as a hobby it is because there must be a screw loose somewhere. A camera in any one of our national parks should soon pay for itself.

Perhaps, without knowing why, our attention is oftimes attracted and held by a picture. It may be the composition of color that pleases us, or the composition in line and mass. In photography we must see our picture in black and white. We therefore look for line and mass. These must hold us within the picture area and not lead off somewhere else. The lines should always lead the eye to the center of interest. This is not always easy or always possible in photography. The artist can place things where he will and thus has the bulge on us. Have your people or animals moving or facing into the picture and not off of it. Watch the way the animal stands, the position of the head and ears. Look for catch lights in the eyes. All these things are done every day. In photographing groups or individual persons, do not have them face the sun directly. Have them turn a little to one side so as to get one highlight on the opposite cheek. In photographing forests and mountain ranges, have the sun to one side so as to throw them into high relief.

Filters and color sensitive (panchromatic) films are usually necessary to photograph clouds, distant objects, and snow capped mountains against the sky. The ordinary film can render these only at very high elevations in clear weather. The filters most in use for this purpose are the K1, K2, K3 and G. Wratten Filters. When you get a box of panchromatic films the factor or multiplication numbers for the increase in exposure for these filters is printed on a card inside.

Get a good exposure meter or guide, to determine your exposures. The Eastman Kodak Company will be glad to furnish free of charge pamphlets describing in detail nearly every photographic activity. If you are interested, send for the whole set.

There are a million things I haven't touched upon. You'll just have to figure them out for yourself.

Dark room work is fully explained in every box of plates, paper, and chemical sold. All you need is practice. To make it easier still, prepared developer and fixing powders are furnished. All you do is to add water. In printing it is well to remember that the paper must be fully developed out. That requires from 45 seconds to 1½ minutes. If the image comes up too fast in the develcper, and you have to take it out before time, it is because you've given the paper too much light. Throw it away and try another.

It is a wise practice to use only the developer formular recommended for the particular brand of paper or films you are using.

VISUAL EDUCATION AND ITS PLACE IN THE NATIONAL PARKS EDUCATIONAL PROGRAM

Discussion led by Dorr G. Yeager and C. A. Harwell.

The use of visual material -- especially lantern slides and motion pictures -- in connection with park lectures was discussed in detail by all members present. No paper was prepared on the subject.

The following memoranda were made during the discussion:

An effort should be made to have all lantern slides well colored. Quality is essential. Occasionally uncolored slides must be used, but they should never be run in the same lecture with colored slides.

The use of double dissolving projection lanterns was strongly recommended. Mr. Hall recommended the Bausch & Lomb Model BB portable dissolving lantern. Other naturalists expressed a preference for two machines mounted in tandem with a double dissolving meniscus in front of the lens. This makes it possible to use both lanterns in case they are needed for two different lectures at the same time. Also, it has the added advantage that when insufficient funds are available one lantern can be purchased and the other added later.

Transparancies are exceedingly effective for museum display, particularly when care is used to get the proper lighting effect. It is just as important that transparencies be colored as it is to have colored lantern slides.

It was recommended that diagrams and drawings be reproduced on lantern slides to supplement the photographs available. This is particularly important in telling the story of geology.

It is very important that there be available in each park suitable equipment for the storage and care of slides. Two kinds of lantern slide cabinets are manufactured at the present time; one is made by the Multiplex Company, and another by G. S. Moler, 408 University Ave., Ithica, N. Y. The latter is a more satisfactory piece of equipment and is cheaper than the former. It can be obtained in golden oak and other finishes to match office furniture. Each cabinet provides room for 1200 lantern slides which are placed in sliding sections (60 per section) so that any slide can be viewed at any time. The cost at the factory is approximately $100.

Suitable lantern slide carrying boxes should be provided and there should be equipment for transferring, mounting and labeling slides without danger of breakage.

THE PRODUCTION OF PHOTOGRAPHIC MATERIAL FOR USE IN THE PARKS

Discussion led by George A. Grant

In an informal way, Mr. Grant told of the work now being done in the laboratories at Educational Headquarters. He also briefly described his field work, accentuating the main objective, which is to secure adequate material for the use of the educational staff in the parks. A secondary objective is to produce scenic views which may be used for publication, advertising, etc., when this use is approved by the Park Service.

Mr. Grant urged all park naturalists to make photographs in their own parks, as it is impossible for one field man to secure negatives of all subjects for each park. Furthermore, certain photographs can only be secured at a certain time and place; the park naturalists are in a position to secure such pictures, whereas the photographer from Educational Headquarters can photograph only what is available at the park at the time he is in the field.

It was reported that Mr. Grant is working upon complete sets of prints from all negatives now available. Sets of these prints will be sent to the park superintendents and park naturalists may order lantern slides by number. These lantern slides will be furnished free and will be turned out as rapidly as possible.

The park naturalists briefly discussed other sources of photographic materials. Frequently pictures of wild animals and other rare subjects can be secured by borrowing negatives from the photographers. Other subjects can occasionally be purchased from park photographers, although with few exceptions their material is largely scenic. It was stated that the National Geographic Society will furnish lantern slides of pictures which have been published in their magazine; orders should state the date of the magazine and page.

ADMINISTRATION AND MISCELLANEOUS

November 29, 30, 1929

1 - Educational Staff

a. Ranger Naturalists

Personal Qualifications
Recruiting Ranger Naturalists

b. Preliminary Training for N. P. S. /
Educational Activities

c. Training for Staff Members

d. Civil Service

e. Exchange of Educational Division Personnel Between Parks

2 - Relation of Educational Division to Other Departments of the National Park Service

3 - Advisors

4 - Research Fellowships in the National Parks

GENERAL ADMINISTRATIVE PROBLEMS

November 29, 30, 1929.

No papers were prepared for these two last days of the Conference. Time was devoted to intensive discussion of administrative problems, particularly such as are common to most parks. The following summary is briefed from the minutes of the meetings.

Standards for the Selection of Ranger Naturalists: (Discussion by George C. Ruhle.)

There should be some variation in standards in the selection of ranger naturalists. Although our work with the public usually requires that a man be especially competent to guide, lecture, and meet the public, certain members of our staff may be chosen because they are specialists in lines of work in which the park requires research.

Ordinarily the ranger naturalist should have a well rounded scientific background. The following three factors, however, may to some degree offset technical knowledge:

(1) Ability to learn
(2) Industry
(3) Love of subject.

The ranger naturalist should also have a personality which is pleasing to the public. In lecturing, nature guiding, and announcing various activities this quality is almost indispensable. People will often follow a ranger naturalist if he has a pleasing personality where under ordinary circumstances they would not have contemplated the trip.

The ranger naturalist should have the ability of distinguishing in the field the interesting from uninteresting and the important from the unimportant -- or he should at least be able to make things interesting which would be meaningless to the untrained visitor.

If the ranger naturalist likes people he will succeed very well providing he has the other necessary requirements.

Industry is absolutely necessary. The ranger naturalist must be willing to work any length of time, as the summer season is always so rushed that it is practically impossible to arrange for definite hours of service. Public contacts represent really hard work if the ranger naturalist endeavors to throw himself into the work to the best of his abilities.

Recruiting the Ranger Naturalist: General Discussion

It was agreed that the School of Field Natural History should be a fruitful source of recruiting ranger naturalists providing the men have chosen to take the work offered because of their love for the subject and not merely because they are preparing for a ranger naturalist job.

Mr. Yeager outlined several methods of selecting ranger naturalists:

(1) Selection of men from applications received.
(2) Selection of men who apply personally during the season.
(3) Sending of form letters to universities stating qualifications and asking for recommendations.
(4) Selection of candidates from application list on file at Educational Headquarters.
(5) Selection of specially qualified applicants for ranger positions, from chief rangers' application files.
(6) Selection from among students of the School of Field Natural History.

It was agreed that the last method may be best because the park naturalist will have the opportunity of learning each man's qualifications and also of giving special training in the subjects required. Also, the candidate will have had preliminary training in ranger naturalist activities such as guiding, lecturing, etc.

The candidates' age is an important consideration because the public will defer to an older man more readily than to an equally well informed young man. Our most effective ranger naturalists have usually been over thirty years of age.

The park naturalist should personally select his staff. He should not give too much weight to recommendations, because the men giving these recommendations are very seldom familiar with the requirements for the position of ranger naturalist and the conditions under which ranger naturalists must serve.

A fruitful means of selecting ranger naturalists is by the park naturalist personally going to universities to interview prospective candidates.

The salary scale for ranger naturalists should certainly be raised because at the present time it is quite frequently impossible to secure the best qualified men on account of the small pay, and quite frequently when well trained men do join the staff they are making a personal sacrifice because of their love for the work.

The ranger naturalist application blanks which are at present filled out by all applicants have proved to be a splendid means of weeding out incompetents. Many men who formerly applied insistently

realize for themselves upon setting down their records that they are not well qualified. With applications on file it is easy to select the men of outstanding scientific qualifications. This is merely an indication of their possible qualifications, however, and should be followed up by personal interviews or by detailed confidential letters to men under whom applicants have worked, with questionnaires to be returned analyzing personal qualifications.

Comments by Mr. E. I. Kotok,
Director of the California Forest Experiment Station

For the fullest development of the individual, a man must be given opportunity to carry out personal projects or experiments. The man may then keep up intense interest in his work. The actual project may not of itself be of great importance, but assumes importance because it stimulates the man to mental activity.

Mr. Kotok stressed the fact that in work with the public, ranger naturalists should accentuate broad relationships in Nature rather than individual facts. He pointed out that it is much more important to tell the story of botany than to name the different species of flowers. Visitors should be interested in the way in which plants are associated with each other. A picture should be painted of the forest as a complex community, each member of which is dependent upon all others. The ranger naturalist should also point out the effects of various kinds of natural and man-caused destruction, such as fire, grazing, insect attacks, and attacks by fungous disease.

Fire may be the most important factor in the growth and appearance of the forest as it causes the most serious change when it occurs. In years past, fires were most disastrous because no efforts were made to suppress them.

The naturalist must know the story of plant succession in order to give the full value of this interesting story to the public. He can build up a story by reference to the fire scars on trees, to the general appearance of the forest, to the lack of reproduction, to the presence of brush fields, etc. The naturalist can perform a great service to conservation by showing people how important it is that fire be kept out of forests.

In the establishment of research reserves it is important that the purpose for each reserve be determined before the area is set aside. Each area must be specially suited for some certain type of scientific investigation.

Mr. Kotok accentuated the importance of each park having a cover type map and a fauna type map.

Miscellaneous Discussion

Considerable time was devoted to the discussion of training for the position of park naturalist, both because many of the park naturalists assembled were interested in registering for academic work toward an advanced degree and also because of the necessity for selecting park naturalists to fill new appointments. The following are memoranda of a few points brought out during the discussion:

In his university preparation the prospective park naturalist can round out his training and experience to best advantage by attending several different universities during his college career. This applies especially to graduate work.

It was agreed that the park naturalist should occasionally be given the opportunity to leave the park for study or training, especially during the winter, so that he may be of greater value to his individual park. It was agreed that it would be extremely advisable if each park naturalist could receive at least one month's training during the winter at Educational Headquarters in Berkeley, working under experts in museum preparation and in the various branches of natural history especially applicable to certain individual parks.

In his program of current administration the park naturalist must decide what work is most important. He should then endeavor to accomplish that first rather than doing a little work on many projects and not bringing any of them to completion.

After a detailed discussion of the Yosemite School of Field Natural History, the park naturalists recommended that an effort be made to turn out well qualified ranger naturalists rather than nature study teachers who are not interested in or who are not competent to become members of the Park Service staff. It was the opinion of the ranger naturalists that attendance at the school should be limited to men and that rigid selection should exclude all those who could obviously not qualify later as ranger naturalists.

Dr. Ruhle brought up the question as to the advisability of using the term "ranger naturalist." No suggestion was forthcoming, however, as to a more suitable designation for members of the park educational staff.

There was considerable discussion as to the advisability of distinguishing ranger naturalists from rangers by uniform. Messrs. Yeager and Ruhle voted for such distinction, and Messrs. Hall, Brockman and Been voted against it.

It was suggested that since this conference had been devoted to the statement of principles of the various educational activities in the national parks, it would be profitable to consider individual problems in detail at the next conference. It was unanimously agreed that this conference has been of greatest value to the park naturalists and that similar conferences should by all means be held annually.
