

PROCEEDINGS
OF THE
NATIONAL PARK CONFERENCE

HELD AT

BERKELEY, CALIFORNIA
MARCH 11, 12, AND 13

1915



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GOVERNMENT PRINTING OFFICE
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INTRODUCTION.

On March 10, 11, 12 there was held at Berkeley, Cal., the third conference of the department officials and other persons interested in the development and administration of the national parks. Two previous conferences have been held, one at Yellowstone National Park on September 11 and 12, 1911, and one at Yosemite National Park on October 14, 15, and 16, 1912. There were present at the Berkeley conference the superintendents of the various parks, the principal Washington officials of the Department of the Interior who handle national-park matters, and representatives of the concessioners, of the transportation companies tributary to the parks, and of independent organizations that have been interested in the problems of park administration. All persons holding concessions in the national parks were invited to be present and all of the railroads tributary to the parks were invited to send representatives. Every important interest connected with the parks, both on the side of the Government and on the side of the concessioners and railroads, was adequately represented. The purpose of the conference was to consider all the questions that arise in the administration of these reservations in order that the department might be able to make such changes in the regulations and to foster such development as might be for the best interest of the public. It should be distinctly understood that the views herein expressed are those of the individuals presenting them, and that the department gives no official sanction to the facts stated or to the recommendations made.

The meetings on the 11th and 12th were held in California Hall of the University of California. The meeting on the 13th was held at the Southern Pacific Auditorium, on the grounds of the Panama-Pacific International Exposition. The department desires to express its appreciation for the courtesies extended by the authorities of the University of California, by the members of the Sigma Chi Fraternity, and by the officials of the Panama-Pacific International Exposition.

PERSONS ATTENDING THE CONFERENCE.

W. B. Acker, assistant attorney, Department of the Interior, Washington, D. C.

Horace M. Albright, secretary to Stephen T. Mather, Washington, D. C.

T. Warren Allen, Chief of Division of National Park Roads, Office of Public Roads, Washington, D. C.

Arthur Arlett, representing the governor of California, Berkeley, Cal.

A. G. Batchelder, chairman executive board, American Automobile Association, Washington, D. C.

Henry G. Bates, Pacific Telephone & Telegraph Co, San Francisco, Cal.

Thomas W. Brazell, supervisor Wind Cave, National Park, Wind Cave (via Hot Springs), S. Dak.

L. M. Brett, acting superintendent Yellowstone National Park, Yellowstone Park, Wyo.

Chester B. Campbell, custodian Petrified Forest National Monument, Adamana, Ariz.

John H. Carroll, general attorney C., B. & Q. R. R., representing Great Northern Railway and Glacier Park Hotel Co., St. Louis, Mo.

A. D. Charlton, assistant general passenger agent Northern Pacific, Portland, Oreg.

Denver S. Church, Congressman seventh district California, Fresno, Cal.

William E. Colby, secretary Sierra Club, San Francisco, Cal.

David A. Curry, Yosemite, Cal.

W. T. S. Curtis, representing certain Hot Springs lessees, Washington, D. C.

Mark Daniels, general superintendent and landscape engineer of National Parks, San Francisco, Cal.

A. B. Davis, San Francisco, Cal.

George R. Davis, geographer, United States Geological Survey, Department of the Interior, Sacramento, Cal.

Coert Du Bois, district forester, United States Forest Service, Department of Agriculture, San Francisco, Cal.

A. H. Eaton, manager The Kiser Co., Portland, Oreg.

H. W. Edelson, Pacific Telephone & Telegraph Co., San Francisco, Cal.

J. Arthur Elston, Congressman sixth district California, Berkeley, Cal.

Roe Emery, Glacier Park Transportation Co., care of The White Co., Cleveland, Ohio.

Chas. S. Fee, passenger traffic manager Southern Pacific Co., San Francisco, Cal.

Amos A. Fries, Corps of Engineers, engineer officer in charge of road construction, Yellowstone National Park, Yellowstone, Wyo.

Walter Fry, superintendent Sequoia National Park, Three Rivers, Cal.

Howard Greenley, architect, New York City.

F. L. Hanna, general agent Santa Fe System, San Francisco, Cal.

Ford Harvey, Santa Fe System, Kansas City, Mo.

George Hayworth, Chief of Field Division, General Land Office, Department of the Interior, San Francisco, Cal.

F. J. Haynes, president Yellowstone Western Stage Co., St. Paul, Minn.

J. R. Hickey, vice president Yellowstone Western Stage Co., St. Paul, Minn.

A. D. Hopkins, in charge forest insect investigations, Bureau of Entomology, Department of Agriculture, Washington, D. C.

W. L. Jepson, associate professor of dendrology, University of California, Berkeley, Cal.

- Joseph N. Le Conte, president Sierra Club, Berkeley, Cal.
 O. W. Lehmer, general manager Yosemite Valley Railroad, Merced, Cal.
 R. B. Marshall, Chief Geographer United States Geological Survey, Department of the Interior, Washington, D. C.
 T. H. Martin, secretary Tacoma Chamber of Commerce, Tacoma, Wash.
 Stephen T. Mather, assistant to the Secretary of the Interior, Washington, D. C.
 C. P. Meinecke, Office of Forest Pathology, Bureau of Plant Industry, Department of Agriculture, Washington, D. C.
 Enos Mills, Estes Park, Colo.
 Guy E. Mitchell, Chief Executive Division, United States Geological Survey, Department of the Interior, Washington, D. C.
 James K. Moffitt, regent University of California, San Francisco, Cal.
 H. D. McGlashan, district engineer, United States Geological Survey, Department of the Interior, San Francisco, Cal.
 John Otto, custodian Colorado National Monument, Grand Junction, Colo.
 W. P. Parks, superintendent Hot Springs Reservation, Hot Springs, Ark.
 Mrs. E. T. Parsons, Berkeley, Cal.
 A. F. Potter, Associate Forester, United States Forest Service, Department of Agriculture, Washington, D. C.
 O. R. Prien, chief ranger, Yosemite National Park, Yosemite, Cal.
 S. F. Ralston, supervisor Glacier National Park, Belton, Mont.
 John L. Reese, Ashford, Wash.
 Thomas Rickner, superintendent Mesa Verde National Park, Mancos, Colo.
 Richard Schaffer, representing E. Lounsbury & Co., Yosemite, Cal.
 W. Gillette Scott, executive secretary Inyo Good Roads Club, San Francisco, Cal.
 W. M. Sell, sr., Raymond, Cal.
 W. M. Sell, jr., Yosemite, Cal.
 John J. Sheehan, supervisor Mount Rainier National Park, Ashford, Wash.
 David A. Sherfey, resident engineer Yosemite National Park, Yosemite, Cal.
 Mrs. John D. Sherman, General Federation of Women's Clubs and chairman of conservation department, Chicago, Ill.
 R. A. Sneed, superintendent Platt National Park, Sulphur, Okla.
 Gabriel Sovulewski, supervisor Yosemite National Park, Yosemite, Cal.
 Will G. Steel, superintendent Crater Lake National Park, Medford, Oreg.
 J. J. Sullivan, entomological ranger, Bureau of Entomology, Department of Agriculture, Washington, D. C.
 Thomas Thorkildsen, Los Angeles, Cal.
 W. D. Thornton, Yosemite, Cal.
 P. J. Walker, president California Automobile Association, San Francisco, Cal.
 John Weightman, Kallispell, Mont.
 Benjamin Ide Wheeler, president University of California, Berkeley, Cal.
 George Whittaker, Yellowstone Park, Wyo.
 John H. Williams, Tacoma, Wash.
 Robert S. Yard, Department of the Interior, Washington, D. C.
 Richard R. Young, assistant to the general superintendent of national parks, San Francisco, Cal.
 Charles M. Ziebach, superintendent Sullys Hill Park, Fort Totten, N. Dak.

MORNING SESSION, MARCH 11.

The conference was called to order at 10 o'clock a. m. by Mr. James K. Moffit.

Mr. JAMES K. MOFFITT.

Before the more formal address of welcome, I have been asked to greet you on behalf of the board of regents of the university, and I do most heartily. We feel that it is most fitting to have you meet here on our campus at Berkeley, and this great university in its academic work is indeed your colaborer in all of the sciences—engineering, botany, geology, forestry, and entomology. But it is only as far as the university succeeds in coordinating and standardizing these many activities, in so far as she is able to create standards, achievement, and research, that she believes that she fulfills her mission as a teacher, as a servant of the State and the Nation. On another side, too, we claim kinship with you. In the earliest days of the university, those days that I think we can name best by calling them the days of Prof. Joseph Le Conte, this university has been concerned with the love of the mountains, the mountain lakes, and the mountain parks of this glorious State. We feel justified that from the university, as the center, has gone out the stimulus to the people of the State that has made the people as a whole love the outdoor mountain life of the State in such measure, a love that has found practical, forceful expression in these organizations of later years, like the Sierra Club of California.

I do not wish to take any thunder from the speakers that come after me, but I can not help calling attention to the happy occasion of this meeting. Now, your honored Secretary of the Interior, Hon. Franklin K. Lane, his former assistant, now one of the members of the Federal Reserve Board, Mr. Miller, and the present assistant in charge of national parks, are all sons of the University of California.

It is my great pleasure and privilege to have known these men and to have been a fellow student with them here at Berkeley. I now take pleasure in introducing to you the head of our university, President Benjamin Ide Wheeler, who will formally welcome you to the campus and to the university.

Dr. BENJAMIN IDE WHEELER, President of the University of California.

I am glad to see you here. I am here to give the formal welcome, which means the cold welcome, I suppose, the formal and the cold being of about the same value. What I want in this address of

welcome is that it shall be brief as possible. We have attended conferences and teachers' institutes in Fresno and some other places down the valley, where they have talked to us for half a day welcoming us to what they call "Our city." There is no need of my trifling with you at all in any such way. You are here for serious business, as serious men, and you know that I am glad that you are here and that this place is at your disposal. If there is anything we can do here for you, it shall be done.

It is not here alone that you are welcome. You are welcome to the great heart of the University of California, spread all throughout this State. This university is the chief pride of this State. If you say anything against it, you will be drummed out of the State. You better not say anything against it until you are safely over the Reno frontier. The State knows perfectly well that through all its attempts, failures, and partial successes there is one thing that it has received credit for, certainly, unquestionably, and that is the university. It is the chief pride of the State deservedly. It is a mass of scattered buildings. You see the new in the form of bright, white granite rising upward from the midst of the older buildings. It has been obliged to provide itself with room here because it has been growing very rapidly. It has outgrown utterly its old equipment. In a dozen years it has changed from what you would call a small college to a university assuming to give instruction in all the various branches of science.

It is widely differentiated. It exists not alone here at Berkeley. It has a biological station, for instance, at La Jolla in San Diego. It has a great and rapidly developing station at Riverside for the study of citrus fruits, their growth and diseases; there is also located there what we call the graduate course in semitropical agriculture. At Santa Monica there is a forestry station. Coming up toward the north at Fresno we have a farm of fifty-five hundred acres that was given to us for agricultural education. It is not perfectly clear how we shall handle that in the future. It is used in part already as an experiment station. Sometime it will be the site of a branch of some kind for agricultural education. The Lick Observatory on Mount Hamilton is the graduate department in astronomy of this university. It was placed in our hands by the State years ago. The State now supports it. It bears the name of Lick because Lick provided it with appliances and a telescope.

At Davis, 25 minutes out of San Francisco, we have a farm school and a place where our agricultural students can have about 6 months of their course for the study in particular in the subjects that can be only taught in the presence of a farm with its equipment. Over in the city we have all sorts of institutions, a school of pharmacy, a

school of dentistry, a school of law, and a school of medicine. That, particularly, in recent years has developed greatly, and has a strong foundation upon modern requirements in medical education. We are expending about \$200,000 a year as a subsidy for the school of medicine. We are spending \$500,000 a year, a little over, for agricultural education and research. This is an institution that can hardly tell what its range is without referring to numbers, and I know how delusive numbers are.

Here on the grounds of the university you will see floating about in all parts hundreds of students. Look into the library building between hours and you will find four or five hundred students sitting there reading. There are fifty-three hundred students right on this campus now. For instance, over yonder in North Hall, you will find at this particular hour eighteen hundred students in the classrooms. There are fifty-three hundred of them in attendance at the university proper. We have what we call a graduate school and an undergraduate course. It is the largest body of undergraduate students anywhere in the United States by a considerable amount. Our graduate school numbers 700. Taking it all together, the number of students we are dealing with, counting our summer sessions, and the different persons that are involved, are over 9,000. Our number of students this year may be said to be slightly over 9,000. We are urging a further agricultural extension course, and our regular course in the university extends to about 75,000 people here in this State. That is our range so far as figures will show it. Wherever the university is we welcome you to it. With all of its purposes and with all of its outlook, I welcome you to it. I know perfectly well that we have your sympathy, and we are trying to do for all what you are trying to do.

The university is a great deal bigger thing than it used to be. The concept of the university has grown in years enormously. We are no longer training callow boys who are spending four years of rollicking. We are no longer undertaking to create a few persons who shall regard themselves as gentlemen, members of the four leading professions; but we are engaged in working for the community and are trying to bring to that community succor and help according to its needs. That is the movement everywhere. Whatever we are trying to do to-day, we shall try to do more somewhere else a few years hence, because, in the adaption of education to the needs of human life and the needs of society, great things take place all the time. We can hardly keep up with progress. We are undertaking to do for these students that come to us what it seems to us best to do under the circumstances, and there is spread abroad throughout all of this student body an atmosphere of willingness and a desire to help. We are a cooperative household, and what we

are trying to do is for all. We are trying to do the best we know how. We give you all a hearty welcome here.

MR. MOFFITT.

The name of Stephen T. Mather is not a new one to us here in Berkeley or in California. Mr. Mather's business activities have taken him for many years to Chicago, but, as in many cases, absence from California has only brought closer to him its needs and has brought him more closely in touch with those who have had the activities of the State in charge. The University of California, the alumni, and the students who have passed through Chicago going East and coming West have had no stronger friend than the Hon. Stephen T. Mather. He has been a man you always felt ready to call upon for counsel and aid. It was a source of great gratification when he, through his love for the mountains, coming here year after year and making extended trips throughout the Sierras of this State, consented to enter the national service.

I now take pleasure in introducing Mr. Stephen T. Mather, Assistant to the Secretary of the Interior, in charge of national parks of the United States.

STEPHEN T. MATHER, Assistant to the Secretary of the Interior.

When I asked Secretary Lane if I could hold a conference of the park superintendents, of which two had already been held in previous years, 1911 and 1912, my thought naturally turned here to Berkeley. I felt that here was the place, especially this year, with the thoughts of the country on the great exposition, to hold this conference, and that this would be the natural place for all of the superintendents to come. When I telegraphed out here and asked permission of President Wheeler to use one of the university buildings, or one of the halls for this purpose, he responded most heartily. I want to now publicly thank him for giving us this opportunity to meet here. I would like to tell all of you a little bit more about the atmosphere of this wonderful institution. I want to thank also the members of my own fraternity, who so willingly threw open their house as an abiding place for our superintendents, supervisors, and members of the official party from Washington. It has been said that the fraternity lives unto itself. I think this little incident alone is proof of the fact that the college fraternity has broadened out, not only in university life but in public life generally. The boys in this case gave up their house and went elsewhere, and gave us the opportunity to have that peculiar home life that otherwise we could not enjoy.

We expect as we meet there day after day and have our meals together around the board, to develop that same fraternity life, and make a fraternity that will be of value to us personally and to the Nation as a whole.

I want to read a telegram which I have just received from my honored chief, Secretary of the Interior Franklin K. Lane:

Please convey my heartiest greetings to the members of the conference. I feel that this opportunity for the exchange of ideas and suggestions will be of great benefit in our effort toward betterment of the national park service, and I have great hopes that the result will be to make the service much more efficient and to make our wonder places more truly national playgrounds and more easily accessible to all our people.

I have another telegram from the American Civic Association:

The American Civic Association sends hearty greetings to the national park conference, with earnest wishes for sessions of great profit to the Nation in the larger administration and exploitation of the great scenic area set aside for national recreation. We stand ready to assist in all movements that will encourage a larger use of our parks by the people of all the States of the Union. Let us make them service parks in every respect.

It is with some diffidence that I come before a conference of this kind, before these superintendents, many of whom are long in years of service in their work, and particularly in view of the fact that I have only been a little over a month in the national service. The only excuse that I can plead is that I have had some interest and love for all of the parks, and had visited some of them before I assumed the duties of my office. And I am now trying to make an extensive study of the tremendous problems that have been coming before me. All of the problems that are arising are intensely interesting. Each day brings up something new and in delving back through the national-park records in the Department of the Interior many interesting propositions are brought to light, nearly all of which offer opportunities for constructive work.

I have been very fortunate in this work in having the very hearty support of all my associates in the department. I am just realizing for the first time what a wonderful fund of information there is right there in Washington that has been gathered from all over the country. The United States Geological Survey, which is doing the great work of mapping out our whole country, has many men who come in during the winter months from all over the country. If I want to find out something about Mount Rainier (and Mount Rainier is a wonderful spot in itself, and no man knows it more thoroughly than does John H. Williams, who has written that great story about it), I can call on one man who has done the topographical work on the north side, others who have done it on the south side, the west or east sides, and get the information that I want.

When the question arose of installing a power plant near one of the lakes in Glacier National Park members of the Geological Survey were ready to furnish me with a report on the amount of water available as a result of stream measurements made through a long period of years, besides giving me a clear idea of the proposed site of the plant. Again, through the Bureau of Entomology of the Department of Agriculture, I could learn in what portions of our own Yosemite dangerous insect pests were attacking the forests, and so I might go on reciting case after case where I have been able to obtain information from other bureaus of the various executive departments which has aided me in my administration of the national-park system.

My own enthusiasm has also been kindled by the interesting material which has come to me from the employees of the department, several of whom have been working on nation-park problems under half a dozen different Secretaries.

The Secretary of the Interior directly administers the parks. The Secretary is personally responsible; but so many different duties devolve upon him that it is hard for him to find time to devote to the parks. As Assistant to the Secretary he has delegated me to those duties which it is physically impossible for him to perform. He can not undertake them in addition to the other tremendous problems that are pressing in on him.

I have had some thoughts in regard to the future of the parks, and I am trying to meet the problems as they come up. But I realize that we must all work together, whether it be our own officials representing the Government, the concessionaries, or the railroads that are reaching the parks. The parks must be, of course, much better known than they are to-day if they are going to be the true playgrounds of the people that we want them to be. There is much that can be done in making them better known. There are many ways in which they can be brought home to the great mass of eastern people. Something along that line has already been done. We are fortunate in having, outside of the Government itself, a great many people who are giving freely of their time and energy to this end. Three or four of the leading lecturers of the country are taking for their themes the national parks, and several powerful organizations, particularly the General Federation of Women's Clubs, are devoting their time and energy unselfishly to the end that these great playgrounds shall be made better known to all the people.

I am sure that the Government is going to have, through such persons as these, a tremendous amount of help. These people, just from their love of the mountains and the open country, are willing to give much of their time and attention to this matter, and can do a great deal of good. I know of one man alone who has given practically half of his time in a most disinterested way to make our parks bet-

ter known. There have been writers in the leading magazines and weeklies who have given their personal attention to stirring people up to the possibilities of these parks and have given first-hand information regarding them. That work has already borne fruit. In this connection I want to specially mention Mrs. John Dickinson Sherman, chairman of the conservation committee of the General Federation of Women's Clubs, who has worked unceasingly on behalf of the parks for several months. The pamphlet she has issued on national parks is extremely valuable, and the work she has done has already reflected itself in the way of activity in the different State organizations of women's clubs. A man from Boston has written me that he has had so much success with national-park lectures that he confines himself largely to this topic instead of devoting his time to different subjects. I think it is the duty of all who are in the Government service to do their part toward turning the thoughts of people in their direction. To the superintendent comes a great burden of responsibility, because it is largely his duty to see that every tourist goes away from the park in the right frame of mind.

The Secretary himself has made it very clear that the question of creature comforts is important in our parks. Scenery is a splendid thing when it is viewed by a man who is in a contented frame of mind. Give him a poor breakfast after he has had a bad night's sleep, and he will not care how fine your scenery is. He is not going to enjoy it.

Now this is only desultory sort of talk. I have not had any time to prepare a set speech. Our little official party since it started from Washington has been on the go every minute.

It may be of interest to you to know that the next man who is to speak to you is an enthusiastic member of the Sierra Club, a great lover of the parks, and a man whom we are sure, when he gets down to Washington, will be of very great service to us in the Halls of Congress; a man whom we are going to call on frequently when it comes to the solution of national park problems. There are many things we have coming up in Congress. During the short time that I have been in the office I have had to make two or three visits to Congress in connection with park problems; and it was pretty strenuous work. When Hon. J. Arthur Elston comes down there we are going to keep in close touch with him. I now have the pleasure of introducing him to you. He will speak to you on the value of our national parks.

HON. J. ARTHUR ELSTON.

Mr. Secretary, ladies, and gentlemen, Mr. Mather has put me to some slight disadvantage by his announcement of my subject. I feel very much like the prisoner who came up before the judge, who asked

him, "Why did you hit that little man?" The prisoner replied, "Judge, suppose I called you a big Irish slob?" The judge says, "I am not." "Suppose I called you a German slob?" The judge replied, "I am not a German slob." "Then, suppose I call you the kind of a slob that you are?" I feel somewhat as if the name of that man might be applied to me, but I might be able to get out of it something like the prisoner did in a certain case that I read of. The attorney for the defendant pleaded very strenuously for him. He said, "Your Honor, this man only put his hand through the window and took the jewels out of the case. It was the man's hand that committed the offense, and you can not blame the ego for what a mere limb did." The judge scratched his head and said, "I think you are correct about that; I do not believe the man ought to be blamed for what he did, so I will sentence the hand and the arm to State's prison for 10 years. Will that be all right?" Thereupon the prisoner unscrewed his wooden arm and hand and left the court room a free man.

I am not going to make any extensive comment upon a subject about which you know a great deal more than I. I merely want to say that I am most happy to greet you here in Berkeley. President Wheeler has given you a welcome to the university, and I welcome you to a place which has a peculiarly sympathetic atmosphere. This is the place where John Muir, once, I suppose, the greatest exponent of national parks, made his headquarters. This is where he had his particular group of intimate friends. This is where William Keith pictured all of the beauties of one of our national parks, and the great natural landscapes all over this coast. Here we have had Prof. Joseph Le Conte, who has made pathways over some of the most inaccessible mountain regions in California. Here we have William Colby, who is a member of a unique organization which has advertised the mountains of this State and the United States to a degree that no other agency has done. The Sierra Club has done a great deal to bring to the attention of the public the natural beauty spots of this State and other places on the Pacific coast. It has been a great agency for the dissemination of information regarding our national parks and places of beauty. Perhaps it might be said that the Sierra Club is the foundation of the idea for the establishment of national parks themselves.

I have not had very much to do with going about in your national parks, but I have always been a great lover of the out of doors; and it has been my great pleasure to learn from many intimate friends of these national parks the laws that create them, and matters of that kind, with which I am not very familiar; but I want to tell you right now that, as far as lies in me, as far as lies in the power of any first-term Congressman—you who have read Mark Twain a great deal

know what he says about a man of that kind—I will do the very best I can for the furtherance of those things that you are striving for now; I will do all that I can to help you along. I hope to collaborate with Secretary Mather in any program that he has, because I realize that a Congressman can look to him as the possessor of first-hand information on all problems relating to national parks. If I went to anybody for information or for guidance in this matter, the first person I would go to would be Mr. Lane, or Mr. Mark Daniels, both of whom are close to me, and we are proud of both of them.

That is about all I have to say to-day. I can not instruct you in subjects about which you know more than I do. I believe that this conference will result in great benefits along the line that Mr. Mather just spoke—that is, the publicity line. I believe it will be a great day for the national parks when they are brought to the attention of all of the people, who will be taught to know that they are their playgrounds and that they can go there and enjoy them. I think that one of the greatest benefits to come from this conference will be to give that publicity to the people of this country. I thank you very much.

ASSISTANT TO THE SECRETARY MATHER.

I will say that from our congressional delegation from California we have already received valuable support for problems regarding national parks. Congressman Church is enthusiastic and is much interested in national parks; Congressman Raker has helped us materially on questions that have come up, and Congressman Kent, particularly, has also helped us in two or three vital matters at a time when a great deal of work had to be done. I feel sure that we have in Congressman Elston a man who will be of just as much help to us.

I consider myself most particularly fortunate in having come into the office with a general superintendent and landscape engineer in charge such as Mr. Mark Daniels. This was a new office which was created only last year by Secretary Lane. In fact, I believe my predecessor, Dr. Miller, was the one who first suggested the idea to Secretary Lane of having Mr. Daniels act in taking up this important work. There have been many plans suggested for a park bureau in times past, and much agitation has taken place before Congress for a park bureau; from the start already made we are pretty well along toward an organization of this character.

Mr. Mark Daniels first took up his work of handling the Yosemite National Park at the munificent salary of \$10 a year. He took it up

at a time when it was a pretty difficult problem to handle, just when the Army was retiring from the park, and when it was necessary to substitute a civil administration for it. Since that time he has taken up this position of general superintendent and has applied himself to the work very enthusiastically. It was impossible under the law to have him in Washington, so he is located here in San Francisco. He is out here in San Francisco in close touch with many of the national parks, very much more so than he would be probably in any other State.

He certainly is in very close touch with all of the parks on the Pacific slope. In fact, all our parks are western parks. The new Rocky Mountain National Park just created by act of Congress in January is the most easterly of the greater parks. It is only 30 hours from Chicago, and therefore nearer to the Eastern States than any other park we now have.

I am going to call on Mr. Daniels to tell us something about national-park development as he has already seen it and as he sees it looking into the future, because he is one of those men of business who is also an idealist and interested for the future. He deals with these problems not only for the present generation, but for future generations.

MR. MARK DANIELS, GENERAL SUPERINTENDENT AND LANDSCAPE
ENGINEER.

Before I enter into any discussion of the problems regarding the parks or a plan of a campaign for developing them, I would like to say a little something about the parks in general.

It seems to me rather a strange thing that the parks, like all other things which involve idealism or estheticism, are constantly being challenged for an excuse for their existence, while at the same time hundreds of things less worthy are stalking the land. The parks have two justifications: One is esthetic, and, strange as it may seem to those who have been constantly crying for an abandonment of the expenditure of money for their support, there is an economic justification. Economics and esthetics really go hand in hand. They are so intimately related that it is impossible to disassociate them, which is the mistake that is so commonly made by those who hold the purse strings. The economists during the period of the Cameralists in Germany repeatedly stated that the economical development of a country was very well measured by its esthetic development. The development of the arts, the development of social sciences, is a good measure of the development of economics. As a specific instance of the economic value of our national parks I would like

to point out something which perhaps you have heard a great many times, that there are four hundred to six hundred million dollars which go to Europe, being spent by American tourists in Europe for the purpose of seeing scenery. Mr. Horsburgh, of the Southern Pacific, several years ago, spent several months making an investigation of the amount of money that goes to Europe for tourist travel, and he told me that it was not less than \$500,000,000. If it were not for the fact that the European has developed the capacity and facility for catering to such a point that it has become with him an art, European resorts would not be so popular, and yet they are very inferior to what can be seen at home for less money. The amount of money that leaves this country by tourist travel is all in coin—it is in cash. I read not long ago an article on the gold reserve, and in it it was clearly pointed out that the tourist travel from the United States very materially affects the gold reserve of this country, due to the fact that money taken out is all in coin. It is not in the form of an exchange. In purchasing scenery from the European we are not spending money there which will be turned back to us in the form of an exchange trip from the European, because the European very seldom comes to this country for scenery.

The parks in general, I think, should be classified so as to properly work out an administrative and development scheme. We are constantly having applications submitted in Washington for the creation of national parks out of areas which are in no way national in their interests. We have city and county parks, State parks, and National parks. Without discussing the characteristics which apply to any of these in their particular category, I might say that national parks should not be created except in those areas where there are features of national interest and where there are bits of scenery or natural phenomena which would attract people from different parts of the country. The function of our parks, either city and county, State or National, is the supplying of playgrounds or recreation grounds to people, furnishing the mental as well as the physical stimulus to tired and exhausted workers. I think the most important feature in the national parks is the educational one. I think that is the one thing that makes a distinction between city and county, State and National parks. In a national park the scenery or natural phenomena is of such a character as to be largely educational. I am sure that no one can go through Yellowstone National Park after hearing the roar of the Hot Springs and seeing the paint pots without feeling that his education has been materially augmented. Nor can he leave Yosemite, after spending enough time in there to see what glacial action was, to see the highest waterfall in the world, the greatest trees in the world, without feeling that his mental horizon has been broadened materially.

If our national parks are ever going to be a success, or if we are going to put them to the use for which they were set aside, in other words, if they are going to bring in dividends, not only in money, but in health, happiness, and increased intelligence, they must certainly be visited by the people; therefore, the first problem to be considered in their development is how shall we get the people to the parks. There are three conditions which determine tourist travel. One is transportation facilities, the second is publicity, and the third is accommodations. We will never get tourists into our parks unless the tourists know that there are parks; therefore, we must have some method of disseminating information. After they get that information they will not go unless there are adequate transportation facilities and good accommodations at the park. The tourists, 99 per cent of them, at least, travel on the line of least resistance. They go where the transportation facilities are good and where the accommodations are good. I venture to say that 75 per cent of them would travel 5,000 miles to stop at a mildly interesting park that had excellent accommodations and transportation, which was first class, rather than to travel 500 miles to a park full of natural wonders which was almost inaccessible and where one could not get accommodations except a cot under a pine tree and a diet of bacon and beans. The reason that Switzerland has attracted the tourists of the world so much is not only the fact that she has magnificent scenery, but she has advertised it and she is inhabited by a race of innkeepers. It is possible to go to Switzerland and stop at chalets throughout the entire country where the accommodations are good and the food is excellent; so that people from the surrounding countries can go to Switzerland for a very small sum of money and spend their vacations there. We have mountain scenery in the State of California which, in the opinion of many people who have traveled in many places, is superior to the scenery of Switzerland, and yet if you wish to see it it will cost you from \$300 to \$750, a sum that is entirely out of the reach of a vast majority of people who would like to go.

Therefore we must have some plan for the development of the accommodations in our parks. The Secretary has taken up the question of organizing an efficient bureau of information. The bureau of information will be operated in such a way as to disseminate that information we wish to go into the hands of the people. He is also taking steps to improve the transportation facilities to the parks. My particular function in this work is the development of the parks themselves. What is now under consideration is the business of establishing three classifications of accommodations in the parks: (1) The hotel or the mountain chalet, where the tourist sleeps and dines; (2) the permanent camp, where

the tourist sleeps in a tent and eats in a dining room; and (3) the camp where the tourist sleeps in a tent which he rents for the night and where he cooks his own food. I want to point out some of the advantages of having these three different kinds of accommodations. There are people in the Eastern States, where the population is densest, who would like to come to these mountains and our parks, nearly all of which are over a thousand miles from their homes. These people go to the office of the railroad company and find out the cost of a railroad ticket; then they begin to investigate what it will cost them when they get into the parks. That is where they have to stop. They can not afford to pay \$8 a day. If we had these three types of accommodations—the hotel which gives a room and board, the camp which furnishes a tent and dining room, and the camp which also furnishes a tent with a stove and furniture, so that the tourist can purchase his commodities and food at the village store—we would reach almost every class of possible tourists.

I discussed this matter in Glacier National Park with Mr. Hill, of the Great Northern Railway. That road tried it out and rented a tepee to tourists at the rate of 50 cents a night. A few hundred feet from the camp was a store in which the tourists could purchase 5 cents worth of coffee, 5 cents worth of bacon, and a few slices of bread. Every one of these camps was filled—every one of them. There were people who came to that park who got their board and lodging for 85 cents a day. Think of what that would mean if you could get it advertised throughout the East. The school-teacher of the Atlantic coast, whose dream for years and years has been of a visit to the Yellowstone National Park, the Yosemite Valley, Mount Rainier, or Crater Lake, would be able to come out here at a cost here of 85 cents a day, which would be cheaper than she could live at home. So, then, there is some possibility of saving to some extent on the transportation. I have heard from Europeans many a time that the reason they go to Switzerland is because they can plan their vacations there cheaper than they can live in their own country, and thereby save a part of the cost of their transportation.

There is a fourth class of tourist for whom accommodations are necessary—the tourist who comes in with his own camp. He takes his own camp. He does his own cooking and he takes his own horses. If he is wise, he takes them right on through the mountains. In the Yosemite Valley there are times when there are five or six thousand people congregated at one time. That community ceases to be a camp; it becomes a village. It can no longer be administered or looked upon in the light of a camp. It has its municipal problems. There are many incorporated cities in this State and in the United States that do not have 5,000 in population. This village has the

population of a municipality. It must have a sanitary system, a water-supply system, a telephone system, an electric light system, and a system of patrolling. There is no instance in the United States of any village that grew to any size without some forethought, without some planning, that did not turn out to be an ugly repellent object. For that reason, if for no other, it is absolutely essential that we take care of the villages in these various parks.

If these three departments are going to be thoroughly developed, it will undoubtedly result in an attendance to the national parks which will probably be four or five times what it has been in the past. That means that Yosemite Valley will have within the next 5 or 10 years, at certain seasons of the year, on the floor of the valley from 10,000 to 15,000 people at one time. That brings it almost into the category of cities. There is no doubt that Glacier National Park, which in four years has developed in its attendance from 2,500 to 15,000 per annum, will in the very near future be in a condition which will absolutely demand some sort of a civic plan in order to properly take care of the people who visit it. The Great Northern Railway estimates that there will be 35,000 people in the park this year, so Yellowstone Park ought to receive more than 35,000. Yellowstone Park will probably take in 40,000 or 50,000 this year. I merely mention this to point out the inevitableness of creating villages in the parks. Our plans are now being drawn to accommodate villages of populations which have been determined or predicated upon the development of growth curves. We have plotted out the attendance at each park, and plotted the maximum population each year, and from that we get a sort of a practical or sensible guess as to what the population may be at some future time.

We have now planned a village for the Yosemite Valley and are working on the village for the Crater Lake National Park, and we expect this spring to take up a village plan for Mount Rainier and Glacier Parks. If a plan for the physical development of any area, as well as a national park, is to be in any way successful or practical or efficient, it has got to be functional. In other words, it must be so drawn that it suits the various conditions—not only the topographical features, but all the physical conditions. Therefore, before we could plan the villages it was first necessary to make a very careful and thorough study of the parks and determine from which direction the majority of the travel would come, at what angles the tourist roads came into the park, whether any of them could be used, and from what central point the larger portion of the park could be seen and visited with the least amount of travel. We have completed a preliminary study for five parks—Sequoia, Yosemite, Crater Lake, Mount Rainier, and Glacier. We have complete preliminary studies

for those. We have complete village plans for the Yosemite Valley, including a study of the architectural character of every building that shall go into the village for the next 10 years.

The building locations are carefully thought out. They are selected and the type of architecture is determined in the light of a careful study of the best arrangement of the buildings and for picturesqueness. We are now engaged on Crater Lake buildings, and will finish the villages for the five parks, for which we have already complete preliminary studies, probably by the end of this coming season.

This work is all very well on paper; it is very interesting and very fascinating, and it may probably take us a long time to get sufficient money from the Government. The only thing that makes it worth while is the hope, or the assurance, that some day, if not in the immediate future, these plans will be executed according to their design. We can not get a sufficient appropriation at present from Congress to develop these plans and put them on the ground as they should be, therefore we are working for an increase in attendance which will give us a justification for a demand upon Congress to increase the appropriations that are necessary to enable us to complete these things. The whole problem then resolves itself into the necessity for support and for attendance on the part of the people. When Secretary Lane first began to consider these plans things looked rather hopeless, but now they have begun to brighten up. In order to get the results we wanted we needed a publicity expert. We needed a good man. The Secretary of the Interior is occupied with problems that are of such magnitude that the importance of the parks dwarfs to insignificance. It was known that he would not be able to give it his personal attention, so when it was announced that Mr. Stephen T. Mather had been appointed Assistant to the Secretary I think a sigh of relief went up from every man who has any interest in the national parks. In the short time that Secretary Mather has been connected with the parks I have begun to see that the clouds are opening and that we will have all of this work well under way, and we will have sufficient construction done by the end of this year to justify our going before Congress with a demand for an appropriation which can not be denied.

ASSISTANT TO THE SECRETARY MATHER.

This evening, in this same hall, we will have a talk by Mr. R. B. Marshall, chief geographer of the United States Geological Survey; also by Mr. Enos Mills who was instrumental in bringing about the creation of the Rocky Mountain National Park. The meeting this afternoon will be in the Chemistry Building at half past 2.

It probably will not be a long session. To-morrow evening we are to have a reception under the auspices of the ladies of the Sierra Club at the Sigma Chi Fraternity House at 2345 College Avenue. To-morrow General Superintendent Daniels will preside over the conference and we will have talks from those in charge of the different parks, giving some of their experiences. The conference will be very valuable to all of us. Saturday will be national park day at the exposition. Some of our best addresses are to be saved for that day. We will be received by the president of the exposition, and we hope to make some impression upon visitors to the exposition through the fact that the day is set aside as national park day.

We have a little time left of the morning session, so I will call upon Mr. Ford Harvey to speak now. The work that we have before us regarding these parks and their proper management is most interesting. It will be particularly interesting to have Mr. Harvey speak to us on account of the many years of experience he has had with the Santa Fe Railroad Co. I have traveled over the Santa Fe road for many years and stopped at all of its various caravansaries. The Swiss have learned the art, as we know, of caring for people. It is in the blood, perhaps. Their fathers and grandfathers before them have been innkeepers. They have learned to realize that the comfort and pleasure of their guests are always deserving of their primary consideration, money making being only incidental. I think this applies to the Harvey system. Mr. Harvey's father started this wonderful development, and Mr. Ford Harvey has advanced it. I want Mr. Harvey to tell us just what he thinks of some of the problems that we have before us.

MR. FORD HARVEY.

Gentlemen, you are not to blame for what you are about to suffer; neither am I. When honored by your chairman with an invitation to address you, I replied by letter that I was totally inexperienced in speaking and could not talk. His response was a telegram reading:

Many thanks. Appreciate your willingness to speak.

I have had no experience in hotels in national parks, and for that reason I can advise freely. My observation is that the man without experience can give most often the best advice. For 10 years we have operated the Hotel El Tovar at the Grand Canyon of Arizona. The Grand Canyon is not a national park, but it ought to be, and I hope it soon will be. For that reason it is a fact that I have had no experience in hotels in national parks except as a guest. I think Mr. Childs would be much better fitted to address you on this subject than I am. Mr. Childs is a smart fellow, as well as a good fellow, and doubtless would be able to make himself understood.

I am doubtful as to the lines my discussion should proceed on, having had no opportunity to talk with anyone about it, but the detail of hotel operation is much the same everywhere, and I will not undertake to discuss it.

I was much impressed with Mr. Daniels's remarks. In fact, he covered the subjects probably as well as anyone could. I have contributed to hotels on several occasions. The situation is entirely different abroad from what it is here, as Mr. Daniels has remarked. I do not remember any national parks on the other side. The whole of Switzerland and all of northern Italy is a park, and apparently there are hotels there that have been centuries in development. Our propositions are practically embryonic. Mr. Daniels is quite right about the scenery. There is no such scenery abroad as we have. There is no Yosemite, and no Yellowstone; there is no Grand Canyon; but everything is done for your entertainment—everything of that kind is studied to bring about your enjoyment. Here those things are absent. I think California is making probably the greatest step of any of the States toward overcoming the roads difficulty. California will get her reward.

Your hotels are a different proposition. I think, Mr. Chairman, that one great mistake in regard to national parks is to consider these various factors of service as concessions. They really are more. They should be there more as agents than as concessioners. The difficulty is that as a general proposition in our parks to-day the man who is operating the accommodation for the service of the public is regarded as if he was there simply to make as much money as he could out of it. He must be watched. As long as that attitude is held trouble will arise that you will never be able to get entirely away from. Our proposition is in the development stage. I can only speak of my own experience.

There is one feature that impressed me when Mr. Daniels was making his talk. A good hotel is a good hotel wherever operated, just as a good man is a good man wherever you find him; and anyone who has anything to do with the operation or ownership of hotels knows how much the man has to do with its success or failure. I think that is probably so of any business, but it seems to me to be more so in the case of a hotel—regardless of the fact that after a man has made a failure of everything else he usually thinks he can run a hotel. The personal element is recognized in the hotel business. The first thing, therefore, in the problem is the man. He must be a man who commands your entire confidence; but let me say right here that I have no aspiration, nor any expectation, regarding hotels in national parks except that of the enjoyment of them. What I now say here is to be considered entirely impersonal, and I hope you will all take what I say that way.

In my opinion the hotels in each national park should be in one man's hands; he should not be there simply with a license to get as much money as possible, but should have a definite obligation and responsibility in the way of satisfactory service. It is no small undertaking to do this properly. All classes of people visit our national parks. That is what they are for. Many do not care what they spend, or do not care what it costs if they get what they want. Others are not so particular what they get if it does not cost too much. They must all be taken care of if the arrangement is to be successful. The initiative skill and the capital are required. They must be compensated either directly or indirectly.

In the past much development has been done by those whose interests have been served indirectly, like the railroads. The railroads have not all been satisfied with the results. Necessarily the investment must be large and the organization adequate; no good man or concern will go into it unless the conditions are all right. The Government is the proprietor and must control. It is entitled to and should require every assurance as to the nature and extent of the accommodations, the character of the service, the charges, and all those fundamental conditions surrounding the service of the public; but, on the other hand, the arrangement should be mutual, and when its agent, who is required to do these things, does them in a broad and satisfactory way, he must have the full cooperation of the Government and must be afforded protection from competition not subjected to the same conditions or requirements.

I firmly believe that this service, to be satisfactory or successful, must be a regulated monopoly, at least for some years to come, and, while there are many other details to be considered, if the principle is accepted as correct, they are not difficult of adjustment. I think it lies at the bottom of the whole proposition. I feel that I have not enlightened you very much, but I thank you.

ASSISTANT TO THE SECRETARY MATHER.

After what Mr. Harvey has told us the solution of that problem seems somewhat simplified; but I do not know that I am prepared to go quite as far as Mr. Harvey. I do not know whether I understood Mr. Harvey to mean that the hotels in all of the parks should be under one management or not, but I will go with him as far as this: I think that the hotels in any one park should be under one management.

MR. HARVEY.

That is my idea, and in saying that I am speaking out of my own training and education. That is the principle I have been working on all of my life, and that is all I know along that line.

ASSISTANT TO THE SECRETARY MATHER.

It has worked out in your case very successfully. You have control all along the line in every form of service; whether the hotel or the restaurant service, it is all in one hand. You carry on your operations in a more efficient and economical way than by any other system.

Mr. HARVEY.

That is the idea, exactly.

ASSISTANT TO THE SECRETARY MATHER.

I do not know as I would care to mention publicly what has been in my mind in connection with the concessioners, but I will agree with Mr. Harvey that perhaps the word "concession" is not a proper one. It is true that the Government should see that the agent is of the very highest character. The concessioner going into the park with a broad privilege should, in the first place, have the interest on his investment thoroughly protected. He should have his operating expenses deducted, and then the profits should be divided, possibly 50 per cent to the Government and 50 per cent to the concessioner. That is the proposition I have had in mind, but whether it is practical or not remains to be seen. It may be tried out in some of the parks. This will close the session for this morning.

AFTERNOON SESSION, MARCH 11.

ASSISTANT TO THE SECRETARY MATHER.

I will now call the meeting to order for the afternoon session. I want to say that the Department of the Interior has been cooperating with the Department of Agriculture along the lines of road building. Mr. T. Warren Allen, who is in the Office of the Public Roads of the United States Department of Agriculture, has been doing some work, both in Sequoia National Park and in the Yosemite Valley, in the way of surveying. I am going to ask him to tell us about the work that he has done and some of the deductions that he has drawn from it.

Mr. T. WARREN ALLEN.

Mr. Secretary and gentlemen, unfortunately I am not much of a speaker, so I will read what I have to say here to you.

I am very glad indeed that I was able to come to this meeting, and I wish to say to you that the development of our national parks is a subject of much interest to me. During the last two years I have spent considerable time in Glacier, Rainier, Sequoia, and Yosemite National Parks, and during the last 12 months, in accordance with a

cooperative agreement between the Assistant to the Secretary of the Interior and the Director of the Office of Public Roads, I have been engaged in making surveys and preparing plans for roads in the Glacier, Sequoia, and Yosemite National Parks.

In order that the parks may be made readily accessible to all of the people there must be roads in abundance constructed in and through them. The problem in each park is a different one, but in general the first roads which should be built are the ones providing ways for all of the people to get into the parks. These entrance ways should have the greatest attention, and should be so located and constructed as to be available for use as early in the spring and as late in the fall as visitors are able to enjoy the advantages conferred by a visit. They should be such that all who wish to visit the parks may do so whether they wish to go on foot, horseback, or by vehicle. The full purpose for which the parks were created will not be attained until they are made, as nearly as possible, accessible alike to the poor and to the rich.

When entrance roads have been provided attention must be given to the interior development. Roads and trails must be constructed from the main system to the points of interest, and accommodations arranged for the care of those who will visit the parks in great numbers when the ways are made smooth.

The Office of Public Roads is also at work, in cooperation with the Forest Service, on road development within the national forests. The location of roads in large park and forest areas has rarely been given proper consideration, and, in view of the large number of undeveloped tracts of this sort within the United States, it would seem that a short general discussion of methods and manner of treatment necessitated by the multitudinous problems would be acceptable.

The problems encountered within the park areas are very similar, though not altogether identical with those encountered within the forests. The development of road systems within the parks and forests is necessary in order that these tracts may not be obstacles blocking the free movement of traffic between adjoining areas; in order to facilitate the preservation and reproduction of forest growth; and to aid in the proper development of the areas both as revenue producers and as attractions to those seeking rest and recreation. Unquestionably the use of mature forest growth for the production of revenue is in its infancy. There are no places where so great relaxation of overtired bodies and brains may be obtained as in the woods, and it should be our endeavor to make them readily accessible to all. The time is not far distant when the benefits to be derived will be better appreciated and when that time comes the road and trail systems should be ready and adequate for the safe accommodation of myriads.

It will usually be found in each case that a system of roads may be devised which will accommodate all classes of traffic which may seek its use. The arrangement of the road system to facilitate the traffic of adjoining areas will also operate to facilitate traffic between the park or forest and these adjoining areas. The maximum of usefulness and benefit requires preservation and reproduction, which may be successful only if it is possible to reach all points readily. Roads to subserve commercial interests may be so built as to harmonize with the natural features and, without undue extension or circumlocution, make accessible the features of natural beauty. The road as such should be inconspicuous. The cost need usually be no more to construct a road which shall be an harmonious feature of the landscape, though the preliminary study may cost a little more.

The primary considerations to be borne in mind in the selection of routes, in addition to the topographical features, are: Lines which through traffic and traffic of adjoining areas would follow in crossing the park or forest if there were no obstacles, points within the area suitable or required for the location of fire lookouts, portions covered with valuable salable mature timber, hotel and camping sites, and features of beauty.

Having the above information properly recorded, the next step is to lay out the main road on a topographical map, if available, having in mind all the influential considerations. The main system will, of course, lead to the park or forest boundary, and in order that a suitable connection may be made with the outside highway system, sufficient study should be made of this phase of the problem, to avoid complications along this line, either present or future. It may be that the proper outlet is unconstructed and the necessity exists for arranging for its construction by the proper authorities. An inside system without proper outlet would, to say the least, be unfortunate. The main system must be so laid out that it may be constructed with very light grades. It must be direct, but directness should usually be sacrificed to grades, bearing in mind, however, that unless reasonable directness is attained it will be difficult to prevent travelers from taking the more direct routes and making short cuts; this is especially true in trail construction. It will usually be possible to indicate on the contour map the proposed branches of the system, but before deciding definitely it will be necessary to take the map and go over the ground to determine whether the route is feasible; it may be that a layout which seems desirable and which appears possible when marked out on the map may not fit the ground; it may be that the paper location should be varied to permit a view of a beautiful waterfall, to get an attractive water, sky, or landscape effect; it may be found that these effects may be introduced when absent, and the road location should be made with such objects in

view. A proper development may necessitate the construction of hotels and rest houses, the designation of camping sites and, perhaps, of village sites. These points should all receive due consideration.

In staking out, the stakes should be marked in such a way that the location shall be visible from points some distance away. The proposed roadway should then be carefully studied from selected points, both upon the roadway site and at a distance from it, in order to determine if there may not be made changes which shall add to the attractiveness of the views which may be obtained by travelers or to insure that the roadway may have an harmonious setting when viewed from the outside. It will be necessary, in order to make sure of not missing attractive views which might be brought out by a little change, to occasionally climb a tree along the route and study the possibilities from such vantage point. It may be advisable for some reasons to locate the road through an open or bare spot. Such places should not be avoided on account of unattractiveness until a study has been made to determine whether the unattractiveness may not be eliminated by a judicious planting of trees and shrubs or possibly by the introduction of a small lake or pond. No pains should be spared to insure the best possible solution at all points, keeping in mind the possibility of such a location as will preclude relocation after the road has been built.

The main system being definitely decided upon, the final survey should be begun and at the same time the preliminary investigation of the remainder of the system be taken up and proceeded with. The work of making the final survey and preparing plans and estimates is not very different from that required for the average country highway. Center-line stakes should be accurately placed at each 100-foot station and cross sections taken at each for such widths on each side as may be necessary in order to accurately estimate the yardage of material which must be moved. I shall not go into the details of the necessary survey work. It would be tiresome to you and serve no useful purpose at this time.

Preparation of the plans follows the survey, and the rough draft should be made as fast as the survey proceeds. This may usually be done without delaying the survey work, but should be done anyhow, as the working up and plotting of the notes may disclose the necessity for additional information, and with the survey party on the ground this information may be easily and cheaply secured.

As soon as a short section of these rough plans has been completed it should be taken out on the road and a close inspection made at all points to see how it fits the ground. At points where there are cuts or fills of any importance proposed, culverts to be built, and ditches dug, consideration should be given to the resulting scenic or landscape effects likely to be produced, and full notes made on the plans

of changes beneficial to this or to other features. If the plans are gotten up as outlined above when the survey has been completed, the rough plans will also be finished and the final plans may be made up and estimates and specifications prepared with little trouble. The final plans will be little more than an elaboration of the results of the rough plans. The final plans should be on sheets of tracing cloth of suitable size and show the same information as the plans for any highway project. If the proposed road is of considerable length, it should be divided when making up the final plans into sections of from 6 to 8 miles each. Every piece of necessary work should be shown on the plans. The plans are to be supplemented and explained by specifications, and these should be a clear and unequivocal exposition of the methods to be used in carrying out the work to be done. The specifications should be drawn with the same care and attention to details whether the work is to be done by contract or otherwise. If the work is to be done by contract, the contractor looks to the specifications for a determination of quality. All evasions and all misleading and ambiguous statements should be avoided. Such statements and statements of requirements which are impossible to carry out as well as of those which it is not the intention to enforce, serve the purpose of increasing the contractor's bid prices. As closely as possible the details of the methods to be used in carrying out the work to be done should be outlined in the specifications and in the order in which the work should be prosecuted.

The estimate should cover in detail everything to be done, from the necessary clearing to the final smoothing up of the completed work. The most painstaking care must be taken in making it up in order that there may be no misapprehension as to the total cost and the amount of money which must be provided to carry the work to successful completion.

In relation to road types for park use I shall say little. The money available will settle that for the present, but no matter which type is at first selected, the design should be such as to enable an economical change to a higher type when such change becomes desirable.

The earth road has its use and will continue as a very important part of our road system indefinitely. It is suitable for light traffic only, and has no life except it be constantly maintained. During certain seasons of the year and when carefully maintained it gives a good account of itself. I believe there are possibilities in the earth road that have not yet been developed. At one time I began a series of earth-road experiments, but I was unable to continue them for a sufficient length of time to arrive at any very valuable conclusions. It is difficult, in some sections, to get such an appreciation of the

value of a well-maintained earth road as will insure a conscientious endeavor to carry out a proper scheme of maintenance. I believe in the patrol system for earth-road maintenance. The gravel road is very short lived unless maintained, and it, too, is adapted to light traffic only. The same statements made in relation to the earth road apply also to the one of gravel. It is just a little higher type and may usually be made dustless or semidustless by the application of some dust laying or abating preparation. I am referring now to water-bound gravel. I have seen many quite fine gravel roads, and when the composition of the gravel is naturally favorable, they may be built and maintained cheaply. The sand-clay road gives very excellent results when it is possible to obtain the proper materials for it, and when properly constructed it is quite cheaply maintained. It is suitable for light traffic only, and to be efficient must be properly maintained. The life of plain macadam is variable, and depends upon the materials of which it is constructed and the kind and amount of traffic it has to carry. If used by many automobiles it soon goes to pieces. Water-bound macadam may be rendered dustless by the application of a dust-laying preparation, and when so treated becomes very serviceable and is suitable for fairly heavy usage. The application of the dust-laying preparation, however, usually waterproofs the road, and it ceases to be water-bound, so that unless the surface is kept treated pot holes will develop and disintegration soon follows. Bituminous macadam has not been in use sufficiently long to determine its life even approximately. It is my opinion that such a road, when properly designed, constructed, and maintained, will endure during the life of the bituminous material used in it. It makes a very excellent road and will carry heavy traffic, probably the heaviest which the present-day rural road is called upon to carry.

As stated before, I am now engaged in making surveys and preparing plans for roads in Glacier, Sequoia, and Yosemite. In Glacier a survey has been made and the plans are nearly complete for the so-called Fish Creek-McGee's Meadow Road, extending from the supervisor's headquarters on Lake McDonald along Fish Creek to McGee's Meadow, a distance of about 5 miles. This road, when constructed, will become a portion of the road through the park along the Flathead River to the Canadian boundary line. The portion of this road which the Fish Creek Road will replace has excessive grades. The proposed road is being designed with very easy grades, none exceeding 5 per cent, and this has been done without any sacrifice in distance or alingment. The location is through a very heavily wooded section, and at times follows the creek, crossing it and its branches several times. There are two other very difficult hills on the Flathead River Road, both of which may be

avoided by relocation. In each case it will be possible to secure very easy grades and in addition improve the road in attractiveness. In addition to the Fish Creek Road survey there was another in progress last fall for a road along the northerly side of Lake McDonald. This was interrupted by inclement weather when about 3 miles had been completed. It is located just far enough back from the lake shore to permit of enticing views of the lake itself and also to leave room for camping sites between the road and the lake front. In time there should be a drive entirely around the lake, and a very beautiful drive it will be. It is planned to continue the survey interrupted last fall to the head of the lake and from there northward along McDonald Creek, to and up Continental Creek to Flat-top Pass, over it into the valley of the Little Kootenai, and down this valley to Waterton Lake. This projected road to Waterton Lake, I believe, will become the main artery for traffic into Glacier Park, and it will be a deservedly popular one, winding, as it will, through dense forests and along the rushing McDonald Creek for miles, emerging on the top of the Continental Divide only to plunge once more into the forest and follow the Little Kootenai through it to Waterton Lake. There is a very attractive waterfall on the Little Kootenai. Later the Flathead River Road should be relocated and rebuilt, a road located from the proposed Lake McDonald-Waterton Lake Road from a point on it near the Avalanche Creek crossing, to and over the so-called Trapper Creek Pass, which is near Mount Oberlin, to connect with the Great Northern development on St. Mary Lake, and a branch provided for by way of Piegan Pass to Lake McDermott. There should also be a connection made between the proposed Lake McDonald-Waterton Lake Road and the road up the Flathead River, perhaps by way of the Kintla Lakes. A road for this purpose built up Olsen Creek, passing the two lakes through which the creek flows, to and over Browns Pass, and down the valley of Bowman Creek and Lake, would be wonderfully attractive; but from Browns Pass down into the valley of upper Bowman Creek the expense of construction would be very heavy. It might be possible to locate the easterly portion of this connection up Valentine Creek, instead of up Olsen. Only after an extensive reconnaissance may a proper decision be arrived at.

In Sequoia a survey has been made for a road from near Ranger, in the Giant Forest, in a generally northerly direction, by way of Wolverton Creek, to and across the Marble Fork of the Kaweah River just above the present trail crossing and thence to the north boundary of the park by way of Willow Meadow and Cahoon Meadow. Plans have been completed for the portion from Ranger to the crossing of the Marble Fork, a distance of about 3 miles. Before Sequoia Park can be visited by the large number its attractions

warrant the road over which visitors must pass to reach it must be very greatly improved; this is especially true of the portion without the park through the national forest, and riding over it in any sort of a vehicle is not enjoyable.

In Yosemite a survey has been made into the park from the boundary line about a mile easterly from the railroad station at El Portal, along the Merced River, following the present road quite closely. The survey has been completed through Yosemite Village and on to the top of the Nevada Falls. The plans have been completed for the first 5 miles of the road and are in a well-advanced state for the remainder. The present scheme contemplates the extension of this survey to the easterly boundary of the park at the low pass above Mono Lake, connecting there with the county highway. This extension may go by way of Merced Lake, up Fletcher Creek, over Tuolumne Pass, and down Rafferty Creek to the Lyell Fork of the Tuolumne River. In my opinion, it is imperative to secure an entrance highway to Yosemite Valley and Park, which may be passable the year round; such will of necessity be down the Merced River from El Portal to connect with some point on the California State highway system. The wagon road entrances by way of Wawona, Oak Flat, and Coulterville are blocked by snow until the season is well advanced and for a considerable period after the valley itself is open. Roads to take the place of these should be located and constructed, one on each side of the valley, but the main entrance should be up the Merced River.

From some point on the proposed main road, at or near the head of Nevada Falls, there should be a road laid out to connect with the Wawona road as it is proposed to relocate it. Such a connecting road would probably cross the Illillouette Creek about 2 miles above the Illillouette Falls. From some point on the mail-line road, above Nevada Falls, should be a road located, by way of Tenaya Lake and the head of Yosemite Falls and through the highlands to the north of the valley, to connect with the road proposed to take the place of the Big Oak Flat and Coulterville roads, and also to connect with the road system to be built to and into the park by the city of San Francisco.

I have paid two visits to Rainier Park, but have done no survey work there. My observations there convinced me that the development of that park will, of necessity, be along radial and, for the present, disconnected lines. It is a case of first building radial roads to connect with the Washington State system, and later, when more money is available, to build a connecting rim road. The present development is radial into the park from the southwest, reaching the Nisqually Glacier, Paradise Park, and surrounding attractions. It is my opinion that the next development should be radial into the

park from the northwest, by way of the Carbon River, to reach Spray Park, Moraine Park, etc.

I also visited Wind Cave Park and the Hot Springs Reservation. At present there does not seem much required in the road line for Wind Cave Park, with the exception of maintenance for the earth road now traversing the park. This road should be maintained as a first-class earth road until traffic increases to such an extent as to necessitate a more durable type. When I was over this road last year it was in very fair shape. There were a few rough places. The removal of stones from the traveled way and smoothing it up with a road drag at such times as it is in condition to be dragged should be sufficient for the present. Through traffic between Denver and vicinity, and Lead, Deadwood, and vicinity passes through Wind Cave Park, and when this through road is more durably constructed the park road must receive like attention. Wind Cave Park is a somewhat barren appearing place, and it would seem that some experiments in tree growing would be worth while there.

The road problem at Hot Springs is quite different from that in the other parks. It is subsidiary to the real problem, which is one of landscape engineering. There is at Hot Springs an excellent opportunity to produce extraordinary results. The bathhouses there are very fine with few exceptions, and there seems to be little doubt of the benefit derived from the use of the spring water, but people wish for more than to be cured of their ailments. They wish to enjoy life while they are being cured, which is one of the reasons why they swarm to Europe and to the watering places there. There must be at Hot Springs the opportunity for a pleasurable existence out of doors. The material is at hand—the topography of the reservation renders it peculiarly suitable to treatment by the landscape gardener, and the system of roads will depend upon the demands of the gardening scheme. The out-of-door aspect to-day is quite dreary and the business of getting well is not aided as it should be by life in the open.

The subject of national park development is a fascinating one and I am inclined to doubt whether any of us fully realizes the Glacier, the Rainier, or the Yosemite Park of to-morrow. I mention these parks because I am more familiar with them, not because I believe they have greater possibilities than the others. I, as a road builder, have dreamed of road development in the various parks, and have dreamed of seeing such roads, lined and banked with the flowers which grow wild in the meadows of the parks and upon the mountain sides, winding unassumingly along the brook, beneath the waterfall, and skirting timidly the majestic mountain.

Gentlemen, you have a wonderful work before you, the harmonious blending of the handiwork of man with that of God.

ASSISTANT TO THE SECRETARY MATHER.

I wonder if General Superintendent Daniels has any comment upon Mr. Allen's paper? Have you any thoughts upon it, Mr. Daniels, you would like to express at this time?

MR. DANIELS.

I am not familiar with Mr. Allen's plans in detail, but I know that they are being carried out partially along the lines of a general road circulating system for the parks. The trouble with the roads into Yosemite Park at present is that they stop at the floor of the valley and the tourists return on the same line. I have never seen anyone who does mountain travel that likes to traverse the same road twice. I think we are working on the principle of getting a road up through the valley onto the rim and an encircling road, or rim road, around the valley. Mr. Allen's survey of the upper end of the valley has been to connect the lower valley with the rim road.

Another comment that he made in his paper, and that I made up my mind to dwell upon, is the necessity of a road coming into the valley that will be open the year round. We have a road running from El Portal into the valley some 14 miles in length. If that road were extended in a westerly direction down the Merced River it would connect with the State highway at Mariposa. I think this road would be something like 40 or 50 miles in length.

If that road is built we could have tourists in that park all the year round. As a matter of fact, many people say that the valley is much more beautiful in the winter than in the summer. We would have additional travel to support and justify the necessary accommodations. If there is any pressure that can be brought to bear upon those that are now planning to build that road up there, I would like very much to see it done.

ASSISTANT TO THE SECRETARY MATHER.

We will now hear from Mr. H. D. McGlashan, who will speak on stream measurement and its use in national parks. Mr. McGlashan is the district engineer for the United States Geological Survey for California.

MR. H. D. MCGLASHAN.

Mr. Secretary, ladies, and gentlemen, what I have to say has been divided into two divisions. The first you will perhaps find a little dry. It relates to the work now being done in the parks. The second section of my remarks will be more interesting, because it will be a set of slides showing in detail the work of the water resources branch

of the Geological Survey in the different sections of the United States.

For the past 25 years the Geological Survey has been investigating the water resources of the United States. The extent of the work has, of course, been determined by the annual appropriations made by Congress. The Geological Survey is now maintaining over 1,000 gaging stations where regular measurements of discharge and gage heights are made for the determination of daily flow. As a result of these investigations, records of flow of greater or less length are available for about 3,000 stations.

In order to secure records of the flow of a stream, it is necessary to have a complete record of the elevations of the water surface and sufficient discharge measurements to cover the range of stage. At the site selected for the gaging station a gage is installed in order that the elevation of the water surface may be readily observed. Equipment is also necessary in order that discharge measurements may be made at all stages.

Gaging stations are now maintained in the following national parks: Glacier, Yellowstone, Yosemite, and Sequoia.

Mr. W. A. Lamb, district engineer, Helena, Mont., is in charge of the work in Glacier National Park. He reports that during 1914 four gaging stations were maintained within the borders of Glacier National Park. One of these stations was maintained in cooperation with the St. Mary project of the United States Reclamation Service. The others were maintained in cooperation with the park officials, who furnished gage-height records for two stations and a few miscellaneous gage readings at the other. The expense of the field work was paid from the regular Montana stream-gaging allotment. It will be very desirable to install additional gaging stations in the park when conditions permit.

Mr. G. Clyde Baldwin, district engineer, Boise, Idaho, is in charge of the work in Yellowstone National Park. Four gaging stations are maintained. As Mr. Baldwin has reported in considerable detail, I will quote direct from his letter. This is of general application to all the parks. Mr. Baldwin says:

The funds available for this work have been decidedly limited, and have only sufficed to pay the salary and expenses of a Survey engineer for about two round trips to the four gaging stations each year and in addition to provide a very small allowance for office work and supervision, etc. In consequence it has as yet been impossible to provide any measuring equipment at the stations, and, furthermore, we have been unable to install the Friez gage sent out from Washington in 1913. Under existing conditions, however, it has been possible to secure very good continuous records at one station, fair records at a second, fairly good low-water records at a third. At the fourth station, namely, the one on Yellowstone River above Upper Falls, we could probably prepare approximate records for open-channel periods from measurements

secured at the outlet of Yellowstone Lake, about 13 miles upstream, and from miscellaneous measurements on intervening tributaries. The control for this station, however, is undoubtedly permanent, and it seemed advisable to postpone making any discharge computations until such time as it may be possible to install cable measuring equipment and secure a few actual measurements in the vicinity of the gage.

The park department has usually provided a team, buggy, and driver for each round trip to the gaging stations when the condition of the roads was such as to make such a conveyance feasible. On Mr. Paulsen's winter trip to these stations it was necessary for him to travel entirely on skis, but in this instance one or two soldiers were detailed to accompany him as guides between each two soldier stations.

The stations on Madison and Gibbon Rivers can be handled satisfactorily without special measuring equipment, but cables are badly needed at the stations on Yellowstone and Snake Rivers, and, in addition, it is desirable to install the Friez automatic gage at the gaging station on Yellowstone River. Only \$200 was allotted from Survey funds for work in this territory during the present fiscal year, and of this amount we now have slightly less than \$100 still remaining. By eliminating the proposed spring gaging trip to these stations it would probably be possible to purchase one of the two cables needed; but I doubt the advisability of cutting out this gaging trip, especially since it is only possible to visit the stations twice each year in any event.

It was my idea to try to make the automatic gage and cable installation at the Yellowstone station in a very artistic manner, and to provide extra large glass windows for the automatic gage house, in order to permit tourists to examine the working of the gage. After the station was satisfactorily rated a rating table could be placed under glass on the outside of the house, and it would then be possible for tourists to determine the quantity of water passing over the falls at the time of their visit, which would doubtless be of especial interest and would furnish quite an advertisement of the work of the Water Resources Branch of the Survey.

I do not see any special object in attempting to handle additional work until we can get the four stations now being maintained in first-class shape, and would be very glad to expand in this territory if necessary additional funds could be procured. Any expansion, however, will require additional money cooperation, as practically all funds now available go into salary and expenses of field men while on actual field work, and the office charge made thus far against these stations has been very small.

Records at the Madison River station will be of value in connection with possible power development outside the park boundary, in addition to obtaining run-off data for high drainage areas, which was one of the primary objects in view in installing these stations. Likewise, the station on Snake River is also of value in connection with the determination of the inflow into the Jackson Lake Reservoir of the United States Reclamation Service, while the one on the Yellowstone, as previously indicated, would be of popular interest when taken in connection with the flow of water over the Lower and Upper Falls of the Yellowstone immediately below. The station on Gibbon River would also have a certain amount of popular interest on account of the fact that practically all tourists visit Gibbon Falls, which are situated about 2 miles upstream.

In the Yosemite National Park four gaging stations are maintained in cooperation with the park officials. The gage-height observations are reported to the Survey by employees of the park,

while all equipment, salaries, and traveling expenses of the engineer have been provided by the Geological Survey. The records obtained at these stations are good, except that the gage-height records have not always been complete.

On May 1, 1914, at the request of the city of San Francisco, the Geological Survey took charge of its stream-gaging work in Hetch Hetchy Valley and vicinity. Five regular stations are maintained at present, and it is expected that ultimately there will be about 15 stations in operation. In accordance with the terms of the Hetch Hetchy bill, the inflow and outflow at each of the three reservoirs must be measured.

Additional records on the streams within the park are very desirable when further cooperation can be arranged.

Four cooperative gaging stations have been installed on streams in or near Sequoia National Park. For a short time during the summer of 1913 gage readings were furnished for these stations. Since that time practically no records have been secured. The run-off records from these drainages are of much value, and a strong effort should be made to secure the data, especially during the low-water period.

The collection of stream-flow data for streams within the national parks is a matter of much importance.

In the early work of the Geological Survey gaging stations were established in the valleys and foothill regions where diversions were feasible for irrigation. Later the work was extended to the higher portions of the watersheds, where records were needed for power development. Cooperation with the Forest Service has afforded an opportunity for securing records at remote localities in the mountains which are reached regularly only by their rangers. In addition the Forest Service has furnished equipment and hydrographers who have worked under our immediate supervision. In this manner run-off records having very great economic value have been collected.

The data collected in the national parks are of much general scientific value, for they show the run-off from especially high elevations. From an economic standpoint the records, of course, possess far greater value. They are of much assistance to the land classification board in connection with right-of-way applications and the withdrawal or restoration of public lands.

Present indications point toward a development of the water resources within the parks. Wolverton Reservoir in the Sequoia National Park is being constructed for the Mount Whitney Power & Electric Co., and the Hetch Hetchy act permits the city of San Francisco to store and divert water in Yosemite National Park. These developments will result in considerable revenue to the parks. Sec-

tion 7 of the Hetch Hetchy act provides "that for and in consideration of the grant by the United States, as provided for in this act, the said grantee shall assign, free of cost to the United States, all roads and trails built under the provisions hereof; and further, after the expiration of 5 years from the passage of this act, the grantee shall pay to the United States the sum of \$15,000 annually for a period of 10 years, beginning with the expiration of the 5-year period before mentioned, and for the next 10 years following \$20,000 annually, and for the remainder of the term of the grant shall, unless, in the discretion of Congress, the annual charge should be increased or diminished, pay the sum of \$30,000 annually, said sums to be paid on the 1st day of July of each year." This money is to be used for the development of the national parks in California.

A few years ago the Geological Survey made a reconnaissance of Yosemite National Park to determine if it were practicable to develop storage in the watersheds above the principal waterfalls. If the low-water flow over these falls could be augmented by stored water, the falls would be much more attractive. Accurate stream-flow records are, of course, absolutely necessary before any such developments are made. Parks under village plan will require water supply, sewer system, and power plants to generate electricity for lighting and for power.

Under the village plan as outlined this morning by Mr. Daniels you will readily see that it will be necessary to have adequate water supply, sewer system, and power plants to furnish light and power for the buildings and for general purposes.

The uses which appeal most strongly or in which we are mostly concerned or the main uses for which data of stream-flow records are valuable may be briefly mentioned. First, the highest use of water, I believe, is generally conceded to be for municipal purposes. Before the city of Los Angeles began construction of its \$25,000,000 aqueduct from Owens River Valley it spent several years collecting, in cooperation with the Survey, very complete data of stream flow in the Owens River drainage. San Francisco has spent 10 years or more collecting stream-flow records in Hetch Hetchy Valley and vicinity on the Tuolumne River and immediate tributaries where storage sites are available. Now, this work has been turned over to the Survey in advance of construction. A large number of private corporations and persons throughout the United States are now cooperating with us in a very substantial manner for similar purposes.

New York City, before taking out its immense project to bring water from the Catskill Mountains to the city of New York, spent a large amount of money and several years securing stream-flow records before it could make definite plans regarding an aqueduct and reservoirs.

The second use of water, which is a close second to municipal uses, is that for irrigation. The foundation of the Reclamation Service, as I have shown you, was based upon calculations of stream flow records. For many years after the work was started the Geological Survey calculated records for that, and it still maintains there a large number of gaging stations. It is not only necessary to have these records before construction is started, but it is necessary to continue them after the works are completed for operation purposes.

Most of the Western States, practically all of them, contribute considerable amounts directly to the survey to carry on the stream-gaging work.

The early developments in water power were at points where the power could be used. For instance, a flour mill or saw mill was built at a desirable point where some fall could be secured, and the power used there, but by the development of machinery and the generating of electricity it is possible now to develop power back in the mountains at remote localities, which could not have been used before, and in this connection it is interesting to note the Big Creek development recently, where the Pacific Light & Power Co. transmits its power 240 miles to the city of Los Angeles, at 150,000 volts.

The State of Wisconsin, through the railroad commission, has cooperated extensively with the Survey in the investigation of undeveloped water-power sites in that State; also New York may be mentioned in this connection.

For many years in this State, as well as in other Western States, water has been used extensively for hydraulic mining. Again records are needed for flood control. Of national importance is the Mississippi River, and locally the Sacramento and San Joaquin. Thousands of acres in the Sacramento Valley are now under water due to the rains of last month. Plans are being perfected for the reclamation of this overflowed land.

Inasmuch as the administration of the national parks and the Geological Survey are in the same department, there should be a very hearty cooperation between the two bureaus. Cooperation can be rendered the Geological Survey in the water-resources investigations by furnishing gage-height observations, assisting with the installation of stream-gaging equipment, and, if conditions permit, by sharing the expenses in connection with the field work.

[Here followed an exhibition of slides by Mr. McGlashan.]

ASSISTANT TO THE SECRETARY MATHER.

That gives us a very good idea of the extensive work that is being done in this particular line by the Geological Survey. We thank Mr. McGlashan for giving it so fully.

I want to give an opportunity to Mr. A. G. Batchelder, chairman of the executive board of the American Automobile Association, who has come here from Washington to attend this conference, to speak. I want a few words from him from the point of view of the automobilist.

MR. A. G. BATCHELDER.

Mr. Chairman, ladies, and gentlemen, our worthy chairman here has been a newspaper man, and in his time he has blue penciled many a speech and also a great deal of copy of various kinds. I shall not detain you very long, because I came here myself more to get instruction than to give instruction. In the early days of automobiling we motorists found only two classes of people that cared to associate with us. They were largely the policemen who arrested us and the justices who fined us. At that time there was never a better illustration of the old saying attributed to Mr. Dana, of the Sun—and it is with some pride that I make reference to the fact that Mr. Mather was a Sun man in his time. Mr. Dana was asked what was the secret of running a newspaper. He replied that all you had to do was to find out where hell was going to break loose next and have a reporter there to cover it. It so happened in those days that when anything regarding an automobile occurred there was always a reporter there to cover it.

I am sorry to say that in the early stages of motor development we had the usual difficulties that attend any new innovation; there were people who perhaps abused it, and there are undoubtedly people who abuse it to-day; but the fact remains that we have increased in number until now there are some 1,783,000 automobiles in use to-day in the United States, and we pay in taxes every year something like \$8,000,000. As a matter of duty we have interested ourselves in this question of roads development, and one of the duties of this conference is to see that the American people become better acquainted with their own country. I was much interested this morning when the new Congressman from this district said that he was going to do the very best he could at Washington. I have not any doubt but he will, but you will find, as we have found, that, when it comes to getting certain things done at Washington the only effective method is to bring a certain amount of pressure from the people at home.

While the commercial aspect of road building in relation to the transport of produce from farm to market and merchandise from factory to consumer properly commands great consideration, the fact should not be overlooked that road travel presents social advantages which are as essential to the development of a nation as is the accumulation of dollars. An intimate knowledge of a man's

own State such as is gained by road travel makes for the betterment of the citizenship generally. The man who visits adjoining States has brought to his attention the needs of other sections of the country, and inevitably his viewpoint assumes a national character.

Now, a few States possess scenic attractions which ought to be reached by road, and while it is true, looked at entirely from a dollars-and-cents standpoint, that some of these highways could not be considered commercially important, their building is essential to enable one to enjoy that which has been supplied by the Creator. Hence, every road we construct should not be passed upon solely for business utility. A nation which interests itself, to the exclusion of everything else, in the accumulation of money misses many of the better things of this life.

Simply because a few people preceded other people in the use of a time-saving, and now economical and widely used, road vehicle, they were and are still designated as "motorists" and are looked upon as a special class and subjected to unfair laws. Such has invariably been the case in the establishment of things which are revolutionary to their effect.

It is the automobile that has widened the scope of road travel until now in the course of a day one may visit several States, while trips from town to town and county to county are commonplace. The most important advantages gained are commercial in character, and this phase of the matter is one which is approaching astonishing proportions and carries with it an amplified demand for community and county roads and continued to the need of intercounty and interstate arteries of communication. Parcel post will attain its maximum development on roads of the first class. Railroads will enter the field of motor trucking—are entering—and this will take care of short-haul freight transport, which in most instances is now carried on at a loss. Continuous roads follow as a positive demand in connection with this new era of transport—town to city, county to county, and State to State.

That the National Government can rightly insist before Federal cooperation is given that the States shall do their proportionate share in the general roads improvement will logically appeal to all fair-minded advocates of roads progress.

That States must establish State systems in charge of competent highway departments is now an acknowledged roads need in promoting state-wide development. Construction by the State of the principal inter-county roads is an essential.

When the call for National Government participation is legislatively recognized, it will naturally relate to the interstate highways. Since the State would then save that which otherwise would be ex-

pended on these big roads, this money can be employed in perfecting its State system.

Persistently and gradually in cooperation with other organizations the American Automobile Association has advanced the proposition that the time has arrived when the National Government should give help to the several States to enable them to meet their increased highway expenses, brought about by the multiplying of road travel and the coming of the vehicle which accelerates communication between centers of population and country districts. Since the State should lend aid to its county units in the cost of construction and maintenance of arteries which connect the various parts of the Commonwealth, it follows that the Federal whole should accept part of the burden of comprehensive road communication.

In roads, as in many other things, the requirements of all States will not coincide. While there has been some effort to make it appear that motor vehicle users seek at the expense of everything else airline routes connecting centers of population and resorts and scenic points of interest, this charge is not borne out by the real facts in the case. We can see no inconsistency in striving concurrently for the development of a road through a State replete with scenic and health attractions and at the same time urging in an agricultural State that proper attention be given to market roads leading to the farm.

If the town pays the salary of its town clerk, and he is nothing more than a town officer, it naturally follows that his entire duty and his entire effort should be for the good of the township. Likewise, since the county supervisor is paid by the county, his duty is to the entire county, and the needs of his locality should be conserved only to the extent that the general good of the county is the first consideration. The same principle should apply to the State legislator, whose services are paid for by the State, which is justified in demanding that he shall serve from the standpoint of benefit to the entire Commonwealth. Since the Nation pays the Member of Congress, it is a continuation of the principle that his own district should be secondary, and his consideration of public questions shall be from a national and not a local standpoint.

Therein are the fundamentals of correlated legislation and a proper distribution of the burdens which devolve upon the several civil subdivision of our form of Government.

ASSISTANT TO THE SECRETARY MATHER.

There is no question but what the automobile has its place. I remember a tramping trip through the Kern River country, when some members of the Sierra Club were with me. One of them was a very good friend of mine. Just about a year from that time I was in an

automobile going up the coast, and we met him coming down from the north in another automobile. We met in the San Marcos Pass. He is a very enthusiastic mountain lover, and nearly always tramps on foot; but this time he was in a car.

We will now have a paper, by Col. L. M. Brett, acting superintendent of Yellowstone National Park, on patrolling and ranger service. It is a subject in which we are all very much interested at this time.

COL. L. M. BRETT.

It would be impossible to go exhaustively into this subject without taking up too much of your time and worrying you. I must call attention to the fact that some of our national parks, especially Yellowstone Park, are the richest game preserves in the world, and that is especially so with regard to fur-bearing animals. The outlaw, if given a license only for a few weeks, would profit enough to keep him for several years in luxury.

I will not touch on the subject of fighting forest fires, because that subject is going to be handled by a man who has lived among the ancient trees in Sequoia and General Grant National Parks and who has protected those forests and loves those grand trees. He will tell you all about that subject, but he will only be able to touch on the main features of it.

There is another important work in connection with national parks, and that is the construction of trails and roads; but I will not dwell upon that, because the subject is inexhaustible. The handling of automobiles is a very important subject that is growing, as you know from what Mr. Batchelder has said, in importance every year. So in handling this subject I will only touch upon the lights and the shadows.

Our national parks have been set aside by the Congress of the United States for the benefit and enjoyment of the people. Each park has its particular attractions and problems, but all of those with which I am familiar need protection from those who are not in harmony with the purposes for which the parks were created and who are seeking their own selfish ends for enjoyment or profit at the expense of scenic beauty and of animal and bird-life. Aside from the danger of vandalism and of lawbreakers there is need of men to guide and direct the tourist, that he may get the largest return for his journey to any park, and to see that the laws and regulations are enforced, and in all ways to make travel safe and enjoyable. The needs of the several parks have caused the employment of men to meet the conditions therein existing. In some of the parks these individuals have been called park rangers; in others, scouts. In

four of the national parks military forces have been used to protect the domains, to fight forest fires, and to guide the tourist. In the early days of these parks such a force was essential, because there were conflicting interests; there were holdings by settlers, many of whom recognized no law other than their own; and there were hunters and trappers who traveled at will, set their traps, and killed their game where they could reap the greatest harvest. To curb such men the strong arm of the military was necessary; but now, generally speaking, there are no such conflicting interests, and the public sentiment of the people surrounding the parks is in favor of due protection to all within them and of proper observance of all laws and regulations governing them. So in consequence the military force has been withdrawn from all the parks but the Yellowstone, and its withdrawal is now contemplated there, it being only a matter of time.

The Secretary of the Interior realizing that a systematic, orderly, and businesslike force was essential to these parks and that their work should, as far as possible, be coordinated and made uniform, on January 9, 1915, promulgated the following regulations governing park rangers in the national parks:

The national park ranger service consists of a general supervisor of ranger service, chief rangers, assistant chief rangers, rangers first class, and rangers.

The ranger service is under the direction of the general superintendent of national parks, who administers it in conformity with regulations promulgated by the Secretary of the Interior.

Appointments and promotions within the service will be made by the Secretary of the Interior on the recommendations of the superintendent of national parks and the supervisors of the several parks in which detachments of the service are serving.

The following annual compensations for the various grades in ranger service are prescribed: Chief ranger, \$1,500; assistant chief, \$1,350; ranger first class, 1,200; ranger, \$900.

The uniform, arms, and equipment of the ranger service shall be those prescribed by the Secretary of the Interior.

Members of the ranger service shall, at their own expense, provide themselves with uniforms, arms, subsistence, bedding, and such equipment as their duties require. Those rangers detailed to mounted duty must, at their own expense, provide themselves with horses and pack animals suited to the service, saddles, pack outfits, and such other horse equipments as are necessary in their mounted work. A service stripe for each five years of completed service in the national park ranger service shall be a part of the uniform.

Rangers and scouts in the service of the several parks prior to the promulgation of these regulations are entitled to wear a service stripe for each completed period of five years of service as ranger or scout.

Members of the national park ranger service may be awarded by the Secretary of the Interior a distinctive badge for conspicuous services under exceptional circumstances, on the recommendation of the supervisor and the general superintendent of national parks. This badge may carry with it extra compensation as determined by the Secretary of the Interior. The badge will form a part of the uniform.

An applicant for the position of ranger must be between 21 and 40 years of age, of good character and correct habits, of sound physique and capable of enduring hardships; tactful in handling people; possess a common-school education; able to ride and care for horses; know how to cook simple food; have had experience in outdoor life; be a good shot with rifle and pistol; and have some knowledge of trail construction and fighting forest fires.

The general superintendent of national parks is authorized to waive such of these requirements as are not essential for rangers hired temporarily, or those hired for specific and special duties.

Rangers, first class, are generally promoted from those rangers who have demonstrated the greatest aptitude for ranger work, and have successfully passed an examination in methods of fighting forest and prairie fires; the packing of horses and mules with pack saddle and aparejo; the construction of fire lanes and trails and the building of cabins; the reading of topographical maps; traveling by map and compass; in the habits of the game and fur-bearing animals of their respective parks; in the geography and geology of their parks and the location and nature of the features of principal interest; and, in those parks where needed, to be skillful on snowshoes and skis.

The assistant chief rangers are selected from the rangers, first class. The selections are made from those rangers whose service has been the most valuable and whose intelligence and judgment in dealing with people and meeting emergencies have been of the highest order.

The chief rangers are selected for fitness and qualifications and must be competent leaders and instructors of every branch of ranger work.

The strength of the ranger detachment assigned to each park shall be prescribed by the general superintendent of national parks, subject to the approval of the Secretary of the Interior.

The duties of the ranger service in each park shall be prescribed by the supervisor of the park and the general superintendent of national parks, subject to the approval of the Secretary of the Interior.

Monthly reports are required of all members of the ranger service, as follows:

1. All rangers will be provided books in which they will enter the duties performed each day; for example, the location and object of the journey, the number of miles traveled, game, loose or stray stock seen, condition of game; if in remote sections of the park, indications of travel or unlawful trespass, and anything unusual seen or heard during the day. These books will be turned in to the chief ranger or officer designated on the last day of each month, or as soon thereafter as possible, and transcribed in his office on blank forms provided for that purpose. These reports, in duplicate, and his own report, also in duplicate, will be submitted to the supervisors.

2. Each supervisor will forward the duplicate reports made by the members of the ranger service to the general superintendent of national parks, with a letter of transmittal containing such comments and explanations as the circumstances call for, and will give all additional information of work completed or in progress, reporting any unusual occurrences during the month, and in general such a detailed statement of park affairs as will keep him thoroughly informed. The general superintendent of national parks will in turn transmit one part of each report to the Secretary of the Interior with such recommendations and suggestions as he may deem proper.

The supervisor will render, on blank provided for that purpose, a report on the efficiency of the chief ranger or senior officer of the ranger service in his park.

The chief ranger or senior officer of the ranger service in each park will render to the supervisor a report on the efficiency of every member of his detachment.

We observe that the superintendent or supervisor is in direct control of the detachment of the park ranger force assigned to his park. It is his duty to prescribe the regulations for his detachment, and in doing so he should make them simple, comprehensive, and easily understood. He should instruct all the members of his force that authority and responsibility rests with those who have been placed in charge over them.

The chief park ranger of any park should be at headquarters and have general charge of the park ranger service. He is not only the chief, but is the business manager and inspector of the force. He should be in constant touch with his assistants and should accompany them frequently on their tours of duty. The assistant chiefs should spend most of their time in the field and be so familiar with the work of their men as to be able at any time to detect neglect and recommend indifferent or colorless men for discharge or to recommend deserving men for advancement. Each assistant chief is in charge of his particular section, and by frequent journeyings over his territory should satisfy himself that the force under him is alert and doing intelligent work. He should recommend changes in patrolling, where new trails should be made, new fire lanes opened, and any needed improvement to make the work of protection sure and to render accessible to the tourist the different points of interest in his section. We know that about 90 per cent of us need urging and supervision, and each of the chiefs should be men selected for their energy and skill in handling men and the traveling public generally.

The arms, uniform, and equipment of the park ranger should be those best adapted to the work, but bearing in mind that it is just as easy to be well and neatly dressed in the field as in other lines of work provided due care is exercised. These men are daily coming in contact with ladies and gentlemen who have made long journeys and who should receive the most courteous treatment and be offered every opportunity to see to the best advantage all that their time will permit. Too much stress can not be laid on the necessity of inspiring in this park ranger force the loyal spirit of public service; and men who will not arise to the full realization of the fact that they are engaged upon a grand work for the public good have no place in this service and should be eliminated. To guide and inspire is the peculiar work of those in charge, and to impress on the personnel the highest motives in this sphere of the public service will require conduct which produces the greatest amount of benefit upon these rangers when sharing in their field work.

To be able to render the best service in patrolling, the park ranger must be properly armed, mounted, and clothed. He must feel that his weapons are superior to those in the hands of any outlaw to whom he may be opposed; his mount must be swifter, and his clothing adequate to protect him against the rigors of the climate of his locality.

In order to render patrolling work effective, a park of large area should be divided into divisions and sections, with one or more ranger stations in each section, so located as to make the patrol journey as short as possible and to enable the patrol to reach any point within his area in the shortest possible time. This will necessitate the building of park ranger cabins, but they need not be a blot on the landscape, as they can be so constructed as to blend into the landscape or be concealed within the timber.

A park ranger about to start on his journey, in addition to his arms, horse, and equipment, should have a piece of canvas with which he can make a canvas shelter effective against any weather, rations ample for the journey, cooking utensils, field glasses, a map of his park and contiguous territory, compass, notebook and pencil, ax, first-aid packet, and telephone tester. As soon as he leaves the ranger station he becomes a scout who must oppose his wits and energy against those whose life is spent in the open among the wild animals and who have taken from these animals those characteristics that we know are possessed by the fox, the cayote, the timber wolf, and the mountain lion. He who rides the trail in a perfunctory and aimless manner is but a joke to such men. To cope with such people he must learn from the Indian, who avails himself of every sign and indication that nature or wild life can give. The Indian never places himself upon the skyline until he is thoroughly satisfied that there is nothing within the range of vision to detect him. He will lie sometimes for an hour with his head against a bush, field glasses to his eyes, and scan the country, and then again scan it, for any sign of human life or for any movement among the wild animals which indicates the stranger in their midst.

The scout does not remain on the trail that has been beaten by somebody else—his enemy would not be there—but he is taking advantage of every inequality of the ground, of swale and the coulées, the branches of trees along the stream banks and the shady side of every ridge, observing carefully for indications of trails, fresh signs of horse, or any imprint of the foot. His eye must be so trained that even the bending of the grass would tell him a story and would arouse his suspicion. He should never build a fire by daylight in the country where he has reason to believe the enemy may be lurking. At night, in some canyon or in some sheltered spot where the blaze

can be seen but a very few feet, he can build his small fire and cook his food for the evening and the next day. It is well for him to have enough food cooked ahead so that he can remain on the trail, or in pursuit of an enemy, for 48 hours without having to stop to cook. In his moments of leisure when resting he should make careful notes of all that he sees and anything out of the ordinary that he can not understand should be carefully described so that he may present this to his superior officer on his return for interpretation. Where he is called to points remote from his usual patrol route he should indicate such a journey on his map by use of his compass, etc. He should be careful to note the condition of the animals and whenever possible to count those of the different species for the information of headquarters. Any indication of sickness among the animals is of the greatest importance and should be reported at once, because epidemics are almost as frequent among animals as among human beings. Interference in any way, shape, or manner with the natural formations should be reported. Dead fish on the surface of the water is a dangerous symptom and would indicate fishing by use of explosives; and generally speaking, any indication that nature or any of her creatures has been disturbed should be given the closest scrutiny and reported to the officer in charge.

Men who will lend themselves conscientiously to this work are not common, and in their training it is of the greatest importance that their faculties of observation be cultivated to the extreme limit. These men must feel a pride in the work and strive to have their section the very best patrolled one within the park. We will not get a force sufficiently educated along the lines that I have indicated unless we all unite in systematic work and instruction, which can not be too comprehensive nor too painstaking.

ASSISTANT TO THE SECRETARY MATHER.

General Superintendent Daniels has been in consultation both in Washington and here with Col. Brett on the subject of ranger service. I wish we had the time to have a few words from Mr. Daniels now on this subject, but we will have to adjourn, and probably he will take it up to-morrow when he presides over the meeting of superintendents and supervisors. I hope that he at that time will go into the matter fully. I thank Col. Brett sincerely for his excellent paper.

The meeting on Saturday will be held at the exposition grounds, in the Southern Pacific Building, at 10 o'clock. Our conference to-morrow will be here in this same building, and we will begin at 11 o'clock. This will close the session for this afternoon, and I will ask the superintendents and supervisors to meet with me immediately afterwards.

MORNING SESSION, MARCH 12.**ASSISTANT TO THE SECRETARY MATHER.**

I think I will call the meeting to order as promptly as possible. We will have a relatively short session this morning, and we want to do some intensive work in it. To-day is particularly superintendents' day, and we are going to have an opportunity of hearing some interesting topics discussed by the general superintendents. Yesterday we were to have heard from Dr. Hopkins, of the Bureau of Entomology, United States Department of Agriculture, who has been doing some excellent work for us in two or three of the parks in the matter of stopping the destruction of trees by insects, particularly the lodge-pole pine trees in Yosemite National Park. I think Dr. Hopkins will give us his talk this afternoon after we have heard from the superintendents. It will be a subject which will be very interesting to all of the superintendents, and he has some suggestions to make which struck me as very interesting when he outlined them in Washington a couple of weeks ago. He will also have with him Mr. Sullivan, an entomological ranger, who did a large part of the work in Yosemite. I am now going to turn the meeting over to Mr. Mark Daniels, the general superintendent, who will act as chairman, and will conduct the meeting for the day.

MR. DANIELS.

When the matter of considering the various subjects that should be discussed came up it was decided that there was in each park a supervisor or a superintendent who had some particular specialty and was interested in some particular branch of the work and the method of handling some particular detail of the park work and knew more about the best methods than, perhaps, others did. For that reason we have given to each man a subject that he seems best qualified to handle. I will suggest that we are surrounded by all of the necessary equipment for giving statements the acid test, so I would suggest that the speakers stick closely to veracity. I will call on Mr. Walter Fry, superintendent of Sequoia and General Grant National Parks, for a paper on forest-fire fighting. Those two parks are in the southern part of the State, where the atmosphere is not so surcharged with water and forest fires are frequent. The result is that he has had more experience, perhaps, in forest-fire fighting in his parks than the supervisors or superintendents of any other parks have had. I have personally gone over a great deal of the country that he has protected and have become personally familiar with his methods of fire fighting. I am sure he has discovered several little tricks in the trade that ought to be given to the other superintendents.

MR. WALTER FRY.

Ladies and gentlemen, since the creation of Sequoia and General Grant National Parks there have been 72 fires within them, with all of which I have had direct or indirect workings in order to subdue them. The subject which I have been assigned is a very large one, so I will not touch upon the methods of protection of forests from fires or the amount of damage by reason of fire, but simply the subject of forest-fire fighting.

Human measures for confining and extinguishing forest fires are variable and many; moreover, the possibility of effectually fighting them has long been a matter of doubt and dispute, so that most contradictory views on these points have obtained currency. Therefore it is imperative that a careful and continued campaign of education be exercised along these lines from which indisputable conclusions may be drawn.

The broad question of forest-fire fighting in our national parks is one of most vital importance, and I do not know that I can say much that is not already in mind, but the principal object of this contribution is to bring to the consideration of those charged with the very important duty of the administration of the national parks the necessity of a complete, comprehensive, and systematic plan for forest-fire fighting.

The methods of forest-fire fighting are not everywhere the same, because of modifying local conditions, but the general principles to be observed in connection therewith are very much the same everywhere. In view of these existing various methods and conditions I submit for your consideration a list of the character of forest fires and a general policy which I consider should be observed in fighting them, as I feel in this way we will get before the conference suggestions that will lead to expressions of opinion or experience or advice from various members with regard to the discussions of the most effective methods to be observed in all classes of forest-fire fighting.

Forest fires are usually distinguished under three different classes, as follows:

- (1) Surface fires, which burn the surface layer of all dry inflammable material, green brush, seedling and sapling trees.
- (2) Ground fires, which burn beneath the surface in deep accumulation of vegetable mold, and soil of peaty character.
- (3) Crown fires, which burn through the crowns of the trees.

Surface fires may be extinguished on their first origin by beating them out with wet sacks, canvas, blankets, green branches, etc., or by covering outer border of fire with embankment of earth; but when once they gain headway, a clearing of the humus and inflam-

mable matter should be made through the forest around them of sufficient width to prevent their crossing, or inside from which back firing may be permitted. The tools most suitable for use in this work are long-handled shovels, hoes, iron-toothed rakes, and axes.

The safest and surest method for extinguishing ground fires is by excavating a trench around them. The most effective tools for use in fighting them are shovels, axes, and mattocks.

Crown fires seldom occur other than in dense forests and when there is a high wind, the velocity of the wind regulating to certain extent the speed of the fire. One method of fighting them is to go a safe distance ahead of the fire and clear a narrow strip through the forest. Inside of and on windward side of this strip a back fire is started against the wind and toward the main fire, thus allowing the two fires to meet. If the main fire is traveling with great rapidity, the felling of a narrow strip of the trees inside of and near outer border of the area burnt over by the back fire will add further precaution in preventing the main fire from jumping across the burnt area. The best tools for use in fighting crown fires are axes, shovels, hoes, rakes, and cross-cut saws.

Quick arrival at fires with an adequate force of well-equipped men skilled in the work of forest fire fighting is of first importance.

Forest fires should be fought vigorously from the moment they are discovered in order that they may not get beyond control. They increase rapidly, and the more help that can be obtained the better.

Streams, roadways, trails, wet meadows, rocky ledges, and sand ridges are mechanical barriers, and such features should always be utilized when possible; all such places are useful from which to start back fires. They often check or stop a fire, and serve as vantage points from which fighting crews may work.

Points of vantage from prevailing winds should always be sought, and notation of any sudden changing thereof, as its shifting may suddenly turn the course of the fire, which may necessitate immediate changing of the fighting crew in order to prevent their suffocation.

More effective work can be accomplished in fire fighting in night-time than in daytime, because the atmosphere is cooler and more humid.

A fire is more easily controlled on the top of a hill or ridge than on a level or hillside, because of the upward tendency of the flames and heated air currents, below which lies the inflammable matter.

Never leave a burning area without entirely inclosing it with either natural or artificial barriers.

After fires have been apparently extinguished, their outer border should be patrolled until their safety is insured, as new fires frequently spring up after old ones have ceased smoking.

MR. DANIELS.

It is particularly gratifying to know that all of these papers are going to be preserved in permanent form. Mr. Gabriel Sovulewski, supervisor of Yosemite National Park, will now read his paper on "Trail building."

MR. GABRIEL SOVULEWSKI.

Before starting on this subject assigned to me by the Secretary, it is necessary and proper to bring to your attention some points which I think are important in this connection.

First. The most important point is that I feel honored to have such a prominent subject assigned to me as trail building; but, not being an engineer nor having the necessary technical training as such, I am very reluctant to enter on this field. Consequently, what you will hear on the subject of trail building will be only what I have gained by years of practical experience, and if that will be of any practical value to the park service, or any part of it, I shall feel well repaid and honored.

Second. My practical experience was mostly gained in the Yosemite National Park and applies to its conditions, though such conditions may apply to parks of the same altitude in California, and may apply to other parts, but, as I am not acquainted with the conditions in parks outside of California, I am not competent to judge.

Trail building is a very important work in national parks when we consider the object for which the parks were created, and on that account any official in charge of a particular park who will delegate trail construction to anyone not in sympathy with this object or who does not fully understand the meaning and intention of park creation, without personal inspection and satisfaction, will be liable to make a serious mistake.

There are many kinds of trails, and this applies also to roads; some constructed for different purposes and built with an object in view—that is, if I were to build a trail for a business purpose I would build it straight and direct to the point to be reached as economically and in as short a time as possible, without taking into consideration any interesting points on the way.

In national parks, however, such a construction of trails would not be desirable and contrary to the spirit and intent for which the parks were created; it also would be unjust to the public if the best natural features along the way were missed by them. Diversion from a straight path to points of interest, regardless of expense, is important and necessary. We can build many trails in the Yosemite National Park at very small expense if we would have as our only object the reaching of certain points; but in doing this we would lose

something that can not be estimated in dollars and cents. I believe it is very important that every feature of natural beauty should be taken into consideration and diversion made to bring such features to the eye of the traveler. It will not be necessary to divert to a great extent from the course laid out; but it is important that trails be laid out along beautiful streams, through the different species of timber and interesting undergrowth, alongside and through rich green meadows and dashing brooks abounding in trout, and not omitting a single interesting feature that will attract the attention of the traveling public in order that the trail taken with these features included will be so delightful that the traveler will forget his fatigue in a review of the panorama unfolding before him at each turn. The trail along brooks and meadows will lead the traveler to many other beautiful views and points of interest, and finally he should be led to a picturesque lake and spot where he can rest and establish his camp for as long a time as he desires.

It is well known to all the park officials in this convention that one could talk and write on this subject without end, and the more he would say the more he would be disappointed that he had said so little, knowing and feeling that his subject has no end. Therefore this convention having a practical point in view it is necessary to take leave from this pleasant field and build the trail.

Trail building will be divided into six parts, and I will endeavor to explain in each part my method and procedure of trail construction in the Yosemite National Park.

It is my experience that exploring for trail building is the first and most important point of all, and, I may say, the hardest. It requires strength, determination, a natural instinct for direction, love for the work, love of nature, and an ability to forget everything for the time except the object in view, and to be able to sit in the saddle for 12 or 14 hours, or walk the same number of hours if required. One should never be satisfied with one day's exploring, but spend many days and explore many times, as he will be delighted every time he goes over the ground to find that he has discovered something new and to his particular advantage that he did not see before. The work is very interesting and delightful in spite of its hardships and dangers, but it will be seen by you all that this kind of work can hardly be done by a man that is a slave to time and confines himself to eight hours of work. I seldom take anyone with me on exploring trips in spite of the objections of my superiors, and on many days I do not return to headquarters until 9 or 10 o'clock at night. I had rather be by myself than to have a grouch along who would spoil my pleasure. And notwithstanding the many miles of wild country and animals, I never carry firearms—only my hatchet and pocketknife.

After the country is explored and I am satisfied with my location, then the laying out of the trail begins by placing dry limbs against the trees, small rock monuments, or some other marks that can be defaced or obliterated and yet easily followed, but I never use an ax to make permanent marks.

The party of workmen varies according to the location and amount of work to be done, and the tools and materials for the different kinds of work and various places are furnished to them. The gang should not, as a rule, exceed nine men including the foreman, packer, and cook. The foreman should be a practical trail builder, have experience in woodcraft, know how to sharpen drills, repair and sharpen tools, and know how to use explosives to advantage. He should be able to take full charge and follow with the construction of the trail along the line laid out for him, taking advantage of the ground at places where an improvement can be made and which were overlooked in laying out the trail.

As to the kind of a trail to be built, in regard to the width or grade, it will depend entirely on the location and importance of the trail. Trails in Yosemite, leading from the floor of the valley to its rim, cross very dangerous and high cliffs, and their grades can not be limited on that account, even at great expense. We have some places on such trails where the grades are between 40 and 50 per cent. Not having any choice, but of necessity having to follow the course which is not in his power to avoid, the builder can not be blamed. They are wide and good trails—from 4 to 6 feet in width—and, on dangerous turns, even wider and perfectly safe.

In the construction of trails under favorable circumstances, ascending long, steep hills, the grade should not be lower than 15 per cent and not exceeding 30 per cent. The width of the trail will depend, as stated above, on the importance of the trail. I believe, however, that an approximate width of 4 feet will be sufficient for all purposes. In passing dangerous points the width may be increased to 6 feet or more, to give a feeling of security to the traveling public and to lessen the danger. To increase the general width of the trail over 4 feet will cost too much, and it is a well-known fact that a trail 2 feet wide is quite comfortable to travel over and answers its purpose, as trails are traveled in single file. Of course, there may be objection on the meeting of parties from opposite directions on a narrow trail, but on consideration of what has been said above these points can be handled locally according to the importance, location, etc., of each trail. It is my belief that all trails should be constructed in cuts by benching back, where possible, instead of building high rubble rock walls, but this method unfortunately can not be followed in places and dry rubble walls for trail support must be built, not as a matter of choice, but of necessity.

The trail should be well brushed along its course in order that the traveler riding along will not be annoyed with overhanging limbs or undergrowth on the sides.

The cost of construction is of local consideration, depending on local conditions as to layout of trail, cost of labor and materials, distance from supplies, etc. The cost of trail construction in the Yosemite National Park varies from approximately \$25 to \$2,500 per mile.

In the construction of trails everyone admires regularity of grades, or I may call it regular railroad grade. It is admitted that the trail looks better on a regular grade, but for every practical purpose regular grade is undesirable for the following reasons. If the grade is regular, the trail will be subject to washouts a great deal more than if the trail has inclines just slight enough to let the water out at intervals of a few hundred feet. This will save the trail maintenance expense. Another feature in favor of trails with inclines in preference to a continued uphill grade is the relief to stock traveling uphill, which is very important, and all who travel mountain trails will realize its virtue.

In connection with construction, as soon as the constructing party advances with the trail, permanent small blazes on trees should be made where trees are available; where not, small permanent rock monuments should be established; across meadows where grass is apt to be tall poles could be used to mark the course of the trail. The preliminary marking, if too prominent when the trail course is slightly changed by the foreman in construction, should be removed to avoid confusion.

Ditching and provision for proper drainage is a very important part of construction and should not be overlooked in trail building. The foreman of trail construction must study each watercourse and stream and provide outlets, where needed, as he advances with his work, in accordance with the conformation of the country through which the trail passes and in accordance with the grade of the trail. Even with the greatest care mistakes are made and points overlooked that will show in a season or two after the trail is constructed and should be attended to without delay when noted. A trail without proper ditching and drainage will cost more in maintenance and repairs in places than if originally constructed in the proper manner. It is customary to use logs for water breaks on trails, but in Yosemite Park we are abandoning this practice by degrees and replacing them by more permanent breaks of rocks. They are generally made of flat split rock embedded in the ground from 10 to 14 inches, depending on the size of the rocks, leaving from 6 to 12 inches above the surface, taking into consideration the grade and location.

There may be objection from old trail builders to permanent breaks on steep grades on account of the wearing of a steep hole on the lower side of the break, which makes travel uncomfortable, even to the point of danger, and the remedy employed for that in the past has been to change the location of the water breaks from time to time or by filling the wornout portion with dirt, if available. This practice is very seldom used on steep grades in Yosemite. The remedy applied by us at present, which works very much better on heavily traveled trails and is more economical, is to lay a rock pavement for 10, 15, or 20 feet on the lower side of the break. This makes the water break practically permanent and travel comfortable, as the water break remains always of the same height, and all that is necessary is to clear the ditch in the fall or before threatening storms to avoid damage. The same method is employed on steep grades where dirt is scarce for refilling the trail after being washed. It is true that this method in the first place is more expensive than filling with dirt, but this expense will decrease the cost of maintenance and in time prove its economy and usefulness.

The maintenance and repair of trails and their cost depend on location, grade, amount of travel, local conditions, altitude, and construction. If the trail has steep, heavy grades of 20 to 30 per cent and travel is heavy, the maintenance in proportion in almost every case will be expensive, though the local conditions as to kind of soil and materials used in construction, together with weather conditions, may reduce its cost. In altitudes over 6,000 feet in Yosemite the trails as a rule are very seldom damaged in the wintertime under heavy storms, but in summer washouts by heavy storms and cloudbursts are frequent. There can be no provision made against cloudbursts. In altitudes below 6,000 feet maintenance is more expensive on account of rainstorms and frequent thawing and freezing, the expansion causing slides of snow and rock. In our classification of trails we call those around the rim of the valley ledge trails, of which we have 38 miles, and the maintenance of them annually is approximately \$22 per mile. The maintenance of the trails beyond the rim of the valley is approximately \$7.50 per mile.

In concluding the subject of trail construction and in consideration of the importance of park development in relation to the intent and purpose for which they were created, it is my belief that no pains should be spared to build only the best possible trails, bearing in mind the object to be attained.

If I have helped in any way with my views and my experience on this important matter of trail construction in the national parks, I am well repaid for the pleasure and honor of the assignment to me of this subject by the Secretary.

MR. DANIELS.

I listened rather attentively for something that might have been omitted, so that I could add it. I find that all I can add is perhaps to elucidate some of the points brought out in the paper, and that is Mr. Sovulewski's method of building checks at the turns in the trail. Unless the rain water is banked to carry it off along the trail it washes off over the edge of the trail. The object is to carry off this rain water, or run-off, without destroying the trail. A check is used in all trail building, but the difference between his method and the others is this: Ordinarily a log is placed to divert the water, but horses traveling cut a deep trench right in front of the check. The result is that in the course of two or three weeks of ordinary travel during the season there will be a hole perhaps 18 or 24 inches deep on the low side of the log check. Eventually it becomes a dangerous spot to the horses that are on the downward passage. Mr. Sovulewski has the idea of placing stones in such a manner so that when the horses come down or go up, they will step on the stones. This distance across is sufficient to cause the horses to walk on the stones. I think that is a very excellent method of building trails, and it has been used in several of the parks, and wherever it has been adopted it has had the effect of reducing the cost of maintenance and preventing the destruction of the trail.

After Mr. Fry's paper was read I neglected to ask for comment, so I would like to ask if there are any comments that any of the supervisors wish to make, or if there are any questions they would like to ask him.

MR. SOVULEWSKI.

I think Mr. Fry has covered his subject very thoroughly. The only thing I would suggest is that, if the paper is going to be published for the information and guidance of all of us, there is one very important feature that he has omitted, and Mr. Fry will probably agree with me on that subject. It is giant powder. In my experience I have had occasion to use giant powder in blasting out logs and have found it better than cutting them off with a saw. One can blast out probably 100 logs in the same time that he could cut through a 4 or a 5 foot log. That is the only thing that could be added to Mr. Fry's paper. I think that is the only way to fight a fire. There is no man living that can decide how he can fight a fire. When he commences to fight a fire he must be like a general of an army in the field. He must decide what he is going to do very quickly. He has not much time to think or much time to issue any particular instructions. When he gets on the ground he must decide upon the best methods very promptly. I think the use of giant powder is a very important feature in forest-fire fighting.

MR. FRY.

All that Mr. Sovulewski has said is appropriate. I have omitted the possibility of using explosives in our national parks, because if you do not have an expert man to handle them, they would be dangerous to life, and very few of the men we have as rangers are experienced in the handling of explosives. It is utterly impossible for a ranger to go about carrying giant powder or other high explosives, therefore I omitted touching upon that subject. I realize the fact that there are various methods of using explosives for fire-fighting purposes and successfully; but the trouble with our national parks in California is that we have not men experienced in the handling of these explosives. I think it would eventually lead to a tendency for each man to want to carry explosives with him. I would not recommend explosives for use in fire fighting in our national parks at present. Under certain circumstances, if giant powder was available and you had experienced men to use it and the conditions were such that it would not ignite any inflammable material elsewhere, I would recommend it. It might be advisable to use it in a national park like the Platt, in Oklahoma, or in some such territory as that; but in my locality I do not think it would be advisable to use explosives, and that is the reason why I omitted touching upon that particular subject in this paper. It was to avoid the danger of bringing up a subject matter that would compel each ranger to carry dynamite or other explosives.

MR. SOVULEWSKI.

I see the point of view of Mr. Fry; that question must be decided for each particular locality. You know, Mr. Daniels, that I am using from 6 to 10 tons of powder in our park a year. We have men who know how to handle it, and we always aim to have that kind of men. They are there for that purpose. Mr. Fry does not use any powder, and that is due, no doubt, to a difference in conditions.

MR. DANIELS.

Where there are men who are expert in the use of powder, and where a fire is of sufficient magnitude to make it essential to blast out a lane, I think the use of powder might be advisable, but under ordinary circumstances I think I am inclined to agree with Mr. Fry that powder should be very sparingly used in forest fire fighting. I believe that elbow grease, a long-handled shovel, and plenty of dirt offer one of the best and most effective means of handling the situation.

Are there any of the superintendents here who care to make any comment on Mr. Sovulewski's paper upon trail building, or are there any question that they have to ask?

MR. MILLS.

I have had some experience in the Rocky Mountains building trails and roads. I have found that a very cheap culvert can be built flush with the road or trail, and planking laid across it 1 inch apart so that the water which comes down on the surface of the road simply drops down through this planking and is carried off through the culvert. I have found this an inexpensive way of taking care of the water. In the Rocky Mountain region it has worked very successfully, and is much cheaper than the old method of embedding a log or stones.

MR. DANIELS.

Does not that clog?

MR. MILLS.

Occasionally, but that is very rare. If there is an excessive amount of sediment in the water, you can lay your planks a little farther apart. These culverts are commonly built of 4-inch planks, sometimes only 2-inch, but a 4-inch plank is the average. You have there a number of slots through which the water and sediment will drop through. The slots may be cleaned out occasionally, but that can be done in a very few minutes.

MR. DANIELS.

On what grade are your trails?

MR. MILLS.

Well, that works on any grade. Commonly these culverts are placed at right angles to the trail, but they may be placed at any angle you may desire.

MR. DANIELS.

We attempt to build our trails so that there is a drainage ditch on the inside of the trail, which slopes toward the outer side. The rain water runs into the ditch and there is some general run-off on the surface of the trail. The problem is to get the run-off off the trails.

MR. MILLS.

Let it drop right down into the ditch and the culvert will carry it off.

Mr. SOVULEWSKI.

Trail building is really a very interesting subject and I want to say that I am very glad that Mr. Mills has come out and told us something. But I do not think his method is practical in the Yosemite. Whether you build them of logs, timber, or anything else, those culverts will rot out in time, and then you have nothing left. Then again, logs are not always available. However, all of these points are very important and should be brought out. I am a lover of trails and a lover of parks, and I want to bring out all of these points for the sake of the information that we may get from them. I thank you very much, Mr. Mills.

Mr. DANIELS.

I will have the satisfaction this year of visiting the new Rocky Mountain National Park, at which time I shall concentrate my energies on the solution of whether that is the right way to build a culvert or not. If there are no more questions to be asked on Mr. Sovulewski's paper on trail building, we will now hear a paper by Mr. Sherfey, who has built a great many bridges in Yosemite National Park. Bridge building is a subject that has been discussed by authorities on the subject in practical form in all of the technical papers that are published. One of our problems in the parks is the matter of bridge building, and it is unique. Nine times out of ten the problem with us is to get some logs together in such shape that they will make a bridge and support traffic over a stream. I believe Mr. Sherfey can give us some pointers on practical bridge building in parks that will be of much value.

Mr. DAVID A. SHERFEY.

There is no one that realizes more than I do the difficulty of presenting a technical subject to a general audience. It is a pretty hard matter for an engineer to make a technical subject interesting, much less to the public at large.

When I learned that I was expected to talk this morning on the subject of park bridges, the question immediately presented itself to me as to what was a park bridge, and, in searching about for a definition and an answer to the question, I tried to formulate one that was based upon my own observations in Yosemite National Park, principally, and somewhat in connection with what I have concluded from other observations, and I think the definition ought to be made in three parts. The first is a log bridge, or a bridge that is made from trees cut near the site of the bridge; the next is what the uninitiated might call a real bridge, consisting of arches or trusses;

and the third is no bridge at all. I am sorry to say we have a few of those cases, where there is no bridge and ought to be one.

Now, as the majority of our park bridges are log bridges, perhaps I have made no error in assuming that I should talk more about log bridges than any other kind of a bridge. In fact, I think you park supervisors and park superintendents know more about log bridges than I do, but this bridge is of such general use in our parks and has served so faithfully the purposes of the pioneer that it seems to me that it is entitled to some scientific recognition, and if you will excuse the effort I will say that I have tried in my own way to show the limitations of the log bridge in a few instances only from an engineering point of view.

Now that we may understand each other it will be best to make a few definitions to begin with. First, what is a log bridge? It is a bridge composed of log beams, the logs being in natural condition or hewn, which are thrown across two abutments, and over which traffic may pass. The span of a bridge must be considered the horizontal space reaching from center to center of the abutments. The diameter of the log is the average diameter of the wood taken at the center of the log. That is, if you will remove the bark and the sapwood and measure the largest and shortest diameter of the log at its center and take the average you would get what we then call the diameter of the log. I realize that no such refinement as that is possible or could be carried out or should be carried out in the field. You can always get closely to the diameter of a log by very few measurements. In using a log we use it in two different shapes. There is the hewn log and the round log. As a general rule, hewing logs for bridges is perhaps unnecessary. There is a ratio between the depth and breadth of a hewn timber that will give its maximum strength as a beam. For instance, if we hew a log into rectangular form, maximum strength is obtained by making the depth of the beam 0.816 of the diameter and the breadth 0.577 of the diameter. Any variation from these dimensions would weaken the timber as a rectangular beam, but in so doing one-third of the strength of the log as a beam is lost.

We have two classes of bridges in our parks, the trail bridge and the highway bridge. I have taken some of the common timbers that we usually find at Yosemite Valley—yellow pine, tamarack, and incense cedar—and have calculated the maximum safe span for different sizes of logs. Perhaps in some of the other parks you have other species that are available. We know the working strength of these timbers, and figures 1 to 4 show the safe spans for the timbers under consideration, with an assumed factor of safety of 10.

The vertical scale in the diagrams represents the diameter of the log in inches; the horizontal scale represents the safe span in feet.

If a line be drawn horizontally from a given point on the vertical scale to the curve representing the kind of timber to be used and then continued vertically to the horizontal scale, its point of intersection on the horizontal scale will indicate the safe span in feet for a log of the diameter selected. Likewise, if a line be drawn vertically from the horizontal scale to the curve, and then continued horizontally to the vertical scale, its point of intersection with the vertical scale will indicate the size log required for the span selected.

Figure 1 shows several spans for trail bridges 6 feet wide carried by three hewn logs 2 feet center to center and designed to carry a load of 50 pounds per square foot. The diagram shows that three 24-inch yellow-pine logs cut to rectangular form will safely span 33 feet, with the assumed loading. I do not mean to say that if you go beyond 33 feet with a log of that size the bridge is going to fall. However, that is a maximum safe span for yellow pine which will sustain 400 pounds per square inch of extreme fiber stress. If you use the incense cedar curve, a 24-inch yellow-pine log will span 44 feet; the fiber factor of safety, however, is cut down from 10 to a little less than 6.

Figure 2 gives data for a trail bridge 6 feet wide supported on two rough logs and designed to carry a load of 50 pounds per square foot. If you will compare the two diagrams (figs. 1 and 2), you will find that there is no advantage whatever in using hewn timbers for a trail bridge so far as strength is concerned.

The next type I have considered is a highway bridge supported on beams spaced 3 feet center to center. I have assumed that the bridge would carry a 10-ton road roller, in addition to its own weight. Figure 3 shows that if the hewn logs are of yellow pine 30 inches in diameter, the bridge will safely span 24 feet. The hewn timbers, of course, in each instance have been cut according to the maximum strength. Figure 4 gives the same data for rough logs, and shows that there is no economy in using hewn timbers.

For a highway bridge thrown across from abutment to abutment it is a waste of time, in my opinion, to hew the timbers unless there is some good reason for doing it. The chief objection to a log bridge, as we all know, is the shortness of its life. I find that by careful attention to details that this objection can be overcome in a measure, but not entirely. If we can design the abutment so that no moisture can collect under the logs the life of the bridge is materially increased. There might be several ways of doing that. If you go under any bridge of this kind you can see the effects of the water on it. Perhaps an even more efficient way would be to remove the bark from the log and the weaker portion of the sap wood and apply some wood-preserving paint. There are several kinds on the market, all

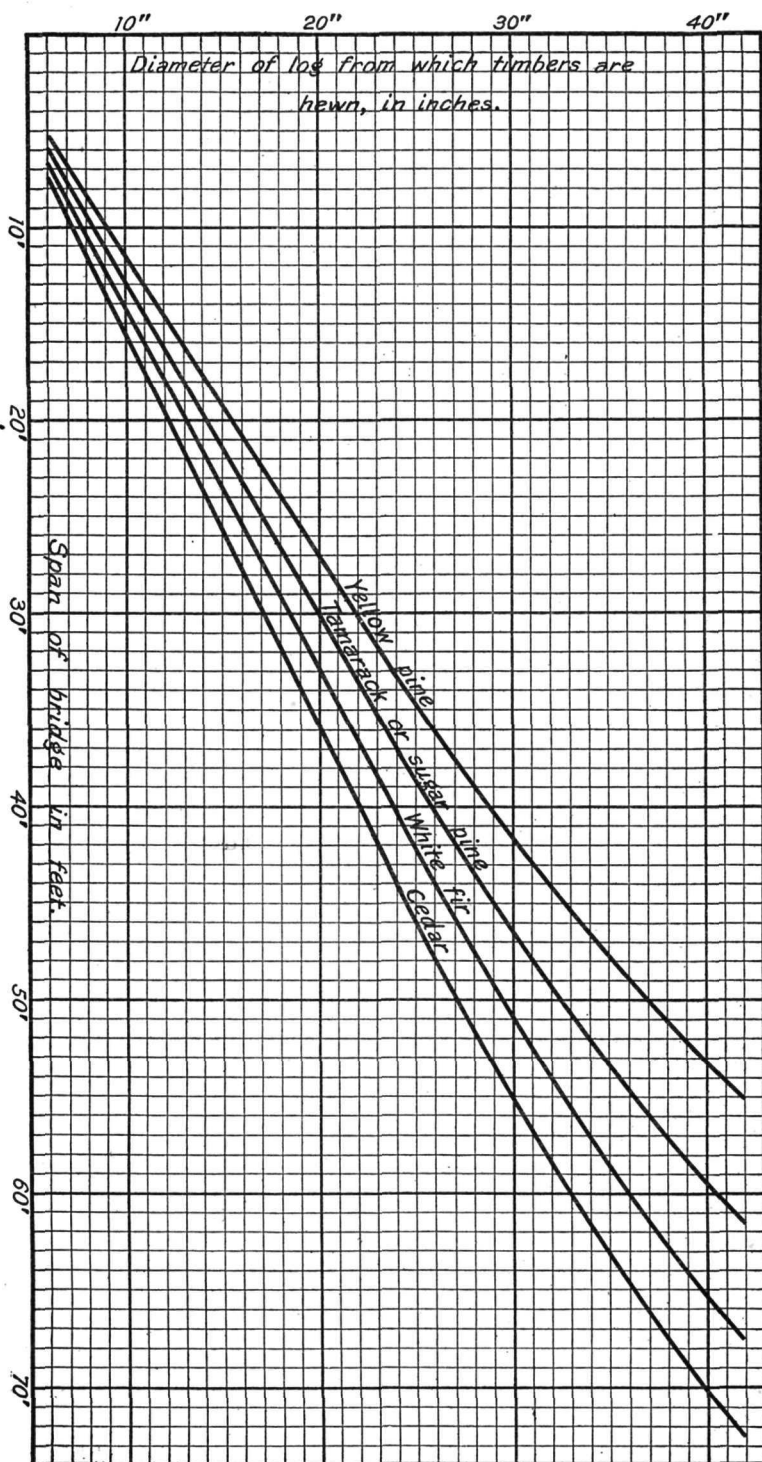


FIG. 1.—Diagram showing safe spans for trail bridge carried on three hewn timbers.

Bridge to have 3-inch floor and to carry a load of 05 05 times the diameter of the log. Depth of hewn timber to be .816 times the diameter of the log. Diagram based on following breaking strengths: Yellow pine, 400 pounds; tamarack or sugar pine, 500 pounds; white fir, 600 pounds; cedar, 700 pounds.

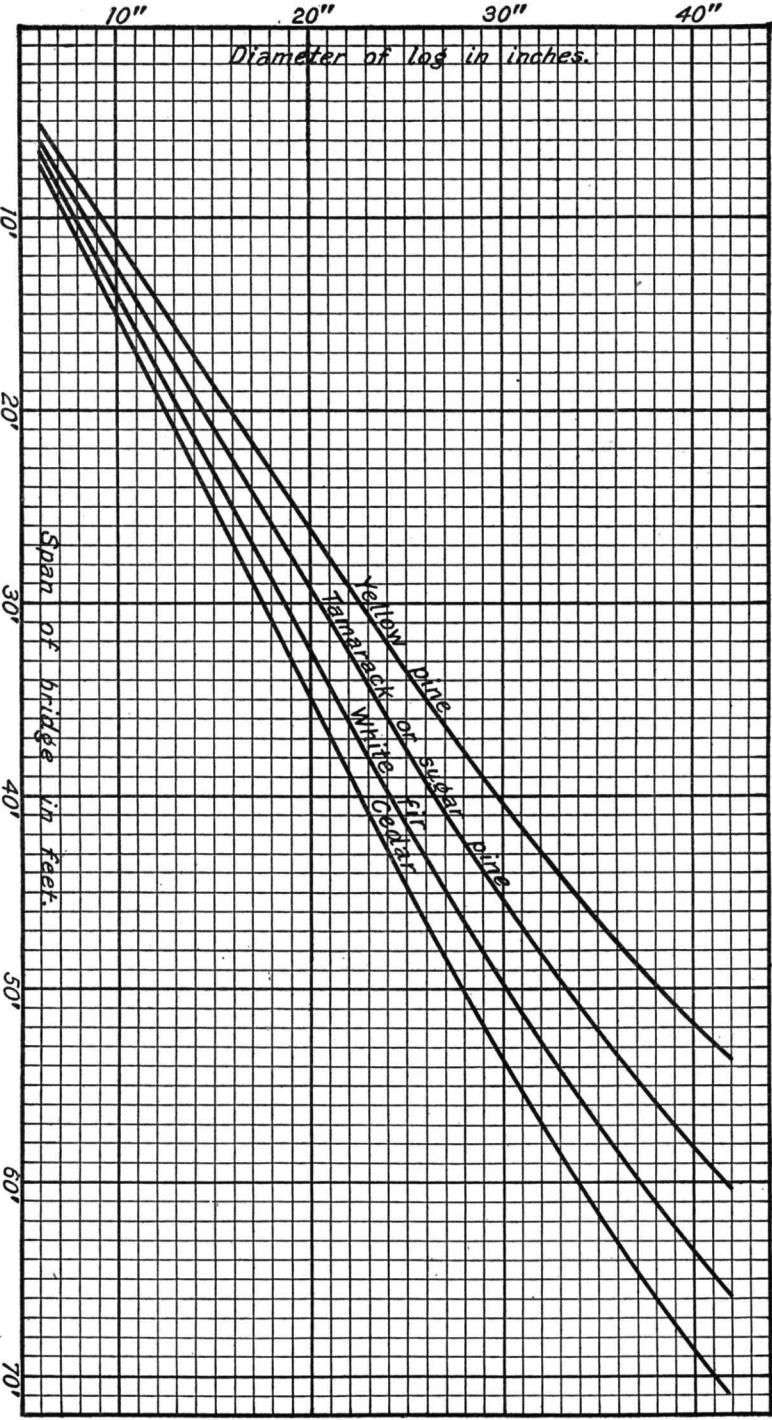


FIG. 2.—Diagram showing safe spans for trail bridge carried on two logs.

Bridge to be 6 feet wide, to have 3-inch floor, and to carry a load of 50 pounds per square foot. Diagram based over on following breaking strengths: Yellow pine, 400 pounds; tamarack or sugar pine, 500 pounds; white fir, 600 pounds; cedar, 700 pounds.

having more or less value, but some of them are better than others and have produced very satisfactory results in the prolongation of the life of timber. One process that the men in the Forest Service have developed is what is called the copper-sulphate process of tim-

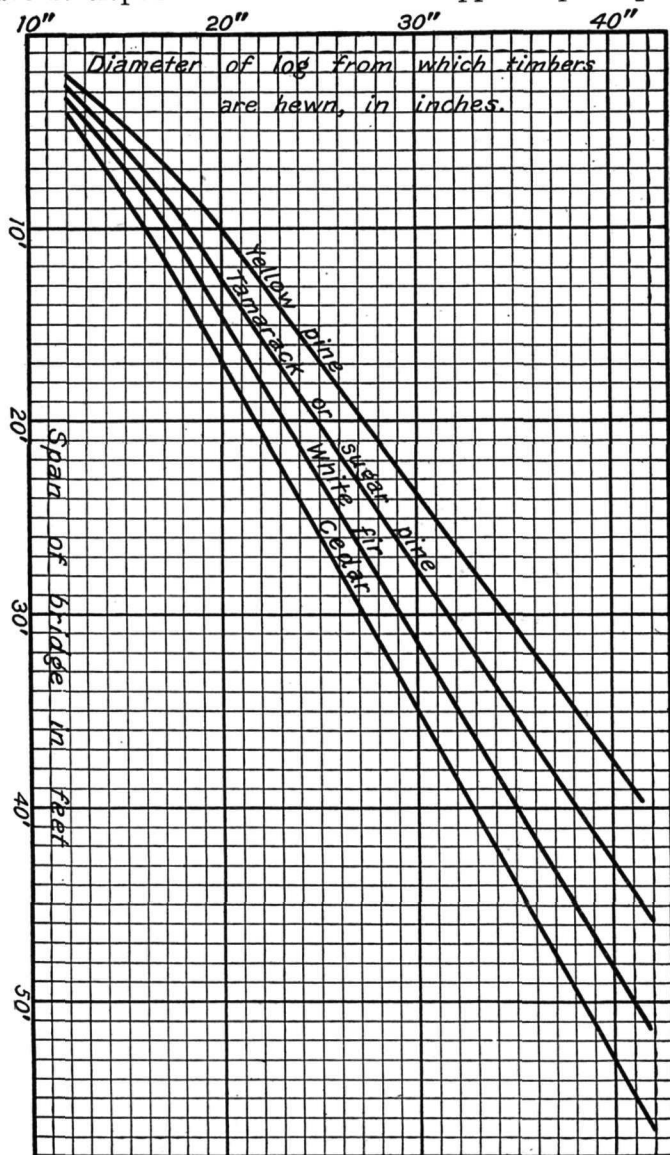


FIG. 3.—Diagram showing safe spans for highway bridge carried on hewn timbers.

Beams to be placed 2 feet center to center; bridge to have 3-inch floor and to carry a 10-ton road roller. Depth of hewn timber to be .577 times the diameter of the log; breadth of hewn timber to be .377 times the diameter of the log. Diagram based on following breaking strengths: Yellow pine, 400 pounds; tamarack or sugar pine, 300 pounds; white fir, 600 pounds; cedar, 700 pounds.

ber preservation, which requires some little apparatus, but the work is simple and the results effective. I will not go into that.

This, perhaps, concludes about all I have to say about log bridges. I hope the time will soon come when all our bridges will be of arch

construction with reinforced concrete, plain concrete, or of stone, as the case may be. We have, I think, some very fine examples of these types in the Yellowstone Park, and I hope that we will soon have enough money to build all of our bridges in this manner. From a bridge of that type the scenery can be seen to advantage, with noth-

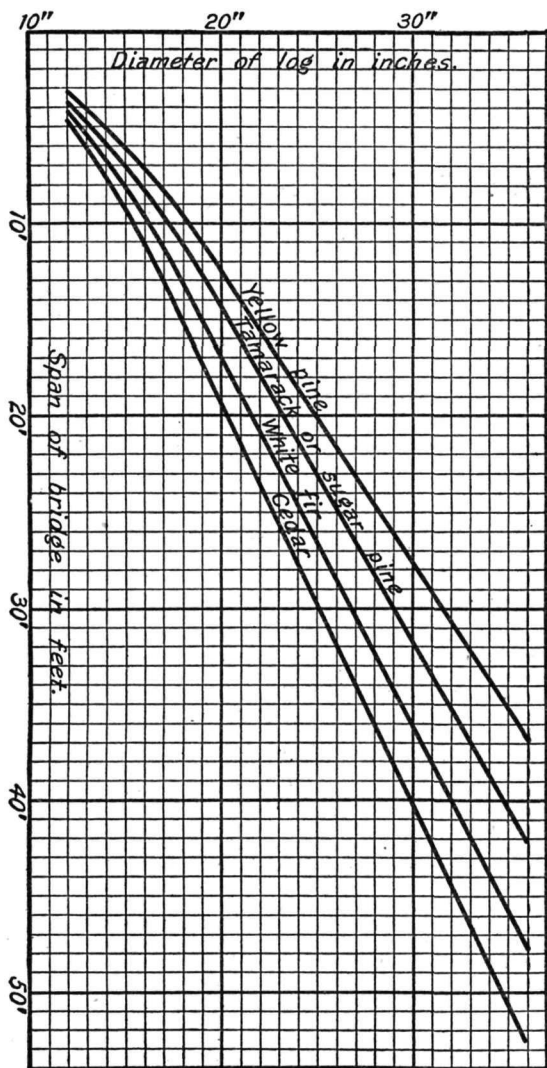


FIG. 4.—Diagram showing safe spans for highway bridge carried on logs.

Logs to be placed 3 feet center to center; bridge to have 3-inch floor and to carry a 10-ton road roller. Diagram based on following breaking strengths: Yellow pine, 400 feet; tamarack or sugar pine, 500 feet; white fir, 600 feet; cedar, 700 feet.

ing in the way to obstruct the view. The truss bridge never has been and probably never will be considered an object of beauty. It is an economical type of bridge and can be built for much less money than the arch bridge. We have been considering some bridges to be built in the Yosemite Valley, and an endeavor is being made to

develop a type of truss bridge which will in the least manner be an offense to its surroundings and will afford the people an opportunity of viewing the scenery without looking between bars like the bars of a cell. One type is a bridge of iron or wood construction that has some unique features. This bridge has a span of $87\frac{1}{2}$ feet and a depth of but 7 feet from center to center of the chords, with a total width of 12 feet. It is proposed to reduce the distance from the floor to the top of the top chord so that a person could walk over the bridge and get a good view of the scenery without looking through the trusses. All of the details have not been thoroughly completed, but we are working upon it in Mr. Daniel's office, and I believe we will have a type of truss bridge that will be very suitable for park purposes up to a span of $87\frac{1}{2}$ feet.

MR. DANIELS.

A supervisor or a ranger is frequently confronted with the problem of replacing a foot bridge that has been destroyed. The first question that presents itself is how big must the logs be to make this span, and not infrequently it is a question of the logs that he has in his immediate vicinity to support the load that will travel over the particular creek or ravine. There has been in the Yosemite Valley and elsewhere an ever-present need for some sort of a tabulation that would give the ranger or supervisor at a glance what the minimum diameter a log should be in order to span a creek. For instance, he finds that it is 26 feet across the opening, and the timber that he has in the immediate vicinity is tamarack or sugar pine. Figure 2 shows that for a 26-foot span, using tamarack or sugar pine, 18 inches is minimum diameter of the logs, placing the logs on 2-foot centers. If he can get plenty of good yellow-pine timber 30 inches in diameter, he may want to know what is the maximum span that he can use on that class of timber. The diagram shows that 41 feet is the maximum span on which he can use yellow pine of that diameter.

If there are any questions or comments, I am sure that Mr. Sherfey will be glad to give you any information in his power.

MR. SOVULEWSKI.

I am no match for Mr. Sherfey in technical matters, but I have had a great deal of experience in constructing bridges. In the valley at present we have large bridges whose spans are from 65 up to 105 feet that have been constructed since I have been there. We all should take notice of what you have suggested in regard to the loads that could be carried. I do not agree with Mr. Sherfey that logs in long-span bridges should be used. When the span is over 25 or 30

feet logs should be used, because it has been our experience that the sap rots the rest of the tree. In constructing long-span bridges we select large timbers and cut the sapwood off. A log cut that way lasts much longer than any other kind. As to the strength, of course it is an indisputable fact that some types of bridges have more strength than others. In the higher altitudes, where smaller bridges are used, I do not think those measurements would be required or necessary, because it is a well-known fact that when a large pole is peeled and seasoned it will last almost forever in a bridge. You have seen examples of that right in our parks.

MR. DANIELS.

Mr. Sherfey has spoken of the Yosemite Valley, in which timber of all kinds is plentiful and which is not a place like Mesa Verde National Park, where every stick of timber used in a bridge has to be hauled for some considerable distance. When that condition arises it becomes necessary for the man who is hauling that timber to calculate upon the size of the timber that he can use so as to save freighting unnecessarily heavy timbers to the point they are to be used.

MAJ. FRIES.

I think Mr. Sherfey made the statement that he hoped that bridges of arch construction would entirely replace all other kinds of bridges. I would like to ask Mr. Sherfey what he thinks of the girder type of concrete bridge in his neighborhood.

MR. SHERFEY.

I realize that we are all controlled, either directly or indirectly, by matters of personal tastes. I do not want to hurt the feelings of anyone at all in the matter, but I believe that as a general rule the girder type of bridge of reinforced concrete is inferior to the arch. At the same time I do not condemn the girder type of bridge. I have seen several very good examples of it, but I would personally prefer the arch wherever it can be used to advantage. I do not like to speak generally on anything in regard to engineering matters. We are called upon to build different kinds of bridges, and the conditions in each locality must determine the kind or character. Where you have a locality in which you can not use an arch bridge for some reason or another, why, I should say, build a girder bridge—a reinforced concrete bridge.

MR. DANIELS.

We will now adjourn until 2 o'clock this afternoon.

AFTERNOON SESSION, MARCH 12.

MR. DANIELS.

We will continue our discussions of this morning which were interrupted by the recess. As we want to have a general conference with the concessioners after the speeches, and as papers by the supervisors have been presented, I will not call on Col. Brett now, whom I had in mind, to give us a little further talk on park-ranger service. Secretary Mather has pulled one of our teeth by calling on Col. Brett to read his paper yesterday afternoon, so we will hear from Mr. Ralston, of Glacier National Park, on "Road building."

MR. RALSTON.

Mr. Chairman, ladies, and gentlemen, my subject, as the chairman has stated, is road building, and after hearing the very able paper read by Mr. Allen yesterday on this same subject I feel somewhat embarrassed over what I have to say. My remarks will at least be brief.

The great object—if there be an object or intent—in nature is the propagation of life. One of the most desirable and commendable things in life is cleanliness—cleanliness of mind and body. In the human body wonderful nature has created the arteries, the highways of the blood which cleanse the anatomy to its farthest extremity. So, likewise, do the highways—the arteries of commerce—cleanse and stimulate the Nation. If the arteries of the human body are not clean, strong, and well laid out, the body as a whole suffers.

Obviously when our national, State, or county highways are poorly laid out, insufficient, or in bad order, the body of the Nation suffers from stagnation of commerce and business. The roads of the country are the highways or arteries of the Nation. The question of roads and road building is one that has occupied a prominent place in the life of nations since the dawn of history. We go back centuries before the birth of Christ and find the splendid system of roads built in Greece and Rome during the flood tide of their respective civilization. In England we find the Cæsars highway built under the direction of Julius Cæsar. Many miles of it constitute one of the splendid highways of England to-day. We read of the fine old roads of Spain, France, and Germany, many of them built many centuries ago, showing that people of those old countries in that far-away time regarded roads and road building as one of the vital problems of their day.

Primarily, most of these roads were built for military purposes, for defensive or offensive operations. But, happily, they served a

much higher and grander purpose by being used as arteries of trade and commerce. Everything else being equal, the standard of civilization of each nation can be gauged by their roads. Take Africa, for example; consider her present backward civilization; no doubt her settlement was as early, if not earlier, than the settlement of Europe. Then mark the absence of the splendid highways which characterize the highly civilized countries of Europe. In our own country there is considerable effort being directed toward securing a well-defined system of national roads and obtaining from Congress a large appropriation for their construction. It is doubtful whether the American people are ready or willing to assume this additional burden of taxation, although the benefits derived from good roads would very greatly outweigh the burden of taxation. If it were possible to divert the \$500,000,000 which is annually appropriated for wars, past and future, into a good-road fund, what wonderful constructive work could be accomplished. In order to realize this vast amount of money it is only necessary to say that if it were divided equally among the 48 States of the Union, each would receive a little over \$10,400,000. Do you realize the vast improvement that would be accomplished by the judicious expenditure of \$10,400,000 in your State? Should this be accomplished, it would not be a new departure of our Government. One of the early roads used for military purposes in America was the Washington or Braddock Road connecting the Potomac and Monongahela Rivers. Gen. Braddock marched his troops over it in his campaign against the French. The Santa Fe was one of the early western roads. The Santa Fe trail was probably first traveled by William Becknell and party in 1822. Later it was laid out and surveyed under the direction of a commission appointed by the United States Government and headed by Thomas Benton, of Missouri.

Judged by a common standard of accomplishment and without taking into consideration the elements of time and the accumulated expenditure of money and labor extended over the life of nearly a hundred generations, the United States does not make a very creditable showing. But when we consider that, during the past 160 years, there has been built in the United States, at least two and one-quarter million miles of wagon roads, and that many thousand of miles of these are splendid macadam or paved roads, and also consider the contributive elements of time, wealth, and experience which favor the older countries, we must believe that the work accomplished in this country is truly remarkable.

But, the people are awakening and are demanding better roads. Massachusetts, Pennsylvania, New Jersey, and New York are leading in this splendid work. New York is foremost in this great de-

velopment and expended over \$50,000,000 of State money on its roads between 1907 and 1913, and is annually spending millions on road improvement.

The West is making splendid progress in road improvement and extension. California, Oregon, Washington, Montana, and Idaho are all doing splendid work, with California leading. There is a section of country in northwest Montana, west and southwest of the Glacier National Park, comprising the country known as Lincoln and Flathead Counties; which, 30 years ago, was a wilderness of forest, lakes, and streams, explored only by the trapper and prospector. To-day numerous automobiles and thousands of horse-drawn vehicles traverse her hundreds of miles of fine roads. The road encircling Flathead Lake, covering a distance approximating 130 miles, built at an expenditure by Flathead County of upwards of \$80,000, is a beautiful stretch of road. Picture to your minds a trip of 130 miles around the shores of what is known as the second largest fresh-water lake in America, opening up a panorama of lake, mountains, streams, and woodland, almost unsurpassed in beauty. The Lincoln County highway, starting at the Idaho line, following the beautiful Kootenai River to Libby, thence by way of Libby Creek, Fisher River, and the Thompson Lake region, traverses one of the most picturesque sections of the West. The Flathead Lake and Kootenai River country can be easily and cheaply visited by tourists visiting the Glacier National Park.

The pioneers of Montana are entitled to considerable credit for the skill and good judgment in laying out many of the old roads of this State, which are traveled to-day. They followed the lines of least resistance. Roads in pioneer days had to be built cheaply; most of the labor was contributed; a great many of them were laid out with the eye, neither level nor instrument being used. In most cases they followed water grades and they used good judgment in selecting routes over which good road material was to be had. We, to-day, can profit by their experience, so far as grades and road materials are concerned.

The value of good roads is almost inestimable. They bring the farm and city closer together; they afford quicker and cheaper communication and exchange of products between agricultural and manufacturing districts, which creates a community of interests and brings about a better feeling. Where good roads have been constructed, it has almost cut in half the cost of getting farm products to railroad points and to market.

In order that you may understand the magnitude of the saving wrought by good roads I will state that if a saving of 3 cents per bushel were made on 1,000,000,000 bushels of corn and wheat, the magnificent sum of \$30,000,000 would be saved. This saving alone

would build an additional 3,000 miles of road, costing \$10,000 per mile. But our transmutation from savagery to civilization and the welding thereof can not be measured by dollars and cents. A great philosopher has said "From the soil we came, to the soil we shall return." Most, if not all, grand thoughts and ideas originate through close contact and communion with the soil and it is to the opportunity which good roads give to the people of our cities to return with greater facility to the country soil, that we owe our best thanks. The influence of the clean earth, morally, physically, and in every way, is incalculable to the denizens of the busy city hives.

There are three very essential things to be considered in successful road building—grades, drainage, and road material. It is advisable to select the best possible grades that are consistent with good drainage. But perfectly flat roads over bottom lands are hard to drain. Water from melting snow or from heavy rains accumulates and stands in the gutters or drainage ditches, and if the road material be of earth as in the case of 90 per cent of the roads of this country, the standing water soaks through. The heavily laden wagon or automobile passes over, ruts are made in the softened earth, wagons and automobiles follow and deeper impressions are made in the earth, and unless the water is drained off and the road repaired it soon becomes impassable.

Furthermore, there are three salient features of the highland road which should give it precedence: Firstly, general symmetry and beauty; secondly, facility for construction, class of material, and drainage; and last but not least important, because such routes usually occupy land which is the least valuable commercially and agriculturally. Local needs and conditions often preclude such selections, but experience teaches that wherever a choice is possible the high routes should be selected. However, soil conditions vary according to the section, and it is only through a careful examination of different conditions that the best results may be obtained. Drainage is perhaps the most important thing to consider, for without good drainage it is practically impossible to have good roads. In the actual construction of the road, some give more attention to crown, but my observation has taught me that if the drainage is perfect the crown, if well constructed, will require much less attention. This may seem a very simple problem to those who have not seen, as I have, the necessity of rearranging one-half the system of drainage on a new road within one year of its completion.

The roads to be built in the national parks should differ from the ordinary road, in that their purpose is to better display the natural scenic beauty of our national playgrounds and thereby encourage our own people to visit these spots of scenic interest and save to our

country the wealth now annually contributed to Europe through the medium of the American tourist.

To this saving extent our roads will be both commercial and scenic, and should follow well-chosen points of vantage to show to the tourist, to the best advantage, the magnitude and splendor of the park. In fact, all considerations bespeak the selection of these routes. The drainage can be made almost perfect at a minimum cost, and it would be hard to find better natural material than that which exists on every hand. This material classes with the best natural material to be found anywhere.

So far in this paper I have dwelt principally upon routes, drainage, road materials, commercial advantages, etc., for the reason that the monotonous repetition of detail necessary in describing the actual construction is tiresome and uninteresting. Suffice it to say, that one common method is used by enlightened road builders all over the United States; first, selection of route, bearing in mind road material, etc.; second, possibilities of good drainage; third, actual construction, tools, etc. If the route be over ground on which it is possible to use plow and grader, the work can be quickly and cheaply done. On ground that is comparatively flat the entire width of roadbed should be plowed, then the greater part of the road can be made with grader. For practical road building the blade grader is the best. After plowing, start with the grader and move the earth toward the center sufficient to make the necessary crown, which should be from one-half to five-eighths of an inch to each foot width of road. In throwing up the crown, care should be taken to break up the sod. If the sod is tough and does not break up readily, it should be removed from the road. After the sod is disposed of, the earth breaks up easily and can be spread in thin layers until the proper height of crown is attained. The common slip or fresno can be used to fill in low places, after which the grader should be used to smooth down high places and give the road a uniform grade. Sidehill grades are worked largely on the same principle, excepting that the earth is most all moved one way, and where the hill slope is steep slips and fresnos are used until sufficient earth is removed to enable the grader to be used. The necessary drainage culverts are put in before the grade is started and the drain ditches are made as the grade progresses, and where practicable extra drain ditches are made to catch the surface water from rain and melting snow and convey it to culverts, preventing the overflow waters from damaging the road. Lastly, we have maintenance, without which our work would be wasted. However, I will not discuss methods, emphasizing only the value of the drag and recommending its diligent use. I refer you to the various departmental pamphlets on this and kindred subjects. The wealth of detail given embraces comprehensively the

entire subject, excluding nothing desired by the ambitious and energetic road builder.

In conclusion I will say that the great stimulants of commercial liberty are competition and criticism. The road builder has been tested in these crucibles and while some base ore has escaped, the amalgam as a whole will assay high. Let us invite criticism and welcome it with the proper spirit, for only in this way shall the trail blazer and road builder ultimately attain the homage and recognition which is his due. Much has been said pro and con as to the excellence of work performed in the past. Let me say that the man does not live who is not prone to mistakes and with few exceptions the finished work of the road builder should prove a source of pride to the citizens of the Nation.

MR. DANIELS.

I want to say that Supervisor Ralston has recently completed a road the cost of which the Secretary of the Interior was told would not under any circumstances be less than \$28,000. At a conference with the Secretary in Washington he asked me if I thought it was possible to build it for less money. I told him that I thought Mr. Ralston could do it. I might say that the road was completed last year, with the exception of surfacing a small portion, at a total cost of \$12,500, and that road, if anything, is a little bit superior to the road which it was proposed to build for \$28,000.

We have in every park road problems, of course, but Maj. Fries is particularly engaged in road building of considerable extent. I would like to ask him if he has not something that he can tell us that will enlighten us further on the subject.

MAJ. FRIES.

Mr. Chairman, ladies, and gentlemen, I have not prepared anything on this, and probably would not have had much time if I had been called upon, because I did not get into Yellowstone Park until last June and I have been very busy building roads. I have had no time to prepare any paper about them, or talk very much about them. I have had my hands pretty nearly full attending to roads, and we have pretty nearly every character of road to build that is at present encountered. We are starting in to build some high-class roads with broken stone and oil finish and we go from that down to roads where we will spend a hundred dollars a mile on them. In these cheaper roads the main thing is the bridges—wooden bridges that we heard about this morning. For instance, in one stretch of about 10 miles we built 55 wooden bridges and culverts ranging from 4 feet to 40 feet in span. In all of these I attempted to get at costs. To reduce

the costs, I want to second what Mr. Ralston has just said about the use of the fresno scraper, slip, and grader. Get them large enough and put enough animals on them to keep them going. That is the big item in road building if you are going to get it done for any reasonable cost.

In this connection I have often thought of the four qualifications of an engineer, and for the first qualification I will put down common sense. If he has got common sense he will do his work; while he may do it slowly and make mistakes, he will get something done. The next two requirements are hustle. Then I would add to that education; then you will have an engineer who can do the work as well as it can be done.

The practical side of our organization is very essential if the roads are of any great extent, as they are in Yellowstone Park, some 300 miles of road under construction and repair at one time, with a short season to work in. It is necessary to have four or five hundred men at work. Supervision must be very carefully done. If the animals have to subsist on forage they must be looked after with great care, because the tendency of men in that country is to bring in poor animals and feed them up at the expense of the Government. For instance, we found one place after a little bit where the foreman was not watching the foraging of the animals and they were costing too much. We put one man on that job to look out for the foraging, and we saved \$6 a day for about 15 or 20 teams.

Inspectors must follow up the work at all times. I do not care how good a hustler the foreman is, if the engineers and overseers do not keep right on his track, he is not going to do as much as he will if the engineer or overseer is on his track. When you get to building the higher class of roads and bridges, then transportation becomes a very great question. As we heard this morning, the type of a bridge is determined by the cost of the material and the distance which you must haul your material.

In Yellowstone Park we are building a great many concrete bridges. I take issue with my friend this morning on concrete bridges only to the extent that he said that the arch bridge was the only one practical that should be used if you have money enough. I disagree with that. I believe there are very many places where you have straight lines that a girder bridge is better, no matter how much money you have got to spend on it. It is a difference of opinion whether concrete bridges are more desirable in parks. In Yellowstone Park we build some wooden bridges, and I will say that if you get your logs heavy enough that they will stand three or four times as long as lighter logs. For instance, if you use lighter logs, your bridge may last three years instead of eight or nine years, and that costs you just three times as much.

We expect to put up some steel bridges in the park, and we are going to put concrete floor on those steel bridges, because replacement of floor is one of the most expensive things we have to contend with in the maintenance of our bridges. It makes a little bit heavier bridge and a little more first cost, but the cost of replacing the floor is very great. I have heard a great deal said about grades. We have reduced the grades of our roads in Yellowstone Park 8 per cent to 6 per cent. If you put down oil macadam and you put your grades too steep, it is impossible for animals to travel over them.

In building our roads we use rock crushers and road rollers, but we have not as yet decided what are the best. We have tried gasoline-driven ones and steam-driven ones, and have found that the steam-driven ones are cheaper.

I do not care to take up any more of your time, because if I started to go through the 300 miles of road work I have encountered during the last summer and since and told you about all of the troubles I have had I could keep you here for hours. Our problems are all alike. The trail is a different thing from a road only in this, that you have a less load to carry and you have no wheel travel. On a road you have heavier travel and faster travel, and where you are going to use automobiles you have got to flatten your grades, widen out your roads, and cut down your curves. You have also to build heavier bridges. Of course the only difference between a trail and a road is in the traffic, but there are just as many chances for economy in trail work as there are in road work. If you have to practice economy in the building of roads, build them right from the start and save enormous repair expenses.

MR. DANIELS.

This subject of road building in the parks is so vital that I would like to ask every supervisor if he has any questions to put on the subject to do so without any hesitancy. I have two or three thoughts on the subject that I will give you after you have fully discussed this subject. Well, I am glad to see that all of you seem to know that everything has been told.

Dr. Parks, of the Hot Springs, has rather a unique and unusual duty to perform. Those are the only hot springs, in that sense of the word, in the United States. The attendance at the Hot Springs outside, I suppose, of the local attendance from the city, averages from 125,000 to 150,000 people per season. His problems are perhaps entirely different, with but very few exceptions, to the problems we have in the other parks. Nevertheless, if the present campaign which the department is now preparing to enter upon for the

dissemination of information is carried out successfully, we hope that there are several other parks that will give Arkansas Hot Springs a pretty lively race for attendance. For that reason it is particularly timely that Dr. Parks should tell us about the Hot Springs and its problems.

DR. W. P. PARKS.

Mr. Secretary, ladies, and gentlemen, my paper, as Mr. Daniels has just stated, will be a little diversity from the other papers. Mine will be a diversity from road building to health building.

Mr. Secretary, superintendents, and others, I deem it a distinguished honor to be permitted to attend this meeting in the glorious State of California and represent as best I can what the people of Arkansas think to be the world's greatest combined health-pleasure resort.

While there are no positive historical data fixing the date of discovery of these hot springs it is presumed from legendary traditions handed down that they were discovered by the nomadic primitive races and their healing waters were used for many generations before the coming of the white man. From the most reliable historical data available at this late date it is believed that these now famous Hot Springs were visited in 1541 by De Soto, and that his proud, chivalric band of Castilians were the first white men to drink from the "fountain." As nearly as can be established, the first white settlers came in the year 1800. Dunbar and Hunter of the Lewis and Clark expedition visited the Hot Springs in 1804, and their report shows that they found an open log cabin and a few huts built of split boards, all constructed for summer encampment, which had been erected by persons resorting to the springs for the restoration of their health. A cabin was built there by Manuel Prudhomme in 1807, and he was joined in the same year by John Purciful and Isaac Cates, who camped here and engaged in hunting and trapping. From this time on history is complete, and shows that the fame of the springs began to spread and each year added to their patronage. Toward the end of the twenties there were permanent settlers at the springs. In 1832 four sections of land was reserved by the Government with the hot springs near the center, and in 1878 this land was platted and sold to various claimants, with the exception of that which now comprises the permanent Hot Springs Reservation and all of the hot springs. At the time of this subdivision the Government retained a large number of city residence lots, practically all of which have since been sold from time to time at public auction by order of the Secretary of the Interior after due advertisement. None of these lots, however, were within the bounds of the permanent reservation, but located in the city proper.

The Hot Springs Reservation now has an area of 911 acres, consisting of five units: Hot Springs, North, West, and Sugar Loaf Mountains, and Whittington Lake Reserve Park, but the hot-water springs issue forth only from the west slope and at the base of Hot Springs Mountain, which embraces 264 acres. The 46 springs with an average daily flow of 826,000 gallons and an average temperature of 135° F, are confined within an area 500 by 1,400 feet.

Situated as they are in a spur of the Ozark Mountains which are noted for their beauty, the hot springs are surrounded by natural scenic conditions that are all the heart could wish, and to sufferers of various diseases they offer a thermal radioactive water and climatic conditions unequaled. No mineral waters yet discovered show as great a number of cures or yield relief to such a range and variety of ailments. Located in the meridian of temperate winds which meet and blend the pure refreshing northern currents with the balmy breezes of the Tropics, thus producing a delightful medium and equalization of temperature; surrounded by the virgin forest-covered mountains which stand, like sentinels, with their cliffs and rugged environs abounding in romantic situations and picturesque scenery; endowed with a thermal water ample in volume and range of temperature and radioactive to a marked degree, to minister to the multitude, the springs are happily situated to contribute to the ultimate objects of man—health, longevity, and pleasure.

The wisdom of the retention, control, and supervision of these springs under the fostering care of the National Government has been fully demonstrated during the years which have elapsed since its title was established. The trust reposed in the Government by the people has been guarded with extreme care. The springs are now the property of the people, free from monopoly and extortion, and within the reach of all. The obligation assumed carried with it responsibilities which have been discharged in a manner befitting their protection and benefit, and is a guaranty that in future years this priceless boon to suffering humanity will be administered with characteristic fidelity to the end that it may remain the common heritage of all mankind.

These waters, emblematic of purity and symbolic of cleanliness, are warmed by the mysterious designs of God's providence and charged with His richest blessings for the human race. Hygeia, robed in her spotless garments of health, has pronounced her magic spell over the waters which gush forth from the mountain side, and like the pool of Siloam, they breathe the eloquence of a mysterious power—the modern Bethesda whose waters are ever stirred by the angel of healing.

On assuming charge of the reservation as superintendent August 4, 1914, I was fortunate in finding a corps of efficient employees which

have been of great assistance in the proper administration of the affairs of this office. The problems with which we have to contend are entirely different from those encountered in any of the other national parks by reason of the fact that a large portion of the 125,000 or more annual visitors calls at the superintendent's office for information and advice relative to doctors, bathhouses, hotels, etc. The information given is necessarily general in character and in most cases a circular of general information issued by the department and a list of the registered physicians is furnished to the applicant. A large number of these persons are sick, debilitated, or nervous, and extreme care is taken to see that all receive kind and courteous treatment, which is highly appreciated by the visiting public. The visitor is the principal asset in Hot Springs, and should be treated with due consideration and made to feel at home upon his arrival. Economy is practiced in the expenditure of funds, and practically all improvement work is done by day labor under direct supervision from the superintendent's office, thereby saving the profits that would otherwise go to contractors and giving the Government full value received for every dollar expended. A complete daily report is rendered by the manager of each bathhouse, showing the name, home, and local address, attendant and doctor, if any, of each purchaser of a bath ticket, together with the total number of baths given each day, supplemented by a sworn monthly statement of the business of the bathhouse, and then at the end of each fiscal year a sworn annual statement is submitted by each bathhouse and the Arlington Hotel, showing the total receipts, itemized expenditures and net profits for the fiscal year just closed. These reports taken as a whole furnish data for a complete and comprehensive record of the business of the bathhouse.

During the month of November, 1914, the Hot Springs Reservation was signally honored by a visit from Hon. Bo Sweeney, Assistant Secretary of the Interior, accompanied by Mr. W. B. Acker, assistant attorney in the department, who for many years has been closely connected with the national park service. While here they had an opportunity of meeting by appointment, in the superintendent's office, a large delegation of the city's most prominent business and professional men and, after each citizen had expressed his views relative to the different matters pertaining to the best interest of Hot Springs and the Government reservation, the Assistant Secretary took up the different matters separately, which had been under discussion, and handled them in such an able and practical manner that his remarks were the subject of much favorable comment by those present.

This visit was made at a most opportune time, during the week in which the Arkansas State fair was held here, at which time there was a large attendance of people from all sections of the State, headed

by Gov. Hays and staff, together with nearly all of our other State officials, all of whom were delighted with the interest the department was taking in this resort.

A few days later in the month, on Thanksgiving Day, we were honored by a visit from the general superintendent and landscape engineer of national parks, Mr. Mark Daniels, whose eminent reputation in his chosen profession had preceded him. It is to be regretted that during his two days' stay it rained almost continually, thereby preventing him from viewing the reservation under favorable conditions. However, he expressed himself as highly pleased and prophesied a great future for this resort. The idea advanced by Mr. Daniels of mapping out a definite and fixed plan of improvements and of completing as much thereof each year as the funds made available by Congress will permit appears to me to be practical, and an excellent plan to adopt for future extensive and permanent improvements, as work done at haphazard is often unsatisfactory. I do not think there is a more advantageous place in this country for a landscape engineer to display his genius, nor one where his accomplishments would be enjoyed to a fuller extent by a greater number of America's health-pleasure seekers than on the Hot Springs Mountain, from which flow the far-famed hot waters of mysterious healing.

Also, in the latter part of September of the same year, the reservation was visited by Mr. T. Warren Allen, Chief of the Division of National Park and Forest Roads of the Department of Agriculture, who made a tour and thorough inspection of the system of mountain roads on the reservation, and took occasion to express himself favorably regarding their general condition.

These visits are beneficial in many respects and bring about a better understanding in the department as to physical conditions as they actually exist, and I now want to extend, on behalf of the citizens of Hot Springs, an urgent and cordial invitation to the Secretary, Hon. Franklin K. Lane, and to the Assistant to the Secretary, Hon. Stephen T. Mather, to visit the Hot Springs Reservation at their earliest convenience, and assure them of a most hearty reception. I feel that this is the most valuable reservation owned by the Government, because of the fact that it affords an opportunity for restoration to health of hundreds of thousands of its citizens who are afflicted with ailments, in which these life-giving waters are beneficial.

Among the more important improvements on the reservation during the past two years may be mentioned the following:

A white-way lighting system was installed on the reservation front, or Bathhouse Row, as it is known; at the present time it consists of 19 five-lamp ornamental electric-light standards placed at

intervals of approximately 100 feet along the inside line of the sidewalk. It is interesting to note in this connection that, although the Government system was the first white-way system in Hot Springs, it was followed within a few months by the installation of an extensive and elaborate system on the main business streets of the city, along the same lines.

The drinking pavilion on top of Hot Springs Mountain, erected a few years ago, was finally supplied with drinking water in the summer of 1914. This improvement includes an ornamental pressed brick, tile-roofed pump house, equipped with an electric pump, and a pipe line, storage tank, and drinking fountain. When one considers the popularity of this mountain for exercise, recreation, and rare scenery, with both visitors and residents, the importance of this improvement can be readily recognized.

Nine substantial and ornamental concrete bridges have been erected on Hot Springs Mountain at various points, many of them permanently replacing old wooden bridges that heretofore required renewing every few years.

An additional impounding reservoir for the conservation and distribution of the hot water was completed under the Fordyce Bathhouse during the past year. This reservoir has a capacity of approximately 72,000 gallons, and our facilities for the handling of the hot water have been materially increased by the construction of this reservoir.

A sprinkling system has been installed on the west slope of Hot Springs Mountain facing Central Avenue by an extension of the city water-supply line with numerous hose connections. As droughts of from 4 to 10 weeks' duration are of yearly occurrence in Arkansas, this sprinkling system has been and will continue to be of immense value in the preservation of the naturally beautiful appearance of Hot Springs Mountain, this slope of the mountain being at present parked and set out in shrubbery from the base to approximately one-third of the distance to the summit.

In addition to 580 linear feet of new concrete walk, curb, and gutter on Reserve Avenue leading to the superintendent's residence, all worn portions of the various concrete walks on the reservation have been renewed.

Several hundred linear feet of rubblestone retaining walls and concrete gutters have been constructed along the mountain roads on the reservation, though there yet remains a large amount of work of this nature to be done.

To prevent a recurrence of earth slides on West Mountain, which have been numerous, with consequent heavy expense to the Government, in the past, a solid masonry retaining wall, containing approximately 7,000 cubic feet, was constructed at the point on West Moun-

tain where most of these slides have occurred, and it is believed that future trouble at this point has been obviated by this action.

In the nature of an experiment an ornamental fountain of native tufa rock, with a basin approximately 12 feet in diameter, was constructed near the main entrance to the Hot Springs Mountain Reservation, adding much to the appearance of the grounds.

Guard railings of 2-inch galvanized pipe have been constructed at various points on the reservation, and at present there is little danger to anyone exercising reasonable care at these points.

In addition to the above items there have been a number of minor improvements, such as the construction of a new wire fence on the northern boundary of the reservation, the reconstruction of the drinking pavilions on Fountain Street, or Happy Hollow, and on Central Avenue; the planting of 36 beds of various bulbs, the construction of walls and gutters in ravines on Hot Springs Mountain, the moving and resetting of 6 iron light poles from the reservation front, after the installation of the white-way system, to the superintendent's official residence and grounds. Approximately 4,000 yards of gravel have been hauled and distributed on the surfaces of the various mountain roads, and in other ways the 10 miles of mountain roads have all been maintained in a high state of repair during this time.

This work, with the necessary repairs and renovations, has been sufficient to keep the regular reservation force of laborers, with some additional labor from time to time, constantly employed in the protection and improvement of the reservation, in keeping with the policy of constant betterment of the Government's possessions at Hot Springs.

Foremost among the immediate needs of the reservation is either an entirely new free bathhouse on the present site or extensive repairs to the present building. For the last two years the average daily number of baths given at this institution has been around 500, and it is imperative that some arrangements be made to continue the administration of free baths to the indigent.

The interior of the building now in use has deteriorated to an alarming extent, though the foundation and walls are in fair condition; and while a new modern building would be preferable a thorough remodeling and renovation of the old building would probably put the house in shape to meet the demands of the service for the next few years. If made, these repairs should include new plumbing throughout, a new roof, a separate bathing department with at least two tubs and a shower for the exclusive use of employees of the reservation, and the arrangement of the second floor to provide facilities for a free clinic for the treatment of needy bathers by local registered physicians free of charge. At all events, it is essential

that something be done in regard to this bathhouse in the very near future.

A modern completely equipped greenhouse should be constructed at a point on the reservation, preferably just in the rear of the bathhouses on Bathhouse Row, where the sunlight would be available; the present old greenhouse being directly in the rear and to the north of the Arlington Hotel, is rarely reached by the rays of the sun. This proposed greenhouse could be erected near the free bathhouse and heated by the plant in the bathhouse.

A modern comfort station should be erected convenient to Bathhouse Row, preferably near the free bathhouse also, as in that way the necessary janitor work could be performed by the employees of the bathhouse.

The driveway leading off Central Avenue at the main entrance to the reservation should be paved from Central Avenue to the free bathhouse. Also, Fountain Street, bounding the Hot Springs Mountain Reservation on the north, should be paved with a suitable material from Central Avenue to a point even with Government monument No. 36, at which point Fountain Street connects with the system of roads on Hot Springs Mountain, and Reserve Avenue, bounding the reservation on the south, should be paved from Central Avenue to a point even with monument No. 26, which would take the pavement just past the grounds occupied by the superintendent's official residence. It is believed that the property owners on the opposite side of these streets from the reservation would be willing to pay their proportionate share for such a valuable and needed improvement.

A new roadway should be constructed down the west slope of North Mountain to connect the mountain road system on Hot Springs and North Mountains with Ramble Street, thus connecting the north end of the city with the roads on these mountains. The details of this proposed roadway have been submitted to the department and I understand are now in the hands of the general superintendent for consideration.

Retaining walls and gutters should be constructed along the driveway on Fountain Street, or Happy Hollow as it is known, and connected with the system of walls and gutters on Hot Springs Mountain, and all points on the mountain roads not now protected should be protected by the construction of retaining walls and gutters.

Provision should be made by the Government for the construction of a storm sewer and surface-drainage system to properly care for the drainage of the reservation. This matter is the subject of an exhaustive report submitted to the department in January, 1913, by Geographer Sledge Tatum and Engineer Barnett.

A new impounding reservoir with a capacity of at least 200,000 gallons should be constructed to better facilitate the handling of the hot water. A good location for this reservoir is in the rear of the Maurice Bathhouse and to the left of the main entrance to the reservation.

The present system of parking on the west slope of Hot Springs Mountain could be greatly and profitably augmented by extension to the summit and the rugged beauty of this portion of the reservation greatly enhanced. The present system for sprinkling could be extended along with this work.

In connection with the item last mentioned, and in order that more time and labor could be devoted to the work embraced therein, Whittington Lake Park, on account of its inaccessibility to the majority of visitors, should be ceded to the city of Hot Springs for a municipal park, being at present largely used by residents in that portion of the city, or the park should be cut up into city lots and sold. If this is not done, however, a new iron fence should be erected around the park, and the bed of the creek running through it protected by a concrete bottom and sides where necessary.

Concrete bridges, similar to those recently constructed on Hot Springs Mountain, should be built at certain points on West Mountain.

Considering the relatively small size of the Hot Springs Reservation as compared with our other national parks, the work outlined above should be easily accomplished, and I am sure that it merits the very best and most earnest efforts of the department.

Approximately \$750,000 has been expended in the construction of new bathhouses in Hot Springs during the past four years, and at least half of this amount has been spent in the past two years, and I think we can safely say that we have as fine, if not the finest, bathhouses in the world. The last one completed and opened on the first day of this month cost \$200,000.

Recently conclusions have been reached by the department relative to the Superior Bathhouse site, and negotiations are under way for the replacing of this bathhouse with a new and modern structure. There yet remain four of the old frame bathhouses on the reservation front, but the leases on three of these have expired some time ago and the lease on the fourth will expire at the end of next year. It is only a question of a very short time until all of these will be replaced with modern fireproof structures of ornamental design, and when they shall have been completed I sincerely believe Bathhouse Row, with its beautiful lawn and flowers in front and the magnificent and stately Hot Springs Mountain Park for a background, will be one of the most attractive show places in America.

There are 20 bathhouses now receiving hot water from the reservation, and with their recently increased facilities it is probable they can accommodate comfortably 25 per cent more bathers than bathed during the past year. The highest degree of sanitation and ventilation has been required by the Government in all houses recently constructed, and this policy should be maintained with reference to bathhouses yet to be constructed.

The nefarious practice of drumming patients to doctors was started in Hot Springs some 40 years ago, when visitors were forced to reach this resort by means of the old-fashioned wild western stage-coach, the same as those which were in common use in California in early days. The drummers in those days would ride out 10 miles or more on horseback and meet the stages coming in and solicit the passengers to the different hotels and later to some doctor who would split his fee half in two with the drummer.

During the past 10 years the department has promulgated rules and regulations setting forth conditions under which registered physicians may prescribe the baths, which if followed to the letter would eliminate the practice of drumming, but this office has experienced much difficulty in getting evidence sufficiently strong in character, as viewed by the department, to justify the removal of any of the doctors' names from the registered list for some time past.

When evidence of drumming is taken by the superintendent against any doctor the same is submitted to the Federal registration board who in turn reviews it and transmits it to the department together with such recommendation as in its judgment the case may warrant. The Federal registration board is composed of three members appointed by the Secretary of the Interior, the present members being Drs. Charles Dake, L. R. Ellis, and J. L. Greene, all local physicians of high standing.

Even though the desired results have not been attained with regard to drumming, the constant investigations being made by this office have deterred this practice to a great extent and it is safe to say that conditions have been much improved during the past two years. Drumming as it exists now is usually consummated through a "confidence game," that is to say, the visitor will be approached by some person shortly after his arrival at the boarding house, who secures the confidence of the visitor, perhaps by telling him that he had the same trouble himself when he came here. The strange visitor will almost invariably ask who his doctor is and usually employ him, thereby drumming himself. The proprietor of the boarding house is the person who receives the split from the doctor. However, vigilance by this office has reduced drumming to such an extent that it is now confined to a very few doctors.

The department has during the past caused investigation to be made as to the chemical contents of these waters, but the physiological action has never been scientifically determined with reference to the effect of the baths on either the sick or the healthy subject.

The baths have been given empirically for such ailments as they seemed to benefit, much as patent medicines are used. Being owned and controlled by the United States Government, a scientific investigation should be made, giving as accurately as possible the physiological and therapeutic effects of the waters of the Hot Springs of Arkansas. No such authoritative information officially exists, and therefore the physician in another State who may have thought of sending patients to Hot Springs does not do so. He would be prescribing an unknown agency. He would not think of prescribing a drug whose effects had not been proven and described physiologically. So the large majority of the physicians of the entire country smile knowingly when a patient speaks of going to Hot Springs and ask why hot water is not just as good at home, hot water being hot water the world over.

Suitable investigation by the department, reported as authentic by the department, would change this attitude, for hot water is not hot water everywhere the same.

The fact is that patients rarely get a really hot bath at Hot Springs—at least, a bath above the normal temperature of the blood. They can get them as hot as can be borne, but the average temperature at which the baths are prescribed at that place is 98° F.

What then is the effect of this water? Let me first call your attention to the effect of a hot bath of the ordinary kind taken anywhere else. You may place a healthy person in a tub of ordinary hot water, as hot as he can get into it, say at 107° F., and after he has been there with the temperature maintained as high as can be borne for 20 minutes, you will notice that his sublingual temperature is unchanged or very slightly so. The skin may be hotter, but the heat-governing centers have seen to it that the conducted heat has been cared for; there has been no increase in general cell activity and usually no increase in the pulse rate after the first shock of getting into the very hot water.

It is necessarily true that the body temperature is the same on the Fourth of July and on Christmas. The thermolytic center, if working, prevents the absorption of conducted heat; if that center is not working properly a sunstroke follows exposure to heat. This rule never varies for warm-blooded animals in good health.

On the other hand, you may place a person in good health in a bath of Hot Springs water even at a temperature lower than his normal temperature, and you will see a remarkable change. The subject with a normal temperature of 98½° F., lying in a cooler

medium than his own blood, will experience an increase in temperature. Usually in 10 minutes the thermometer under the tongue will show a temperature of 100° F., in 12 to 15 minutes, 101° F., and the subject's temperature is known to have gone much higher. Taking the water internally adds to the rapidity of the reaction. If the water is very active it is not necessary to immerse the entire body in order to get the reaction. If only the feet are kept in the water the subject's temperature will go up, though more slowly, as might be expected.

Where does this heat come from? Certainly not from the water, as it is colder than the subject's blood. At the same time the pulse rate is correspondingly increased 30 or 40 or even 50 beats per minute, depending upon the individual's peculiar heart action. If the heart action is very excitable from any organic or functional cause, sudden syncope is sometimes observed.

When removed from the bath the subject sweats profusely, as he should do when sweating off a fever, and in about 40 minutes his temperature is about normal, the pulse running a little higher than normal for a longer period, depending on individual idiosyncrasy. The period of increased cell activity, also the duration of the sweat and extent of elimination, may be prolonged by a few minutes in the vapor or hot room, or both.

Where does this increase in body temperature come from? Evidently some quality of the water has started a general increase in cell activity throughout the subject's body. The blood cells work faster; the cells of the bone marrow become more active; the cells of every organ must feel the stimulus; the muscle cells give up waste products as after severe exercise, and this general increased metabolism causes a corresponding rise in the body temperature. Something has "started the pot to boiling," as it were, in that subject, and he furnishes the heat himself for this increase in temperature.

The good of the tub bath at Hot Springs is due to this increased metabolism, with the subsequent elimination and reconstruction, and the increase in cell activity is directly measurable by the increase in body temperature.

The results of this increased metabolism are two-fold—eliminative and constructive. The elimination through the skin is shown by the sweating and by the uric-acid eczema which occurs in certain cases from the early baths, to disappear after a number of baths have given sufficient elimination.

The elimination through the kidneys is proven by the high specific gravity of the urine, 1,030 or more, seen in nearly all cases after a few baths even when the water lost in sweating is compensated for by increased ingestion and even when the urine is kept at or above the normal quantity.

The elimination is also shown, contradictory as it may seem at first glance, by the constipation following the baths. The constipation is due to lack of bile, the so-called natural purgative of the bowels, and the lack of bile is due to the liver cells being crowded with effete material in the process of elimination. The constipation follows the baths whether the hot water is drunk or not. Mild saline purgatives usually suffice to overcome it, though occasionally recourse must be had to classical "liver medicines."

The constructive metabolism following the baths is shown most typical in chronic malaria, where exists anemia, hemaglobinæmia, and a balky condition of the hematopoietic system. After a few baths the picture changes and there can be no doubt that the change is due not so much to elimination as to hematogenesis through increased activity of the cellular elements of the blood, bone marrow, spleen, etc.

The question for years has been, "How does the water cure?" or in other words, "How is the physiological effect produced?"

No drug or chemical known to science will, if taken into the system, cause such an increase in cell activity, and it naturally follows that the repeated chemical analyses of the waters throw no light on the subject. Thinking observers long since came to the conclusion that such an effect must be due to a force and not to a chemical substance, and electricity or some electrical condition of the water was often suggested as the source of its power. But this explanation failed to gain credence because no known application of electricity would produce such an effect.

Since the discovery of the X ray and later of radium and radioactivity of substances brought in contact with the salts of radium, a good working theory has been brought out to account for the physiological effect of the Hot Springs baths.

First, it was found by observers that incidental to the application of the X ray, especially if in small dosage and at comparatively long distances and long duration, a distinct increase in metabolism, followed by increased elimination, occurred, so much so that its use was contraindicated in chronic kidney disease at certain stages. Later it appeared that radioactive substances had a similar effect. And it was found by Profs. Boltwood and Pratt, of New Haven, making tests of this water for the department, that the waters on the Hot Springs Reservation are all radioactive to a marked degree and that this radioactivity is due to the presence of a radioactive gas.

I wish again to call attention to the fact that physicians all over the country are under the impression that these are merely hot baths. They deter, in all honesty, patients from going to Hot Springs, declaring that hot water is hot water anywhere and advising the patient to take hot baths at home. I wish also to emphasize the fact that

while this water comes out hot, and would not remain radioactive if it came out cold and had to be heated, as it would then lose the gas in which resides the radioactivity, still that water being hot is merely incidental, and that the baths are not given very hot and that the water is just as effective at a lower temperature as at a higher, if not all dead water from the exposed cooling tank.

The increase in metabolism is not the only physiological effect of a Hot Springs bath. There also occurs a marked fall in the blood pressure. This fall is fully equal to that obtained by the high-frequency D'Arsonval current used with the autocondensation pad. It will average 20 millimeters of mercury in normal individuals and a 50-millimeter fall has been noted during one 20-minute bath in one case of very high blood pressure. This fact is not known officially, and before the present war began thousands of Americans went to Nauheim for treatment for high-blood pressure, leaving a more efficacious resort at home.

There is also a rise in the opsonic index in patients suffering from most diseases, tuberculosis and cancer being notable exceptions, as the increased cell activity in those diseases means increased destruction and waste. In cases of chronic malaria we have a most marked rise in the opsonic index, meaning the ability of the white blood cells to destroy disease germs.

To cure a disease of bacterial origin we must give immunity, and in no other way can health be restored, and the question arises, How can be the radioactive baths give immunity? Increased cell activity is probably the answer. The method of this brings up for our consideration the effect of forces upon all cell life, and brings to mind many things analogous but not directly bearing upon the subject. The house plant, pale and white and stunted, an example of sluggish cell action, becomes, when put out in the sunlight, the acme of cell activity. There are certain rays we may say which are necessary to the growth, health, and good color to plant life, an example of the effect of a force upon cell action.

In considering the physiological effect of any crude drug due attention is paid to the quality of the various specimens of the product. Now, it must be admitted that as used the Hot Springs baths are crude, and, as might be expected, the results vary at the different bathhouses. The radioactivity of the water depends, according to Boltwood and Pratt, who made the first department tests, upon the presence of a radioactive gas. This gas is, of course, lost to some extent by exposure of the water in the cooling tanks which each bathhouse provides, as there must be a tank of cool water with which to temper the bath, the hot water being delivered to the bathhouse at a temperature of from 135° F. up.

This variation of results at the different houses, even when supplied with water from the same reservoir, is not due to any change in the water as it emerges from the earth, but, as before stated, to the duration of the exposure in the primary reservoir and to the age of the water in the cold tank at the individual bathhouse. Bathhouses with very large cooling tanks would be expected to have a slow bath, the larger bulk of water cooling more slowly would be longer exposed and become more inactive and would probably also be delivered at the tub even warmer than from a smaller cooling tank, thus requiring more of the inactive water to cool the bath and a greater dilution of the fresh active water from the hot side. The results could be made more uniform if the primary reservoirs were made as small as possible to still serve their purpose and if the cooling tanks were done away with and the water on the cold side of the tub faucet delivered through a refrigerating coil.

There are adjuncts to the baths at Hot Springs—the vapor bath, the hot room, the needle bath, and shower—which may be used, as at other places, to meet some of the indications of hydrotherapy or thermotherapy, but none of these are peculiar to the place, and in the tub only is seen the true Hot Springs effect.

We have summed up crudely what we know about the physiological effects of the Hot Springs baths—they increase metabolism, raise the body temperature, accelerate the circulation, increase elimination, lower the blood pressure, and raise the opsonic index by increasing the activity of the phagocytes, and also have the usual hydrotherapeutic and thermic effects of other hot water.

How valuable it would be if we had an authoritative presentation of the therapeutic effects of these hot baths—their effect on the sick. Thousands of sick people need Hot Springs baths, and there is no one to tell them so, while, on the other hand, hundreds go to Hot Springs who can not be helped by the baths and many who can be harmed by them. Consumption and cancer have been mentioned as contraindicating the baths. Any disease in the fever stage is also contraindicated. Organic heart disease is supposed to be a contraindication, but in certain forms of valvular troubles the baths are very beneficial. These facts should be known. Other patients who have taken a lifetime to acquire gout or arteriosclerosis or chronic joint conditions go to Hot Springs expecting to get as good results in three weeks as a case of subacute rheumatism, when they should be told before leaving home that they can only get results in months, not weeks. The baths are wonderful enough and have a very wide scope of usefulness; they can kill your taste for liquor, cure chronic malaria, promote fecundity in the female, do beautiful work in subacute rheumatism, good but slower work in neuritis, give help in arterio-

sclerosis, eliminate uric acid to some extent, and aid all forms of lowered metabolism, and then some other things; but the public needs definite information. A few years ago a bill was introduced in the House of Representatives to appropriate \$100,000 for the expense of a commission which was to take two years in which to investigate the physiological and therapeutic effects of these waters. It is to be regretted that the bill did not pass. Such an investigation would secure data for publication which would enable any physician in the world who chooses to inform himself what patients to send to Hot Springs and which to keep at home.

MR. DANIELS.

I was rather skeptical of Arkansas Hot Springs until I visited there. I have seen people who have gone to Arkansas in wheeled chairs, crippled and distorted with rheumatism, and I have seen them shortly afterwards, after taking the treatment of the baths, run at a pretty good speed and catch a train. Hundreds of people who have taken the course of baths at Arkansas Hot Springs annually have been greatly benefited, and there is absolutely no question of the efficacy of these waters in certain cases. I believe that Dr. Parks's paper brings out a point that is very, very important, that of classifying the diseases and illnesses that would be remedied by the waters of the Arkansas Hot Springs.

If we ever hope to get any appropriation necessary to defray such expense we can only do it by the backing of a sufficient number of people who will urge the matter before the Committee on Appropriations in Washington.

We have another park in which there are medicinal waters, and during my visit there I met some 60 or 70 people. This was at Sulphur, in Oklahoma, and Col. Sneed, who is superintendent of that park, suggested that I ask these visitors who were congregated in a room at the hotel why they came to Sulphur, Okla. I found that out of the sixty and odd that there were only eight who had not come there either to die or with the hope possibly of getting well. I never saw a huskier crowd of men in my life. The medicinal qualities of the Platt National Park springs have not been published and there are not many people in the country that know about them, but Col. Sneed is here, and I believe he has a little paper or at least can give us a little talk on the subject. Have you anything you can give us, Colonel?

COL. SNEED.

Ladies and gentlemen, my trip since I left Platt Park has been a wonderfully pleasant one and a liberal education. I have enjoyed the different talks and papers that have been read before this con-

ference. I have learned something about our national parks that I never dreamed of before.

Platt National Park, at Sulphur, in Murray County, Okla., meets many conditions of national character. The waters are varied and bounteous. The landscape is characterized by a conglomerate rock formation of rare occurrence and immense masses of late Travertine formation.

Historically Platt Park is a monument to the amicable relations which the Indians of the Five Civilized Tribes maintain with the white people among them.

Provision for the segregation of the area included in Platt National Park was first made in the agreement between the Federal Government and the Indians of the Choctaw and Chickasaw Nations for the allotment in severalty of the lands which these tribes had held jointly and in common. This agreement was a voluntary concession by the Indians of this tract for public uses, in which the white people of their country might share. The agreement was submitted by act of Congress of July 1, 1902, to a vote of the Indian tribes and was ratified by them on September 25, 1902. The original area was 629.33 acres. An additional 218.89 acres was granted by act of Congress of April 21, 1904. The original designation of "The Sulphur Springs Reservation" was changed to "Platt National Park" by joint resolution of Congress of June 29, 1906, in commemoration of Senator Orville H. Platt, of Connecticut, who had interested himself greatly in its establishment.

The Sulphur Springs of Platt National Park have been a favorite resort for the Indians since their migration westward, and their old Council Rock is a notable feature of the park.

There is not a shadow of race antipathy between the white people of Oklahoma and the Indians of the Five Civilized Tribes. These Indians are excellent people, intelligent, manly, and independent, and are frequent visitors to the park. The Platt Park congressional district until recently was represented by one of these Indians, and another one now is United States Senator from Oklahoma. The retiring governor of Oklahoma, who is a Kentucky gentleman of the best type, is an intermarried citizen of the Choctaw Nation.

Within the Platt Park are many mineral and three nonmineral springs. The waters are highly medicinal, especially the outflow of the Bromide and Medicine Springs, which are in constant demand for nervous affections and disorders of the stomach. Extreme care is required in the conservation of the Bromide and Medicine waters, but the flow from the other springs is abundant. The Antelope and Buffalo Springs, which are nonmineral, approximate a discharge of 5,000,000 gallons daily, although once in the history of the park and

once before in the memory of the old Indians the flow entirely ceased for a short period. These springs are the head of Travertine Creek, which is fed continuously along its course from other springs hidden in the bed of the creek. It would be possible to develop several of these springs into distinctive features. Medicine Spring and Cold Spring have been developed in this way since the park was established.

The elevation above sea level at the Bromide Spring is 929 feet, at Antelope it is 1,080 feet, and at Buffalo Springs it is 1,078 feet. Travertine Creek courses $2\frac{1}{2}$ miles wholly within the park from its head springs to Rock Creek, and in the immediate vicinity of its mouth are the principal sulphur springs. It is a beautiful brook walled with and flowing over travertine rocks and bordered by narrow vales heavily timbered with native trees. It has a fall of approximately 150 feet and does not overflow its banks. More than a dozen cascades and as many shining pools have been deemed worthy of particular designation, and have been photographed by thousands of visitors.

Rock Creek is much larger than Travertine, and is subject to periodical overflows. Until the numerous flowing wells in the city of Sulphur were developed Rock Creek did not flow steadily above the mouth of Travertine Creek. There are now 20 of these flowing wells which show no sign of abatement after six years, and the flow of the springs does not seem to be affected by them. All but one of these wells within the city limits are now capped, but three outside of the city are flowing without restraint. It is hoped the State authorities will assist in regulating them also.

The general altitude of the Platt National Park is about 1,000 feet above sea level, but it has several hills which rise 200 feet and more higher. One of these hills, from beneath which Bromide and Medicine Springs emerge, faces Rock Creek with a towering wooded bluff about 250 feet high. Alongside this bluff, about midway of its face, a trail has been hewn which looks out to the north across a broad, rolling prairie. This trail was one of the earliest improvements made in the park, and it continues to be one of the most popular.

In the beginning of the park its resources were principally applied to developing and protecting the sources of water supply and making roadways for public travel.

During the administration of the second superintendent about 40 young trees were planted. One half of them had died by May 1, 1909, and but few of them are now living. During the next administration 178 young trees, including elm, oak, walnut, pecan, and box elder, were planted and about one-fourth of them are now living. Already during this administration, which began February 14, 1914,

180 young trees have been planted and all of them are in thrifty condition.

From July 1, 1913, until October 25, 1913, Platt Park was without an appropriation for maintenance, but out of the previous year's appropriations the four superintendents had laid out, graded, and macadamized 1,525 linear feet of new driveway along Travertine Creek, with six culverts, and on June 30, 1914, there was a total of 10,337½ linear feet of similarly macadamized driveways and 25,062 linear feet of other graded roads. At the end of the new macadam road along Travertine Creek a new spring of pure water was developed and improved, and designated "Cold Spring." About 50 acres of wooded dell adjacent to Cold Spring were cleared of underbrush and a picnic ground established with benches and tables for the accommodation of picnic parties. Forty-eight new benches were placed elsewhere in the park, and the work of eradicating the Canadian thistle was prosecuted vigorously. All general work toward the maintenance and improvement of the park was suspended after June 30, 1913, until a new superintendent was appointed in February, 1914, but in the meantime a sanitary sewer was constructed by contract under the direction of Mr. E. A. Keys as supervising engineer, at a total cost of \$20,238.13, which was paid for jointly by the Federal Government and the city of Sulphur. The total length of the main line of this sewer through the park is 7,900 feet, and it has four branch lines aggregating 4,700 feet in length. The main line crosses Rock Creek by means of a siphon which involved serious engineering problems, but which is a pronounced success. One of the branch lines has a siphon across Travertine Creek to reach the administration buildings of the park. This sewer will accommodate a population of 16,000 persons.

After the completion of this sewer, Mr. Keys and his assistant, Mr. R. R. Hornor, upon the request and recommendation of the present superintendent, remained for several weeks and completed an extension of the macadamized driveway along Travertine Creek for a distance of 11,715 feet from Cold Spring to the head of the creek, including a loop which encircles the Buffalo Springs. This extension cost \$3,483.99 from the park appropriation for that current year, and the completed road is 13,240 feet in length. It has 26 cement culverts. The grade between ditches is 18 feet wide, and the macadamized surface is 14 feet wide with 6 inches of gravel. The road material is found in the park and is of excellent quality and when placed upon the roadbeds becomes cemented and solid. It has been pronounced by expert engineers as the best for road-making purposes. The driveway follows closely the windings of Travertine Creek and crosses it frequently. It is well shaded through the summer for the whole distance and the pleasing prospect and sooth-

ing sound of the running water in the shaded dells which it traverses are very restful and attractive to the wearied visitors who frequent it.

No attempt has been made to alter the rustic features of Travertine Creek, but the willow growth in Rock Creek had become so dense that the beauty of that watercourse was obscured, and much of that growth was cut away in the spring of 1914. No other permanent improvements were made in the past two years, but maintenance work has been carefully kept up, and 48 additional benches for visitors were added this year for use in the several parks, and the little fields of alfalfa have been carefully conserved. All of the spring houses and pavilions in the park and the superintendent's residence were repainted and the residence renovated. Much attention has been given to the propagation of such rare plants as were available, and some of the flower gardens are very attractive. Red, white, and Japan clover has been started at various places, and it is hoped to demonstrate the utility of these grasses in future plans for the park. A total of \$242.81 was realized from the surplus crop grown in the park in 1913. The surplus hay crop of 1914 is not yet all sold. For the present year the pasturage on certain undeveloped areas has been contracted, with the approval of the Secretary of the Interior, for an additional \$120 rental.

The birds and wild flowers of the Platt National Park deserve the attention of every visitor and of the department. Every month during the spring, summer, and autumn brings a distinct variety of blooms. One student has identified 52 species, and the classification of countless others has not been determined. Another student reports that in the month of January, 1914, he had recognized 30 distinct varieties of birds, some of which he had never seen listed so far north at that season, and one, the painted bunting, which is very rare in this section of the country. The mocking bird is at home in the Platt Park the year round, and during the breeding season sings all through the night. Quail, plover, and squirrels are especially protected and are very numerous and, with the blue jays, are almost domesticated, as are also the cardinals.

The winter climate of Platt Park is mild, the district is free from malaria, and all the year round the park has its quota of seekers after health and recreation. A record of visitors to the Bromide Spring is constantly maintained and shows a daily attendance ranging from less than 50 on some days to over 2,000 on others. The whole number of visitors to the park during 1914 probably exceeded 30,000. At any rate, the attendance is greater than to any other national park except Hot Springs Reservation. This is uniformly true despite the fact that there are no amusement features of any kind at or near the park, which is very much deplored and detracts from the popularity that this beauty spot should enjoy. It is patronized wholly

for health and rest and recreation, and it is the only spot in Oklahoma, Texas, or Kansas designated or especially suited for such joint use. Turnstile registers at all pathways entering the park have been suggested and ought to be installed. The wagon roads through the park are regularly used for local travel, and it would be difficult to register visitors by automobiles and carriages.

The discipline of the park has never been a serious problem, and the general character of the visitors is well shown by the fact that no rangers or other character of police supervision is maintained by the present administration, and none is necessary. Visitors are not permitted in the park after 11 p. m., nor on the trails after sundown. Fishing with hook and line is permitted, except during the legally closed season, and both Rock Creek and Travertine Creek are well adapted to bass and trout, although no effort has been made to stock them.

Platt Park is conveniently accessible to a well-developed agricultural country which is rapidly growing, and it can readily and easily be made self-sustaining. Its medicinal springs are almost useless without bathhouses and hospital accommodations. Its streams of running water might easily be converted into fish preserves, swimming pools, and boating courses. Rock Creek from the mouth of Travertine Creek to the park limits, about 1 mile of distance, has a fall of $19\frac{1}{2}$ feet and has good banks. Excellent grounds are available for golf courses, and Oklahoma is badly in need of an athletic field and stadium for scholastic meets and similar gatherings, and tourists by auto are more and more frequent every year. Licenses for summer cottages would find ready sale at a good ground rent. A public camp ground away from the city is now provided and is well patronized, but no public conveniences of any kind are provided for such visitors. Another camp ground accessible to up-town conveniences has become a necessity for a great many people who want to spend their summers in the open and do not want to be burdened with housekeeping cares. Frequent applications have been made to license amusement pavilions in the park, and new and ample pavilions are badly needed at the principal springs, and such pavilions would afford opportunities for the sale of concessions.

The problem most perplexing in the administration of Platt Park is to conserve its mineral waters and bring them into more general use. The nature and properties of these waters have been carefully studied and are well understood, but their origin and extent have not been scientifically studied. No survey of the underground waters has been undertaken. None of the wells in the vicinity flow above the thousand-foot level, and the Mystic Cave, about 8 miles distant from the park, gives access to an underground river of considerable volume which flows at about the same level. About 30

miles distant to the north, the south, and the west are natural gas fields of considerable extent. Exposure to the air soon deprives the sulphur water of all indications of mineral character and it is frequently suggested that natural gas is the characteristic of these waters. Several wells in the immediate vicinity have shown some gas in strata near sea level.

The conglomerate rock with its associate standstones are the only rock measures in Platt Park, except the late travertine deposits. Together the conglomerate and travertine rocks form the most pleasing features of the landscape, and the conglomerate is particularly puzzling. Loads of it have been transported for landscape embellishment, and competent engineers have pronounced it an exceedingly rare formation. It is several hundred feet thick and is persistent throughout the park. It is necessary to blast holes for tree planting to get satisfactory results where it lies near the surface. The Bromide Bluff and the Council Rock are the most notable occurrences of the conglomerate.

Platt Park is not in the arid belt and its natural vegetation is luxuriant, but the climate is subject to extended droughts and it would add enormously to the natural advantages if a system of irrigation was adopted for the available areas, which are extensive. With such assistance admirable effects could be secured in floriculture, horticulture, and arboriculture. An effort to propagate the Eucalyptus tree in that region would be particularly desirable. All flowers, shrubs, and trees of the Temperate Zone are indigenous to the soil in Platt Park. Excellent opportunities are also available for the preservation of rare animals, and the establishment of a bird refuge would be a charming feature and ought not involve much expense.

The superintendent and supervisors of all of the parks ought to have the counsel and cooperation of a competent engineer and expert landscape gardener. If all the superintendents and supervisors were supervised by the same counsel the work could be correlated and some degree of unity maintained in the national system. Platt Park particularly shows the effect of constant changes in plans for its development. When our national parks are reduced to a system and brought into immediate relation one to another it will be easier to make their advantages known and bring the public to appreciate them as they deserve. Then, and not until then, will Americans appreciate the natural beauties and advantages of our own country.

Platt Park is accessible to the main lines of the St. Louis and San Francisco and the Atchison, Topeka & Santa Fe Railroads by branch lines, which are so operated as to meet all main-line trains, and an interstate highway from Wichita, Kans., 225 miles north, to Dallas, Tex., 115 miles south, passing through Platt Park, has been carefully logged and provided for. The section through Murray County is

now practically completed. Another highway connecting the Hot Springs Reservation, Platt Park, and the Fort Sill Reservation and Forest Reserve has been suggested as an experiment in national highways, and would certainly be justified. There is enough local interest along that route to assure adequate cooperation. Platt Park is about 75 miles due east of Fort Sill and about 225 miles due west of Hot Springs. The Indian base line passes through Platt Park and Hot Springs and 6 miles south of Fort Sill.

The policy of the present administration to exploit the move to "see America first" is a step in the right direction, and should be commended by the American public to the extent that they will make it their duty as well as their pleasure to assist in this patriotic movement.

MR. DANIELS.

In North Dakota we have a national park which has neither an appropriation or revenues. This park is under the supervision of the superintendent of the Fort Totten Indian School, Mr. Charles M. Ziebach, who will tell us something about the Sullys Hill Park.

MR. CHARLES M. ZIEBACH.

The Sullys Hill Park was set aside by Executive proclamation dated June 2, 1904, under the act approved April 27, 1904 (33 Stat., 319). The park comprises about 960 acres of rough and hilly land bordering on the south shore of Devils Lake, N. Dak., and has about 2 miles of shore line. The western border of the park is about 1 mile east of the Fort Totten School. The tract is well wooded and has an abundant supply of fresh water from numerous springs which feed a small lake in the southwestern part of the reserve, known as Sweet Water Lake. There are numerous shade trees around this lake in which the undergrowth has been grubbed out and provides an ideal picnicking ground. Nearly all of the people who visit this park during the year provide themselves with a basket lunch, which is eaten at this place.

The park for the most part is still in its original state, as no appropriation has ever been made for the improvement of the park, and no improvements have been made other than cutting out a few trails through the timber for roads and clearing up a place around Sweet Water Lake for picnic grounds. Nothing, as yet, has been done toward making permanent roads or otherwise beautifying the grounds. The natural beauties of the park and its popularity as a picnic ground have drawn an aggregate of about 2,000 people to the place for a short time. A very small portion of these people has spent a single night there, and none, so far as is known, has camped in the park for a longer time.

An appropriation was made by Congress in the year 1914 of \$5,000 for the establishment and maintenance of a game preserve in this park, and more particularly to fence the tract and provide corrals, etc., for this purpose. Bids for a contract to fence the park were opened in the office of the Secretary of Agriculture on February 2, 1915, but I am advised by the honorable Secretary of the Interior, in his letter of February 24, that no contract for the construction of the fence has yet been awarded, as the lowest bid received was considerably in excess of the appropriation made by Congress.

There should be some permanent roads built in this park, so as to make it more accessible to the public, as there are many people who would visit the park who do not otherwise on account of there being no easy access by automobile. A dock should be built on the lake shore so that launches could draw up to it for a landing, as Devils Lake is provided with several good gasoline launches and a number of sailboats, the latter of which are owned by a boat and yacht club of the city of Devils Lake and the former by private individuals, some of which are used exclusively for passenger purposes. The only manner of landing on the shore of the park is by rowboat, from the larger craft.

The beach at the foot of the large hill within the park, from which the park derives its name, offers one of the best bathing places on Devils Lake. Some bathhouses should be built and other minor improvements of this character made. It is anticipated that if a game preserve is provided within the park a caretaker will be employed and a residence provided for him. If none is provided from this source, one should be employed and suitable residence provided for him.

The track of land lying east of the park, consisting of the remainder of section 10 and the north half of section 15, not already within the boundaries of the park, the north half of section 14 and the balance of section 11 bordering on the shore of Devils Lake, comprising 765.54 acres, should be purchased so as to enlarge the park. I believe that this land could be purchased at about \$7 per acre.

An appropriation of about \$10,000 would improve this park so that it would be of easy access to the public, and would make it one of the most noted resorts in the State of North Dakota.

MR. DANIELS.

In addition to the beauty spring, which brings out a divine complexion, there is the sulphur spring, which aids digestion to such an extent that it is almost impossible to find anybody in the town of Sulphur who has bad digestion. Then there is the bromide spring, which is a sleep producer equal to Jack Johnson's right hook.

Prior to my last visit to Platt National Park in my ardent pursuit of official duties, after having been interrupted by smallpox, which I contracted on my way from one of the parks, I contracted an attack of a form of insomnia which stayed with me for some time. I had been suffering from that for about 10 days before I reached Sulphur. Col. Sneed suggested that I drink several gallons of that bromide water, but I thought that if there was any efficacy in that bromide water, I could get it out of a quart. I took it skeptically and at Col. Sneed's urgent request, but I had not the slightest idea that there would be any beneficial results. When I retired that evening I did so anticipating no results, and with the thought that I would occupy the night figuring out how long it would take me to get to the next place, where I would be called upon by some of the department heads to answer questions that no answers could be given to. I was surprised when I awoke nine hours later and found that it was considerably after breakfast time. I am convinced now that that good night's sleep was produced in me by the bromide water in Platt Park.

Mr. Acker probably is the man who knows more about the secret thought and nefarious schemes of supervisors and superintendents than any one man in the service. I believe he is the oldest man connected with the park service. I believe, I should say, that he has been connected with the park service longer than any other man, but at that he is older than he looks. Administrations may come and administrations may go, but Acker stays on forever, or at least I hope that he does. I will ask Mr. Acker to tell you all he can about the relation between the Federal and State jurisdiction in the parks without telling you any of the secrets that must be kept back.

MR. W. B. ACKER.

Mr. Chairman, ladies, and gentlemen, I will not detain you very long. What I have to talk about is considered rather dry material and it is probably old to most of you. I see some new park superintendents here, however, and what I have to say may be of interest to them.

Congress in 1872 first inaugurated the policy of establishing national parks for the benefit of the people generally and preserving in these reservations the wonders of nature. The first park created was that of Yellowstone, in Wyoming and Montana. The act providing for the creation of this park authorized the Secretary of the Interior to promulgate rules and regulations for the government of the park, as well as for the leasing of lands and granting privileges of various kinds, but this act made no provision for the enforcement of the regulations in the courts, the only penalty for violating same being

ejection from the park. The park was administered by civilian superintendents under the regulations promulgated by the Secretary of the Interior up to and including 1883, when Congress inaugurated a new policy by removing the civil authorities in the park and substituting for them troops detailed by the Secretary of War for protective purposes. The troops have been continued in that reservation for protective purposes up to the present time.

At the time of the admission of the State of Wyoming into the Union in 1890, the United States reserved exclusive jurisdiction over the lands embraced in Yellowstone National Park. It failed, however, to provide any law which could be enforced in regard to the handling of the people generally in that reservation, the protection of the wonders therein, and particularly in reference to the conservation of private rights. There were Federal laws that provided for the punishment of persons charged with larceny, murder, etc., and those were enforced. The administrative difficulties in the park, owing to a lack of proper laws for its government, continued up to May 7, 1894, when Congress passed an act for the protection of birds and animals in the Yellowstone Park, and to punish crimes in that reservation, and for other purposes. This act prohibited the killing, wounding, or capturing of birds and wild animals in the park and provided for violations of the regulations for the government of the park. It designated such offenses as misdemeanors and subjected the person offending to a fine of not more than \$1,000, or imprisonment of not more than two years, or both, as well as to pay the cost of all proceedings. That act has been in force since 1894, has been successfully administered, and many convictions obtained thereunder. Congress evidently intended that offenses under this act should be dealt with as a misdemeanor to be tried and punished as such by the commissioner in the park. Since the act, however, authorized the punishing for not exceeding two years for offenses committed under it, they could not be regarded other than as crimes within the meaning of the Constitution of the United States to be prosecuted under indictment in the regular way. It was only in 1913 that this defect in the law, which had been known to the department for many years, was brought to the attention of the Department of Justice by the United States District Attorney in a case arising at that time, and he held that in all cases under this act proceedings thereunder should be had with the United States commissioner, who would merely act as a committing magistrate, the case being thence sent to the grand jury for consideration. As a result of this determination much hardship has been imposed upon the people who have been charged with misdemeanor under the act. For instance, a man going through the park with a child. The latter might stop and break off a piece of formation. That

would be a violation of the park regulations, and would be presented to the United States commissioner and the accused held over to the grand jury. Bail would have to be given. The accused in all likelihood would have to go home and then go to Cheyenne, Wyo., where the court meets, and be tried. Then in all probability he would be acquitted. The department has sought to remedy this condition of affairs by presenting the matter to Congress with recommendation for the park act to be amended so as to make the term of imprisonment prescribed thereunder not exceeding one year, instead of two years as at present. It is to be hoped that the necessary legislation will be enacted by Congress at an early date.

Between 1872 and 1915, thirteen national parks have been created, embracing probably, in round numbers, 4,700,000 acres of land. Each of these acts creating the parks was drafted practically along the lines of the Yellowstone Park act in so far as authorizing the Secretary of the Interior to prescribe rules and regulations is concerned. They differ from the act in relation to Yellowstone Park in certain minor particulars, for instance, in some cases they authorize the location of mining claims; in other cases they authorize the maintenance of restaurants; and in other cases provision is made for the elimination of patented lands within the metes and bounds of the park and the selection of other lands in lieu thereof. In all other respects, as far as regulations are concerned, they are practically the same. Some of these acts provided a penalty for the violation of any regulation provided therein. The majority of them, however, did not. Those regulations, of course, notwithstanding the penalty for violation thereof, could not be enforced in the courts of those States where exclusive jurisdiction had not been ceded by that particular State to the United States.

In 1893, I think it was, the Legislature of Arkansas ceded exclusive jurisdiction over a portion of the Hot Springs Reservation to the United States. The Government had long desired that legislation in order to protect people against the nefarious system of doctor drumming, which had grown to be a stench in the nostrils of the public generally, through the actions of physicians down there in performing fake operations and taking the money of the patient for claiming to do things which they did not do. Subsequently a bill was introduced in Congress accepting jurisdiction extending over that portion of the Hot Springs Reservation, on which the hot springs are located, and provided a penalty for the violation of the provisions thereof. This bill, while pending in Congress, raised the question as to whether or not a State was precluded from surrendering jurisdiction to the United States over any portion of its territory. The matter was discussed before a particular committee of Congress, and in view of the authorities brought to their attention it was concluded that

the State did have a right to cede jurisdiction to the United States, and accordingly the bill was reported on favorably by the committee and subsequently became a law. That was the second case in which the United States obtained exclusive jurisdiction over territory within a park; the Hot Springs Reservation is designated by law as a park.

In Sulphur, Okla., we have the Platt National Park to which reference has been made by the superintendent, Mr. Sneed, in his paper. At the time the statehood bill, the bill providing for the admission of Oklahoma as a State, was under consideration in Congress, the department, knowing that it had this reservation to administer and having had the experience in administering similar reservations in other parts of the country, suggested a paragraph in that bill reserving exclusive jurisdiction over Platt Park, and any other reservation that might thereafter be created by Congress within the State. That received favorable consideration and the bill became a law with that paragraph in it, so that at the present time we have Platt Park, where there is exclusive jurisdiction; Yellowstone National Park, where we have exclusive jurisdiction, except certain strips of land in Montana on the north and west of the park and on the west side of the park in Idaho. As to those small strips of land, the State laws still obtain over them and the regulations of the park would not be enforceable in the courts if any violations occurred in that territory.

In 1901 the Legislature of Washington ceded to the United States exclusive jurisdiction over Mount Rainier National Park, to become effective when the United States should assume jurisdiction over the reservation. A bill was prepared substantially along the lines of the bill in the Yellowstone and was introduced in Congress and referred to the department for report, and it was favorably reported upon. When it was before the committee the same question arose as was presented in the case of the Hot Springs Reservation. The matter of the constitutionality of the act was very thoroughly thrashed out, and the committee concluded to report favorably on the bill, principally upon the ground that the park was an instrumentality of the Government, over which the United States could accept and have exclusive jurisdiction and administer it exclusively. Unfortunately, that bill failed to become a law.

In 1911 the State of Montana ceded exclusive jurisdiction over the Glacier National Park. Bills were prepared along the lines of the Mount Rainier bill, but in a somewhat modified form, and received favorable consideration by Congress; and very recently that bill became a law, so the United States has exclusive jurisdiction over the Glacier National Park.

In January, 1915, the State of Oregon ceded exclusive jurisdiction over the Crater Lake National Park. The department has not had an opportunity to present that matter to Congress in the shape of a bill.

In California no important steps have been taken for the reason that there are very large areas of patented lands in those parks which it is desirable to eliminate as far as possible before securing exclusive jurisdiction.

This gives briefly and chronologically a history of the situation as regards the administration of national parks, and the enforcement of regulations therein to the present time. It is highly desirable from an administrative standpoint that the department secure exclusive jurisdiction from the other States in which the other parks are located, and steps will shortly be taken looking to that end. Many problems present themselves in the administration of these parks where they are under State laws which can not be solved except at great cost to the Government; they also cause great annoyance and much perplexity to the officers in the reservations to know what to do in particular cases and how to apply the proper remedy. I thank you.

MR. DANIELS.

It may be said that the department is now very arduously doing work trying to draft some sort of uniform regulations and laws which will bring the administration of all the parks under one system. It is to be hoped the work will be finished soon.

We are to have some discussions and talks by the concessioners, but it is my personal experience that no one afternoon is going to suffice to hear their troubles. I have therefore suggested to Secretary Mather that we devote a half or three-quarters of an hour this afternoon to that purpose. I would like to hear now from any of the concessioners in Yellowstone Park who may have any compliments to pay us, or other things to say to us. Have you anything to say about Yellowstone Park? Then we will take up Glacier National Park. Mr. Emory, is there anything regarding transportation problems you would like to take up for discussion here?

MR. EMORY.

There are 26 miles of road there on the Indian reservation, and there is no maintenance of it at all. We expect 30,000 people there this year to go over that road. There is nobody looking after that road. Those roads are in the Indian reservation.

MR. DANIELS.

What about the portions of the road that are within the park boundaries?

MR. EMORY.

They are all in most excellent shape. They are handled by Mr. Ralston, and kept up in fine shape. We have about 4 miles of road there that I do not believe we could handle three horse-drawn vehicles on. The automobiles can not go over it at all.

MR. DANIELS.

You feel, then, that some arrangement should be made for maintaining the roads in the Indian reservation?

MR. EMORY.

It is rather a joke for the park officials only to spend money on the Government roads inside of the boundaries. There are different points that people want to go and see, and they have no way of going to those points in case of bad weather. Somebody ought to look after them. Certainly the concessioners can not when you are held down by the Government in the charges you make for taking tourists across there.

MR. DANIELS.

If the concessioners operate on those roads, it would be wise for them to maintain them.

MR. EMORY.

Well, let me charge enough so I can afford to do it and I will gladly do it.

MR. DANIELS.

Would you like to make an application to raise your rates?

MR. EMORY.

I certainly would.

MR. DANIELS.

The Department of the Interior can not spend any money outside of the park area.

MR. EMORY.

That outside road is a very serious proposition. The Great Northern road has spent \$98,000 on that road.

MR. DANIELS.

I would suggest that you memorialize the Secretary of the Interior to see if some of the funds of the Indian Service could not be used for the maintenance of that road in the Indian reservation.

MR. EMORY.

That is all that confronts us up there—that condition.

MR. DANIELS.

I see Mr. Curry sitting patiently up there. What are your problems in Yosemite National Park, Mr. Curry?

MR. CURRY.

I think I will make some remarks in addition to what I made two or three years ago when we had a meeting in Yosemite Valley. I believe we need some hotels, and we ought to have better hotels also, but I want to begin with an answer to something that was said yesterday regarding hotels in national parks—that they should be handled under one management in the interest of the tourists. It was proposed that we go into a monopoly and put somebody in charge of each park and have all of the tourist business in one park done by one company or one person. I am very thoroughly against that proposition. If you want to put all of the hotels in a park under one company, I have no objection to that, but if you combine hotels and camps and private camps, I am bitterly opposed to it, and I believe that it is opposite to anything that is democratic in the American people. I have seen the effect of combining hotels and camps belonging to the same parties. I do not believe in it. I believe we should have camps that are made as good as people can make them, and the hotels should be just as good as hotel men are willing to make them. There is a cry all the time that we ought to have a four or five or six dollar a day hotel. The camp men do not care if there are a dozen such hotels in Yosemite Valley. I would not care if there were such hotels all through the national parks, but the trouble with such hotels is that they will not pay expenses.

An illustration was given of the service along the Santa Fe Railroad—the Harvey system—where they charge 75 cents per meal. I have eaten many of the Harvey meals, and I have got no complaint to make of them, but I say that two-thirds of the people who travel on the Santa Fe do not eat those meals, because they are too high in price for them. People all over this western country say that the price of the Santa Fe meals is too high. But the transportation interests are telling us that we want high-priced hotels. What we want are camps that are good. We have nothing to say about the hotels.

I am going to talk about our own park, the Yosemite Park. The reason we do not get business to Yosemite is on account of the high charges to get there. It is not due to the Southern Pacific Railroad,

nor to the Santa Fe, but it is due to the Yosemite Valley line. There was a good deal of talk here yesterday about the parks being run in the interests of the common people, and all of the people, and we can do that when we have these private camps as we have in Yosemite, public camps as we have in Yosemite, and we might have a good hotel there, too, if anybody will put up the money to run it. But when they talk about putting up money for good hotels and at the same time absorbing the camping interests, I say that is impossible.

Another thing, it is all right for the railroad companies to run a sleeper if they run also a chair car or a coach. The sleeper weighs three times as much as a coach, and it does not pay one-third of the revenue that the coach ordinarily pays. Let us put the cart before the horse and give publicity to our parks, and I believe we will treble and quadruple our attendance. I have been traveling throughout the State here for the last three or four months, and I believe we are going to have lots of people out here this season. We ought to have 50,000 people visiting Yosemite Valley. Publicity for our national parks is what we need, and then we will get the people out here.

What I would like to get is lower rates for trips to our parks. I do not believe any other park in our country has as exorbitant rates as we have to Yosemite. It is a side trip that costs too much. I want lower rates.

What we want in our parks are business men who will go into the business and stay in the business, and will be willing to put the last dollar they make into the business. I have just been on a visit down in Riverside, and there is a man there that puts \$10 into his business for every \$5 he gets out of it. If we had people here like that we would have people who would take up that work as their life's work, and they would be willing to put all of the money into it that they possibly could.

MR. DANIELS.

I do not think it was the intention of Mr. Ford Harvey to say that he believed in such a monopoly as you suggest. I think it was in his mind to consolidate the various different classes. I distinctly stated in my remarks yesterday that there should be three classes of service. Each of these three classes of service should be kept distinctly in its own class. I believe in competition, but I would rather see it between classes of service than between the same class of service. I do not think such a thing as the combination of hotels and camps could be tolerated. I do not believe Mr. Harvey even thought of that.

As to the publicity you speak of, the Secretary has entered into a campaign of publicity. He has not as yet actually entered into that campaign, but he is preparing to enter into one, and has secured the

services of one of the most prominent publishers in this country, who has been the editor of one of our greatest magazines, and whose name is known to us all. He is going to concentrate his time and energy particularly on disseminating information.

As to long-term leases, I am thoroughly convinced that we should have long-term leases. On Mr. Mather's arrival here we took up the question of long-term leases in the parks in general. We have now thrashed out a scheme which, I think, will be adopted, and which, if adopted, will be uniform in all of the parks. It is a plan of co-partnership between the Government and the concessioner, and will be arranged something like this: The concessioner will write off his office charges, his cost of maintenance, and his cost of operation and his depreciation items. Add 6 per cent to that, and what is over, if there is anything, will be shared between the concessioner and the Government, in some equitable proportion which will be determined at the drawing up of the contract. That makes the concessioner substantially a partner with the Government. It makes the concessioner interested and the Government interested. It ties together a mutual interest in a way that I think will solve many of our problems. By establishing that sort of a system we can use it uniformly throughout the parks. Then there will be no necessity of drafting a peculiar or unusual contract for each particular concessioner. We will eliminate the tremendous amount of detail that has to be followed now, and I think it will result in a better feeling all around. I see other concessioners here from the Yosemite. I would like to hear from them if they have anything they want to say.

MR. WEIGHTMAN.

Being familiar with the conditions where I am, near Glacier Park, I would like to enlighten you upon some matters. There is one road there that is about 2 miles in length. The material of the soil is of clay, and during the excessive rains the road becomes impassable. It is that road that Mr. Emory referred to. It is a stretch of road that is probably 3 miles in length right through the leaf mould. During the rainy season it gets very soft. If it is possible to secure any money from the department to fix up that road, it ought to be done.

MR. DANIELS.

Is that outside of the park?

MR. WEIGHTMAN.

Yes; I have no jurisdiction to fix it, and I know you have not; but I wanted to call that matter to your attention.

I would like to say a little in regard to the western entrance to Glacier National Park. I am one of the concessioners there, and did

some of the first work, as far as transportation is concerned, between Belton and Lake McDonald, a little short road, about 3 miles long. Originally that was the only entrance to what is now known as Glacier National Park. It is on the line of the Great Northern, and it is 60 miles from the eastern entrance. There is no wagon road between those two points, and before Mr. Hill came there the only entrance to that park was from Belton, a distance of about 3 miles. Fifteen years ago we had people there from all over the world, and the accommodations were very poor. I feel as though I am one of the ones that created the tourist travel into that park. Maj. Logan, our first superintendent, built the road there for about 2 miles, I think, a good macadam road, with crushed rock and everything of that kind. It was a very expensive piece of road. At that time Mr. Keyes made a survey from the top across the park, the top on the west side of the river to the park—the river is the dividing line. He made a survey there for a bridge to the park across the river from what we call Schneider Hill, which was a distance of about half a mile. The County Automobile Club and one thing and another spent \$17,000 to build an automobile road from Kalispell to Belton, 30 miles. From the top of the bridge it is in the neighborhood of one-quarter of a mile from the bridge to the top of this Schneider Hill. The county, when it got to the top of the grade, stopped working on that road and thought they would build a bridge. The Government thought the same thing and did not improve the road between this hill and the bridge; consequently it made a muddy, bad piece of road. Last year it was fixed a good deal, and we will probably have a good road.

All around Lake McDonald there have been lots of people who have put in permanent residences. A lot of people come there every year to camp. Probably most of that land between Belton and the lake is owned by private individuals, and especially around the foot of the lake at the Government dock. Mr. Lewis, near the head of the lake, put up a large hotel on the plan of the Glacier Park Hotel at the Glacier Park entrance, and consequently we all feel as though we had some rights there. I myself have a residence there, barn, and all accommodations, etc., at the foot of Lake McDonald, and I have conveyances, tally-ho, wagons, and surreys enough to carry a hundred people from one train or boat. I find that the largest share of the tourists that come through do not care about the automobiles. They prefer the stages, and I must say that the horse accommodations throughout the park have been considered very, very poor, with the exception of my teams. Money can not buy better horses, better conveyances, or better harness than I have got, and nobody can get any more courteous and sober men than I have got for drivers. The fare is—I established it myself 15 years ago—50 cents for each

person, 50 cents for a trunk, and 25 cents for 100 pounds of freight, and all that sort of thing. The proposition is that at the entrance to the park the land has been homesteaded by the innkeeper, postman, and hotelkeeper by the name of Dow. I understand that the Great Northern tried to make some arrangement with him to purchase that ground and put their headquarters there, but I do not know whether they did it or not. I believe that some of them paid six or seven thousand dollars each for little pieces up in the rocks, where they have now got chalets, and I think the Great Northern deserves credit for all that it has done through there.

My horses have been furnished to the Geological Survey and the State land survey, and everything of that kind. The conditions are such on the eastern entrance, where the land is poor, and there is no automobile road that comes in there. People do not come in there with automobiles, because they prefer to travel on the stages. We handle about 7,000 fares. I do not mean 7,000 round trippers; I mean 3,500 round trippers. We haul all of the freight up in there. I have wagons that haul freight for the hotels and everything of that kind. Mr. Lewis purchased some property up there, and he is now putting up a lot of cabins, and intends to take care of some of the Lake McDonald tourists. Well, I think I am talking a whole lot here. I have come here a long distance to talk about this matter and pay my respects to Mr. Daniels and Mr. Mather, and I hope to see them privately before I go away and have a talk with them. I can explain it more fully to them than I can here now.

There is no automobile competition at the eastern entrance. Mr. Emory, I believe, of the Glacier Park Transportation Co., is thinking about putting on a line of automobiles. I think they can give good service; but we can give just as good service as he can. I have an investment there of over \$14,000. If there is too much competition there the tourists will grow dissatisfied. There are several hundred people there that have to be taken care of.

MR. DANIELS.

We have with us to-day one of the officials of the Southern Pacific Co. who might be considered as a party to the crime alleged by Mr. Curry. I wonder if Mr. Fee would care to say anything about the transportation conditions to Yosemite Valley?

MR. CHARLES S. FEE.

I do not feel at liberty to discuss that subject because it has been a matter placed in the hands of the California railroad commission. We are not a terminal line in the Yosemite Valley. Our rails do

not touch the Yosemite Valley Railroad, but of course we are interested in the travel to that valley; but I would prefer not to discuss that feature of it for the reasons I have stated.

MR. DANIELS.

What is your guess on the effect the exposition is going to have on our tourist travel in regard to numbers? We have all made a conjecture as to that. Of course the more people we can get out here the more reasons we can give the concessioners for expending a little more energy.

MR. FEE.

I sometimes think, Mr. Chairman, that I can guess about as good as another one. My own observation in regard to the travel this present year and my own estimates have appeared to some to be somewhat high. Prior to the European war I made an estimate with reference to the attendance at the exposition at San Francisco of 17,000,000 people through the gates. That did not mean 17,000,000 in San Francisco, but included the people of San Francisco—17,000,000 admissions through the gates. That contemplated that perhaps from four to five millions of those people would be concessioners going and coming there sometimes several times a day.

My recollection is that at the Chicago Exposition there were 26,000,000 admissions, of which 21,000,000 were cash admissions. At Paris, 10 or 12 years ago, there were 35,000,000 admissions, twenty-seven or twenty-eight million of which were cash admissions. I have said that in my judgment, and I will have to modify this, however, because the estimate was made prior to the European war, that we should have crossing the Sierras 750,000 people. I still hope we will have that many. I really hope that we will have more, but if we have half a million people crossing the Sierras during this year 1915 I shall feel very much disappointed, at the same time not greatly surprised. I am hoping, however, that it will wind up and show that my original estimate was perhaps under rather than over.

Now, what the attendance at these parks, consequent upon this exposition in California, will be it is pretty difficult to say.

I remember the chairman speaking yesterday and stating the three factors that were absolutely necessary for the conduct of a great resort such as the Yellowstone or the Yosemite, and that the first one was transportation, the second publicity, and the third hotels. If the chairman permits, I will move to amend and place it in this order: First, transportation, for without access to these great playgrounds a large attendance upon them is not probable; but the

second, instead of publicity, I will substitute hotels and accommodations. By hotel accommodations I am including hotels of sufficient size to accommodate three, or four, or five hundred people, supplemented by chalets and accommodations such as we have in the Yosemite to-day, substantially in the manner indicated in the chairman's talk yesterday, in which I was very much interested. I say that without the hotel accommodations the publicity falls far short of accomplishing what it should. You must have a place to eat and sleep for people of all classes at prices that will suit their own pocketbooks. The man who has but a dollar a day, or 50 cents a day, to spend for his accommodations should be provided for. The man who wants to spend, and is in the habit of spending, four or five, six, or ten dollars a day should be given an opportunity to spend that money and leave it in the places where these great national parks are to be found. I have regretted extremely that it does not seem possible to interest outside capital to the extent of building at the Yosemite, and at some of the other national reservations, such as Sequoia National Park, hotels that would compare favorably with those elsewhere. I realize that you must treat each one of these parks differently, and that you can not say that the same plan that may be followed with success in the Yellowstone can be followed with success in the Yosemite National Park. In Yosemite National Park you have grouped, not within a stone's throw but within a very few miles, seven-tenths of all the features, the commanding features, of interest within that region. I have always felt that until some very large commodious hotel was built in the Yosemite at a central point within the sound of the Yosemite Falls neither we, the transportation people, nor any of the concessioners, can expect the volume of travel that we should have. It is not possible. I do not feel that the fault is with the transportation or with the rates. I do not feel that you have a right to require a man who wants to make the trip to Yosemite as quickly as he can to rob that man of two days. If he wants to travel at night and have his daylight in which to see the wonders of nature, you are bound to give him that privilege. If you can supplement that by the additional opportunity to travel by daylight for those who want to go that way, all well and good.

With reference to transportation into the Yosemite Valley it is a matter, as I have said, that we do not hold the key to. We are anxious to cooperate and do what we can to make it easy and more convenient to go into the Yosemite National Park. As to the travel to the Yosemite during the present year I think, perhaps, there are some who are in a better position to judge of that than I am. I have not given that a great deal of thought, but if people are not return-

ing in 30 or 60 days, and they can secure the accommodations they want, and they can be provided, I would say that 30,000 people in the Yosemite this year was a very conservative estimate.

There was one feature of your talk yesterday that appealed to me greatly, and that was in regard to establishing a line of chalets in the mountain regions. I have seen all in the way of scenery that is to be found in North America. In the Kings River and Kern River Canyon regions there is scenery which is second to none on the American Continent, and yet it is comparatively inaccessible. If accommodations such as you have spoken could be provided in the Yosemite and elsewhere—that is, having chalets conveniently located at points of interest, leading back into these great mountain regions—it would be for the benefit of the State of California and for all of us in any way interested, either as concessioners or transportation agents. It would be a grand thing for this whole coast, the whole State of California.

MR. DANIELS.

It is within five minutes now of striking the hour. There is no possibility of our ending within a reasonable time a discussion of the problems of the concessioners, or begin to cover all of them now. I think we had better adjourn and continue this discussion to-morrow afternoon at the conclusion of our program.

To-morrow we will meet at the Fillmore Street entrance of the exposition grounds at 10 o'clock, and we will be conducted by the exposition officials and a band to the Southern Pacific Building, where the National Park Service will be presented with a bronze plaque. We will meet in the theater, or the hall, in the Southern Pacific Building and adjourn for lunch, then meet in the afternoon and conclude our program.

MORNING SESSION, MARCH 13.

ASSISTANT TO THE SECRETARY MATHER.

This is the third day of the conference of national park superintendents and supervisors. The other two meetings have been held in Berkeley. I will call upon the Hon. Arthur Arlett, representing the governor of the State of California, to say a few words.

HON. ARTHUR ARLETT.

Mr. Chairman, ladies, and gentlemen, during the last few weeks it has been my privilege on several occasions, similar in many respects to this, to say a word of greeting and of welcome on behalf of my

illustrious chief and, through him, for our Commonwealth. To-day, however, I have the unique distinction of being absolutely a trinitarian. As a member of the exposition family, it is my privilege to recognize your presence here in the presentation of a plaque. I am here in my official capacity representing his excellency, Gov. Johnson, but what appeals to me in this hour most strongly is that I am here to say a word of greeting to those men in loyal service, who are teaming in a great caravan of progress, under the leadership of my intimate personal friend, Secretary Lane. And with those three angles of vision this morning it is no wonder that I feel myself peculiarly honored.

You men are experienced in the things that are being considered in your conference, of course, and no word of mine would be of value, and it would be presumptuous if I even suggested it. I do not want to make any comment on your great work, but somehow or other you men are dealing with primal things, and primal things are measureably understood and measureably appreciated even by the veriest tyro.

I was thinking only the other day as a group of people came from Marin County to share in the exposition feast—I was thinking of the marvelous aspects which men like yourselves in this great work of national parks, and of conservation generally, of the great assets that you are making for all of us. No man can go out into the places where your work especially lies and fail to appreciate the wealth that is his in a common possession of these great assets. For no man may step reverently, as we all must, through the aisles of nature's cathedrals, such as we have here at Muir Woods, and such as you have in your places of labor up there, without knowing that there is being added with each moment something that makes for his eternal greatness. You men and you women, I have wondered, if with your constant contact with the problems that confront your department, sometimes, you do not because of your very familiarity with them lose, perhaps, some of the inspiration and gleam. It is that word in speaking a word of welcome to you on behalf of my chief, and in welcoming you here into the activities of this exposition to-day—it is that word of high challenge and great opportunity, of full vision, which your department calls for, that I would remind you of.

As we sit in conference to-day, as you have been sitting in conference for several days last past, may we not remember that the equation which has made your great chief great as he is, and those who are associated with him, wonderful contributors to the Commonwealth. Is it not this, that these gifts of God may be gathered to ourselves and preserved to our children, that men in growing into a likeness of the Creator may through this inspiration step by step

go up. So, Mr. Chairman, it affords me especial pleasure for the reasons just stated, and for those intimate and personal reasons that every man must have, as he measures up with you, your associates in this work, that I present this plaque, simple yet beautiful, perhaps reminding you of the things with which you are most interested. Accept it with the exposition's very best wishes and the hope that the measure of contribution that you make to-day to the exposition may be a real and a lasting contribution to the feast of the nations.

ASSISTANT TO THE SECRETARY MATHER.

Mr. Arlett, first I want to thank you on behalf of my chief, Secretary Lane. He is an old friend of mine, also, back in my boyhood days in California. Secretary Lane has a warm sympathy with the entire work we are here trying to do on behalf of the national parks, and he wants to bring the parks closer to the people. He wants to make the parks better known. That is one of the duties which has been assigned to me when he called me down a few months ago to Washington to take up this work.

It is an especially keen pleasure to meet Mr. Arlett and to be here in my own native State and to feel that right from this center much of the work on behalf of the national parks is to radiate. We have here to-day the superintendents of every one of the national parks, a total of now nearly 5,000,000 acres, all of them with a zest and interest in the work of each of their parks. If you could have seen them as they sat around the board at their meals over in the house in Berkeley where we were living and noticed the keen interest that each took in the problems he had to present and the problems that every one of the other superintendents had to present, you would feel that we were really going to accomplish something in the work which has been laid out for us and which our worthy chief is so anxious to have accomplished.

I think it will be especially interesting to you and to the audience here to know and to realize that here at San Francisco is practically the headquarters of the national parks; that another loyal Californian besides our chief is here in charge of this work. Mr. Mark Daniels is the general superintendent and landscape engineer of the parks. His office in San Francisco will be the central point to which all of the superintendents of parks will report. At first glance, perhaps, to our eastern friends it might seem that San Francisco is a little distant from the parks, but as a matter of fact it is the nearest central point, the nearest average central point to all of the parks, particularly when we consider that four of our large parks are here on the Pacific coast. It will be our pleasure to encourage the great tide of eastern travel to visit this great exposition

on the shores of the Pacific; also to let each tourist know, at the same time, what a priceless heritage he has in these parks.

I feel while this creation of the sculptor and the artist here near the golden gate is beautiful beyond description, it is but a symbol of the greater and infinitely more enduring expositions that await us in the Sierra Nevadas. And if we can lay the proper foundation in the years to come, we will see tourists flocking across these mountains, visiting our parks and find joy and life that have never been theirs before.

I think now that it is only fit that I should turn over this plaque to Mr. Daniels, and in that busy office of his, busy now, but which will be still busier as the work will go on for the parks, he may keep this as a memento of this very auspicious occasion. I will now call upon Mr. Mark Daniels to speak.

MR. DANIELS.

Mr. Secretary, on behalf of those engaged in the national park service and their associates I wish at this time to express my appreciation of the honor that has at this time been conferred upon us. This event will no doubt remain long in the minds of those members of the national park service who are now engaged upon the work, and will act as a stimulus and inspiration to those who shall follow. Many of the men who are now engaged in our national park service have devoted the better part of their lives to this work with little or no more encouragement than the realization that they are doing their work and doing it well.

The Federal Government has wisely set aside certain areas in its public domain in which nature has done her utmost to create scenic wonders of marvelous beauty, and has done so in order that they may be protected from vandalism and in order that these areas may not be devoted to commercial uses by people who would profit in their exploitation.

The superintendents, supervisors, and rangers of these parks are called upon annually to report to the Federal Government on the progress of their work, and in their requisitions for the meager sums of money to carry on their work that is vital to the existence of the parks they are confronted by the question from those who control the purse strings, "Are not our parks almost fully developed?" That is a question that is self-evident of the lack of knowledge on the part of our department officials, and Government officials in general. The parks are not developed. Our work has just begun. There are roads to be built, and there are bridges to be built, and there are trails to be built, and there are hotels to be built, and sanitation must be taken care of. Insect pests must be removed.

We are just fairly lodged on the course of our work, and yet as each of these supervisors works and labors on the problems of his particular park he does so without any consideration of when the money is to come, or whether he is to get more, or whether he is to get less. I feel that there is nothing that can be too strong or that would be too high in the praise of the service of the men who are devoting their lives and their energies to the preservation and maintenance of these parks.

This exposition here has been established to commemorate a great event. Our conference, of which this is the third day, is the crowning of one of the most successful conferences that I have ever attended, and it also, in my opinion, commemorates an event. The exposition is primarily in commemoration of a new era in commerce. I believe this day, which is the closing one of our conference, will commemorate a new era in the administration of the national parks. Nothing is more fitting than that we should hold the closing day of our conference at this exposition.

Mr. Secretary, on behalf of the superintendents and supervisors of national parks, I want to express our heartfelt thanks for the honor that has been conferred upon the service in the presentation of this plaque.

ASSISTANT TO THE SECRETARY MATHER.

We will now begin with the work of the conference and continue it from where we stopped yesterday. We are all very much interested in the question of the preservation of the trees in the parks, and in the last two or three years some very interesting work has been carried on between the Department of Agriculture and the Department of the Interior in this matter. I am going to call upon Dr. A. D. Hopkins, of the Bureau of Entomology, United States Department of Agriculture, who will talk to us on the subject of "Insect investigations as affecting the national park forests," and some of the work that has been done under him in Yosemite Valley and other parks.

DR. A. D. HOPKINS.

Mr. Secretary and members of the conference, I am especially glad to meet with you all and to talk with you again about the insects which are a menace to some of the beautiful features of the national parks.

At the conference held in the Yellowstone National Park in September, 1911, we called attention to the character and extent of the damage by tree-killing insects to national park forests, mentioned some of the peculiarities in the habits of the principal insect depredators, some of the natural and artificial conditions which were

favorable and unfavorable for the multiplication, and referred to general methods of control and prevention. This is now available in published form.

To avoid repetition we will this time call attention to some specific cases of insect depredations in the forests of the Pacific slope and Rocky Mountain regions and how they have been investigated and finally dealt with; also to try and show from the results of our investigations and experimental and demonstration control work that the protection of the forests of the national parks from their most destructive enemies is, in fact, a comparatively simple, inexpensive process, and then explain how we are prepared to go into the forest and show a practical woodsman how to do it.

It may be of interest in this connection to mention that the investigation of forest insects as a special feature of the research work of the Bureau of Entomology of the Department of Agriculture was begun here in Berkeley about 16 years ago, or, to be exact, on April 18, 1899. A number of new species of forest insects and the habits of known ones were discovered here for the first time in the trees on the college campus. The next day an insect enemy of the redwood was discovered at Guerneville, Cal.; on the 21st the destructive habits of the western pine beetle were discovered at McCloud, Cal.; and at Grants Pass, on April 26, the mountain pine beetle was discovered in sugar pine. The western pine beetle and the mountain pine beetle have since been found to be the most destructive insect enemies of the pines of the Pacific coast and northern Rocky Mountain regions. In fact, from what we know now, after 16 years of investigations, we feel safe in saying that these two beetles are, in the long run, the most destructive natural enemies of two of the most important species of western pines—the western pine beetle as a destroyer of the yellow pine and the mountain pine beetle as a destroyer of yellow pine and sugar pine.

During the past 10 years we have had field stations located at different places in the States of California, Oregon, Washington, Idaho, and Montana, with one or more specially trained forest entomologists at each station devoting their entire time to the study of forest insects and insect problems. Special attention has been given to the study of the two beetles mentioned to determine the essential details in their life histories and habits, the character and extent of their damage to the forest, and the problems relating to methods of control and prevention. Much of the results of these investigations has been published in both technical and popular form for the information of the entomologists and the practical forester, but a great deal has been determined within recent years about the actual extent of the damage caused by these insects that

has not been published. Special cruises of representative areas in northern California have been made which show that from 10 to 30 per cent of the entire stand of merchantable-sized yellow pine had been killed by these beetles within a period of 10 to 30 years. A careful cruise of $5\frac{1}{8}$ sections in the Klamath National Forest was made by the State forester and a representative of the Forest Service, and showed that there was 12,628,800 feet board measure of living yellow pine and 5,623,100 feet board measure of dead yellow pine on the area, and that 90 per cent of the dead timber had been killed by insects within a period of 25 to 30 years. This area was said to be a representative of that section of the forest, and from my personal knowledge of conditions, supplemented by the reports of our investigators, who for the past three years have studied the subject, it is representative of extensive areas in northern California and southern Oregon, all of which indicates that the average annual loss of yellow pine from insect depredations is at least one-half of 1 per cent of the total merchantable stand of yellow-pine timber in northern California and southern Oregon. This may seem to be a comparatively small loss; it does not attract much attention, scattered as most of it is throughout the forest, but when we consider that according to reliable authorities there is more than 100,000,000,000 feet board measure of yellow-pine timber in California, and if one-half of 1 per cent of this, or 500,000,000 feet, is killed each year, we will realize that this is considerably more than the recorded annual cut of yellow pine in the State, and that the loss in stumpage value alone at \$2 per thousand feet board measure amounts to \$1,000,000 annually.

We have one of the most striking examples of the destructive work of the mountain-pine beetle in the Hetch Hetchy and Tenaya watersheds of the Yosemite National Park. There are extensive areas here in which from 50 to 90 per cent of the lodgepole pine has been killed by the mountain-pine beetle during the past 10 to 15 years.

Our attention was first called to the trouble affecting the timber of this region in 1903, and in the spring of 1904 I was instructed to make an investigation. I reached the Yosemite Valley over the old Yosemite Trail on June 13, but could not get into the affected area on account of deep snow and unfavorable weather conditions. Considerable time, however, was devoted to the general investigations of the work of the insects in the valley and the region between the valley and the Mariposa Grove, which convinced me that the extent of the loss of some, affecting the best sugar pine and yellow pine of the park caused by insects, was vastly greater than was realized by the park officials.

In 1906 I sent one of my assistants, Mr. H. E. Burke, to continue the investigations. Mr. Burke entered the park on May 28 and con-

tinued his investigations, with headquarters at Summerdale, Cal., until July 3. He found that the death of the timber in the Tenaya and adjacent areas was caused by the mountain-pine beetle and not by a needle miner, as had been supposed by the rangers and others who had visited the area. He found at that time areas of 1,000 acres or more in which 95 per cent of the trees had been killed.

In 1910 continued destruction of the lodgepole was reported to the Secretary of the Interior by the park superintendent, and in 1911 investigations were made by a forest pathologist of the Department of Agriculture for evidence of any fungous disease which might be the cause of the trouble, but he reported that the damage was caused by insects.

In October, 1912, one of my assistants, Mr. J. M. Miller, was detailed to make further investigations, and went over the area with Park Ranger Gaylor.

In July, 1913, control work was started under our recommendations and special arrangements with the Department of the Interior by which we gave the instructions and the department furnished the men and facilities for carrying on the work. Mr. Miller was placed in charge of the project, with Entomological Ranger Sullivan as his assistant. During the summer and fall 1,584 infested trees were treated, at a cost of \$1,169, or about 74 cents per tree.

In 1914 further funds were provided by the Interior Department and arrangements made to continue the work under the supervision of Entomological Ranger Sullivan under instructions to begin operations in the yellow-pine areas at the lower elevation and work into the lodgepole higher up as the season advanced. Two thousand and sixty-eight infested yellow pine and lodgepole pine were treated during the season at a cost of \$2,789.40, making the total number treated during the two seasons 3,652 at a cost of \$3,937.40, or an average cost of \$1.05 per tree with an average diameter of 24.8 inches.

The areas treated in 1913 were inspected by Miller and Sullivan in the fall of 1914. They found that in the Cathedral Creek project where 74 per cent of the infestation on the actual treated area had been disposed of (or a much less percentage when the infestation of adjacent areas was included) had resulted in 87 per cent reduction of the infestation in 1914, while in the Tenaya project, where the work was conducted later in the season when the beetles were flying, showed only about 33 per cent reduction. This latter result was plainly due to the fact that only a very small percentage of the infestation of the entire adjacent area had been disposed of, and that the beetles had been attracted to the control area by the control operations.

Judging from the results of more than 26 demonstration projects carried on in different sections of the Rocky Mountain and Pacific

Slope regions during the past 10 years, the work done on the Hetch Hetchy and Tenaya watersheds should have a marked influence toward protecting the remaining living timber from any further depredations of a serious character.

Since 1905 the control projects carried on under our recommendations and immediate instructions has involved the treatment of over 202,000 trees at a cost of about \$74,800. The average cost per tree in the several projects has ranged from nothing to over \$4. In one case the infested trees were converted into lumber and sold at a profit of \$1.12 per tree, so that the average net cost per tree for all of the projects was 37 cents.

In no case has more than 75 per cent of the infestation of the treated and adjacent areas been removed, and in some projects less than 25 per cent of the infestation has been removed. In every case where the control work was done at the proper time and carried out in accordance with the requirements marked reduction of the infestation has followed, ranging from 75 per cent to 95 per cent below that of the year preceding the control work. A few of the more striking examples may be cited. The Tongue River Indian Reservation project involved an area of about 75,000 acres, where in three years 45,000 trees had been killed by the Black Hills beetle. The treatment of 11,017 trees, or less than 73 per cent of the infested timber, in 1912, at a net cost of \$903.53, or about 8 $\frac{1}{4}$ cents per tree (the work having been done by the Indians under the instructions of two of our entomological rangers), resulted the next year in 97 per cent reduction, or practically a complete control.

The northeastern Oregon project (Whitman National Forest and adjacent privately owned timber) involved a treated area of about 90,000 acres of yellow pine and lodgepole pine, where it was estimated that more than 400,000 trees had died within a period of six years on and adjacent to the treated area. The treatment of 34,490 trees (or less than 50 per cent of the total infestation) in 1910-11, at a cost of \$28,851.67, or about 85 cents per tree, resulted in 1912 and 1913 in a reduction of over 90 per cent in the number of trees killed within the treated area and within a radius of 1 to 4 miles in the adjacent untreated area.

The Klamath River project, including the Craggy, Barkhouse, and McKinney Creel areas of national forest and privately owned lands, involved a treated area of 32,400 acres, or (including the adjacent forests) a total area of 82,000 acres, where it is estimated that over 60,000 yellow-pine trees had died during a period of 25 years. The treatment of 1,098 trees in 1912-13, or about 27 per cent of the entire infestation of treated and adjacent areas at a cost of \$4,602.97, or about \$4 per tree, resulted in a reduction within the entire treated and adjacent area of over 91 per cent, or practically complete control.

Now, the significant part of the results is in the fact that the disposal of from 27 per cent to 75 per cent of the infestation of an area has been sufficient to bring the depredations of the beetles under control.

This means that instead of spending a great lot of money in a vain attempt to exterminate the beetles a comparatively small amount of money properly expended in disposing of a part of the infestation will give the desired results.

This is what we call the percentage principle of insect control. It is based on the well-known fact that the depredating beetles have to contend with a multitude of opposing agencies in nature, and that it is only through the power to overcome these agencies that they are enabled to maintain their position or to multiply to sufficient numbers to attack and overcome the natural resistance of vigorous healthy trees. Therefore, if by natural or artificial means they are reduced in numbers to a point where they can not kill the trees they are no longer a menace.

The Department of Agriculture, through its Bureau of Entomology and experts on forest-insect investigations and forest-insect control, is prepared to give advice, make special recommendations, and give instructions in the forest on the application of this principle and to conduct further demonstration control projects. The only thing we ask is for the Federal, State, and private owners to furnish the men to be trained in connection with actual work in the forest, and when they are trained and recommended as qualified, to put them in charge of the insect control and prevention work, wherever the conditions in Federal, State, and privately owned forests justify their employment. If this is done we can predict that within a few years the value of the timber protected from destruction by insects will represent a return of more than 100 per cent on the money properly expended for this purpose and that the benefit will be cumulative during a long period in the future.

We have a project which has been presented in which we propose to furnish one of our expert entomological rangers, who is one of the experts of the Bureau of Entomology, on the practical details of control work.

These men have had many years of experience in these different control projects, and are prepared to go to the park rangers and give instructions on the practical details of locating infested timber and carrying on the control operations at the least possible cost. We feel that the park officials can well afford to give the matter serious consideration. It means the protection of one of the beautiful features of the parks—the natural forests—and keeping them in a healthy condition, which can be done at a very low cost.

Now I will be glad to answer any questions in regard to this matter.

ASSISTANT TO THE SECRETARY MATHER.

This certainly is one of the most important pieces of work that could be done in the national parks. Those who will look over the damage will see how the destruction has gone through the forests almost like a fire. Look at the pine trees in the upper Yosemite Park—it is as though a fire had swept through them.

This proposition of Dr. Hopkins to train up our rangers to look after this matter is very interesting. I am going to ask General Superintendent Daniels to conduct the discussion and say a few words from his standpoint.

MR. DANIELS.

The pursuit of this elusive bug that in so short a time becomes a bore is something that has occupied the mind of almost every supervisor, and it has certainly occupied mine and kept my hands busy scratching where dead leaves have fallen as I passed under the trees. In Glacier National Park there are several miles where there is not a living tree—a specter forest. The doctor has mentioned the possibility of cooperation, and in my private life I have had occasion to use that same system, and I am very glad to think we can do it in the department. We certainly need it, especially in California, where the tree doctor, or, as he is called, the tree dentist, has excavated the interior of a tree that is diseased and filled it with concrete. His work has been by the day at very exorbitant prices. They excavated so much wood from the tree that I can not speak of a tree in the abstract, it is always in the concrete. I found that at the end of six or eight months they had spent something like \$35,000 to preserve something like 50 trees on a man's estate. Immediately we realized that it had to be stopped. We went to the University of California and secured men who could instruct the gardeners. We also hired in our agricultural department an expert and sent him down, and he instructed the gardeners on the ground. He spent two or three days telling them what to do and how to handle each specific case, then the gardeners did the work. We cleaned up and repaired, I think, a hundred and sixty-five trees at an average cost of \$8 a tree.

Now the Government has this problem of tree protection. We can establish the same system. We can have Dr. Hopkins or his representative teach the rangers in the parks how to do this insect fighting. They are skillful enough to do fighting in all other forms, and I have no doubt they will readily adapt themselves to this form.

I would like to ask Supervisor Ralston if he has any comments to make or any requests or any question that he would like to ask of

Dr. Hopkins regarding the method of treatment that would be advisable in Glacier National Park.

MR. RALSTON.

I have had no experience in fighting the tree beetle, and I should like to have the doctor explain how it is done and what method of treatment is followed. There are a great many beetle-infested trees in Glacier Park. The trees are principally the white pine.

DR. HOPKINS.

We did considerable work in the Glacier National Park some three or four years ago. You have the same beetle there that has infested the pine trees in the Yosemite Valley. We have two species of beetles on the Pacific coast and the northern mountain region, two beetles which affect the pine tree. They are easily recognized by their work. You do not have to know much about beetles or you do not ever need see a beetle. Faded foliage, turning yellow, indicates the presence of the beetle. By removing the bark from the trunk, a small portion of the bark, the very characteristic work is shown. This piece of bark here is hardly large enough, but it shows the work of the mountain pine beetle, which attacks the sugar pine and the mountain pine, or silver pine and yellow pine, by entering the bark—the beetle enters the bark from the outside and then excavates a long longitudinal gallery, sometimes 2 or 3 feet long, running almost directly up the tree in the inner bark. The eggs are deposited on each side of these in small groups, three or four in a group. When the eggs hatch the grubs or larvæ radiate in the inner bark. That is where they get a footing, in the inner layer of the bark. When they are matured they make a little case like the parent, and then the next thing they bore out through the bark and fly away to a different tree. To get rid of this particular beetle it is not necessary to cut the trees down, but remove the bark from the main trunk and leave the tops, because the principal beetles are in the main trunk and the eggs, after they are exposed when the bark is removed—these young, tender grubs are exposed to the elements and soon die.

It is not necessary to burn anything. It is really entirely unnecessary to burn the tops, because the tops are filled with a lot of secondary beetles that are the natural enemies of these insects. If the tops are burned, you burn up a lot of your friends. In that case it reduces greatly the cost of treatment by simply removing the bark from the main trunk, and that leaves the tree available for lumber if it is in a location where it can be converted into lumber. It will remain there for several years. It is only necessary to treat the principal sections infested. The scattered large trees and small trees

will be left just as they are, with the tops on, because they support the natural enemies of these insects. They will take care of them. That is a fact that has been proven over and over again. It is an established fact that we can rely on.

There is another beetle which is quite different and more abundant here in California and of great destructiveness to the yellow pine. That beetle seldom, if ever, attacks the sugar pine. Instead of making a longitudinal gallery it makes a peculiar winding gallery. It is necessary to know all about the insects that you can, but it is not absolutely necessary to any more than be able to recognize these galleries to know what is the matter with the trees and to know what to do. We have published the method of treatment.

Now, in the case of this beetle the bark must be burned, because the young, instead of being exposed in the bark, are in the inner bark. In fact, they live just back of the inner, living layers of the bark, in the outer portion. When the larvæ are matured they go out in this outer bark and excavate little cases, where they transfer to beetles; therefore it is necessary to remove this bark from the main trunk, but not from the top. The trees die rapidly after they are attacked by this beetle. They have a struggle to overcome the resistance of the tree and the resin thrown into the gallery, and they must throw that out.

These beetles make longitudinal galleries in the trees, and the trees will remain green for nearly a year after they are attacked. Trees attacked in August will be green and healthy looking apparently until May, perfectly green, but after that, as soon as the hot weather comes on, they fade quite rapidly and are easily recognized. These trees with the living foliage may have every particle of the bark dead, but there is enough vitality that remains in the sapwood and in the branches to keep the foliage green. In such trees they are more difficult to locate. In this case the work should be completed, depending upon the latitude and altitude, about the middle of June, or the work can be continued until about the middle of July. That gives plenty of opportunity to locate the trees that have begun to fade.

Here we have the work of another beetle which is peculiar to Yosemite Valley, not entirely, but it is found in the Yosemite Valley. This is the Jeffery pine beetle. It is very much larger than the mountain pine beetle, and confines its attack largely to the Jeffery pine, and requires the same treatment, but it is nothing to be compared with the other two. These two beetles here are found in timber on the Pacific coast and the Rocky Mountains, and I think I am safe in saying that they have destroyed vastly more timber than forest fires in the past 50 years. All through the forest regions you will find fallen trunks and snags, indicating that at

one time it was covered with fine matured timber which has been killed by these insects. That can all be prevented. It is a simple matter now that we have worked out the history and habits of the insects; it is an absolutely simple matter. You can go into any national park, no matter how far away, and cut out a few trees there, sufficient to stop this depredation, and by a little careful management it can be maintained forever, because this beetle has a hard struggle to live and overcome the resistance of these trees. It has also to overcome the influence of its natural enemies, including the parasitic insects and all sorts of things. It does not take very long to get results. It is far easier to control beetles in the forests than in our orchards and our cultivated crops.

MR. RALSTON.

Do they ever attack the balsam?

DR. HOPKINS.

No. There is a beetle that does attack the balsam.

MR. RALSTON.

In the Glacier National Park there are large areas in balsam that are apparently dead; just a few green limbs coming out from the top and the balance of the leaves are all dry.

DR. HOPKINS.

There are a number of beetles that attack different species of trees. The greatest damage they do is to cause a decay, which follows a primary attack. They attack the trees and excavate their galleries in the living bark, and in that way they cripple the tree. The injury forms a dead spot in the side of the tree, which is exposed for a long time before it is healed over. In the meantime fungus germs get in there, and then the tree starts to decay, and in the end results in the death of the tree.

The fir tree, I think, is more affected by root disease, which contributes to the death of that tree more than anything else. The great problem is to deal with these insects in the open. There is also one class of beetle that attacks the Douglas fir. It is very destructive to the Douglas fir, but not so destructive as the others.

MR. DANIELS.

I would like to ask you whether a ranger whose knowledge of entomology has been rather neglected would distinguish a tree that was attacked by one of these beetles before it would die.

DR. HOPKINS.

That I would have to show you in the woods.

MR. DANIELS.

Is there any way of telling it by the bark?

DR. HOPKINS.

Yes; by the pitch. There is a small amount of pitch, or resin, that flows out of the entrance. Those are called the constituents of the tree; but in many cases those are not found. Our expert insect-control rangers can see a tree that is infested among a lot of others, and by pointing it out to a ranger you would show him in a little while.

MR. DANIELS.

I had in mind this cooperative scheme about which you spoke, so that our national park rangers would be able to carry on this work. I was wondering just what method they could pursue in order to take care of the tree before it was too far gone.

DR. HOPKINS.

The less he knows about entomology the better we like him. We can teach him all that is necessary to know about entomology as he goes along. It is not necessary for him to know too much about the insect. It is only necessary for him to know how to locate these infested trees; how to select those that should be treated, and then treat them. It is a simple proposition.

ASSISTANT TO THE SECRETARY MATHER.

I wonder if Dr. Jepson, from his knowledge of trees, would like to say a word? We would like to hear from him.

DR. JEPSON.

Mr. Secretary, I am not an entomologist. I am a botanist. I do not pretend to know anything about the matter upon which Dr. Hopkins has spoken. I have only learned some things from my entomological friends. As a botanist I should think that some of these beetles represent a pretty high type of beetle life. For this reason an entomologist told me that these beetles, or certain of them, restrict their activities to one kind of a tree. They do not range from one species to another. They have the power of discriminating with great accuracy the different species to work upon and confine

their attention strictly to one kind. Now, that is something the botanist sometimes finds it difficult to do. Botanists do not always agree upon what are the different species of trees. Trees in the different portions of a range are very variable, and that is interesting to the botanist from that particular standpoint. In the Yosemite Park the botanists, in traveling through certain portions of the park in recent years—for a good many years—have been almost appalled by the destructive effects of the beetle that works upon the pine. We have here upon the coast a species of tree which we have thought, some of us, to be different from the pine in the North, and have spoken of it under a different name, but it now appears that the species of beetle which works upon that pine in the Sierras and works upon those trees in the Yosemite is the same kind of a beetle, so it would look to me that these beetles were exactly of the same species.

If the secretary will permit me, I should like to say a word about the flowers of the parks, just for a moment.

I think it will be generally agreed that one of the most important resources of the parks is the flowering vegetation. The flowers of the parks in California can not make their maximum appeal to the people at large until two conditions, I think, are fulfilled. There is no reason why there should not be as much interest in our flowers as in the Alpine flower fields. The first condition to be fulfilled is that the flowering plants must be better known than some of them are known to-day. If our flowers are to make a strong appeal they must be better known and in time we shall have a larger amount of knowledge available in that way. A few species have a very great interest for travelers. We have every reason to suppose that there are many species that have a very interesting and almost marvelous interest in the matter of their life history and habits. As that knowledge becomes known and becomes disseminated there will be on the part of the people a very much greater interest in the flower fields of the Sierras.

The second condition is that we want more common names, more folk names, for the plants in our parks. By a folk name, I mean a name that has been given to the plant by the folk, by the people who have lived amongst the plants, and know them from their point of view. Of course the botanist has named practically all of the plants in the parks. He has given them scientific names, but scientific names very rarely make an appeal to the people at large. When once you have folk names, then the interest in the flower fields will be very much greater. Take mountain misery, for example, which is found in the Yosemite Park and the Sequoia Park, that plant at once shows the flavor of the soil. There are many more such names, but

many more must be invented either by us or by the people who live in the mountains or live in the parks.

I was coming down out of the mountains on a trip, and I had been studying what we botanists call *Calandrinia caulescens* var. *menziesii*, and I met some children that had in their hands a bunch of the flowers; so I stopped and asked the children what they called those flowers. After some little hesitation they said, "Kisses." I asked them why they called them kisses, and they either would not or could not tell. But as I went on I heard the larger or elder child say, "That is a botany man, and he is always asking why." You can not always tell why. Sometimes you just do things. So it is with many common names, you can not always tell why those names have been given. A mountain name, like mountain misery, at once makes a strong appeal to the people. Common names indicate the way in which the plants have affected the people who live there, whether they are conscious of that or not. I think in time we shall have these two conditions fulfilled. Imagine the thoughts of a person going to the meadows and seeing the mountain grass filled with shooting stars. I have seen as many as 500,000 flowers and shooting stars in a Sierra meadow, making a most wonderful sight. Now, when that plant is known to the people as is the edelweiss in the Alpine country, then we shall have created a desire on the part of our people that will be shown in their making excursions to our national parks.

ASSISTANT TO THE SECRETARY MATHER.

I am very glad to hear those words from you with regard to our wild flowers. What you say about the shooting stars bring back to my mind some very wonderful fields of that flower that I saw in the Sequoia National Park. They also bring back to my memory the sight of that wonderful flower *Erythronium montanum* in Mount Rainier National Park. I think the most impressive sight I ever saw in wild flowers was that wonderful white flower under the trees in great white masses. I can see the members of the Sierra Club standing there with drawn breath as they were looking on that wonderful sight. I remember the mountain misery very well, although I thought we had another name for it. As I came out five years ago from a trip up into the Kings River country and went into a telegraph office the operator sniffed a little bit and said: "You have been up in the mountains." I said that I had. "How do you know?" And he replied: "Why, I can smell the bear clover." It has a very distinct pungent smell, that old mountain misery.

We have a man that knows something about the mountains right here on the platform and I am going to have him say a word to us. He is an enthusiast in the congressional delegation from California.

He is an important member of it. Congressman Kent has been a tower of strength, as also has Congressman Raker, in whose district is included Yosemite Park, and he has taken a great interest in the work there.

Our official party, coming from Washington, had the pleasure of the company of the Congressman from the seventh district, Hon. Denver S. Church. I am now going to call on Congressman Church to give us a few words about parks from his point of view.

HON. DENVER S. CHURCH.

Mr. Chairman, ladies, and gentlemen, I naturally feel very timid here to-day. I am not familiar at all with the subject matter about which you have been discussing, to start in with. You have been talking about beetles and bugs. I can not discuss that, I am sure. I have in my time come in contact with a good many humbugs, and that is the only kind of a bug that I know anything about. I can not talk about them here to-day. I am sorry, indeed, that I have not had the opportunity of being at this conference until just now. I do not know what you have done, but I will grant that you have done something good.

I had the privilege some time ago of meeting my old friend Mark Daniels; by the way, I guess he is my young friend, though. I think I am the old fellow, in Washington, and I found that he was just full of national parks. Then, as I came along on the train from Washington I had the great pleasure of falling in with Mr. Mather and his party, and they could not talk about anything but the national parks. Now, I wanted to talk to them about California, because I am a native son of California, and I am glad of it; but they would not stand for that. They wanted me to come in with them and talk about national parks, and nothing else. I listened to them talk about national parks all over the United States. I am interested in national parks from the standpoint of California. They would not let me talk about California on the train, but I want to tell them right now that I am going to talk for a few minutes on the biggest subject on the face of the earth, a subject a thousand miles in length and 350 miles in width, bounded on the north by Oregon, where it rains 365 days in the year, where web feet are seen—maidens, men, and boys—seen, however, more often on men and boys; bounded on the east by the sagebrush State of Nevada, with its 80,000 men, women, and children, its 1,000,000 coyotes, and its million jack rabbits, horned toads, and billy owls. When the Creator of all things chose the very best dirt that he could possibly find from His great universe of worlds and made His great masterpiece, California, and hurled it out

into space, I am sorry that it landed so near the sagebrush State of Nevada. However, that is no knock on Nevada. I do not intend it should be. I was married in Nevada, and my oldest child was born in Nevada. California, bounded on the south by Arizona, the land of the gila monster, and bounded on the west by the boundless waves of the great sea.

When I was a boy, and, by the way, that is a long time ago, my father built a cabin in the woods just on this side of Old Baldy. Often at eventime I climbed up the old rock and looked out and saw the sun going down behind the waves, and I saw the crimson streak as it reached downward toward the shore, and I saw the great waves meet and dash against the bleak and ancient rocks; saw the tide come in and the great ships pursue their lonesome, solitary way.

California! There are so many phases to this great subject. There is California in the springtime, when the earth is green and the landscape covered with flowers, when the meadow lark is singing down in the meadow, and the dove is cooing on the tree top, the quail is whistling back of the barn, the ground squirrel chirping on the rock below, and the grouse calling from the mountain top—California in the springtime.

Then there is California in the fall of the year, when the autumn winds begin to bellow and the great white clouds, sentinels of the winter storms, drive majestically across the sky.

Then there is California in the wintertime, when the fog rushes down the brow of the old blue mountain, and the storm clouds hover around Mount St. Helens, Mount Shasta, and Mount Diablo.

Then there is California in the nighttime, away late at night; California by daylight; and California by moonlight. Oh! The great big California moon. Twice as big and twice as bright as the moon of any other land. Do you remember, Mr. Chairman, the time that you stood on the street by a lamp-post and looked over toward the Sierra Nevada and saw two moons rising instead of one? Talk about the California moon. I have been over in the East and I have seen their little, old, freckled, measly, weather-beaten moon out there, not even a half sister, or a sister-in-law, or a mother-in-law to the great big California moon that we have out here.

Then, there is California by the seashore; but, oh! the treacherous sea, the treacherous waves, the treacherous undertow, and the 10,000 treacherous summer girls clad in airy garments. It is no place for us to linger by the shore; but let us go back into the mountain heights and stand 10,000 feet above the level of the sea along in the Sequoia Park, if you please, where the pioneer stood in 1849. We must tread lightly, though, because this is holy ground, for here is

where they slept the first night on California soil; from here they made trails and picked their way; they ran their drifts and they dug their shafts and they washed the sands in the mountain streams for gold. But they are gone; their camp fires long since have ceased to burn, and their cabins have fallen by the way of all things, like their broken picks and shovels. Their work is done; they are still; but let us hope when they took their departure that they simply journeyed a little farther west, and that to-day away over beyond where the sun goes down—away over beyond where the shadows start—for their western children they are watching and waiting.

From where we stand we can look across the great canyons, clad with their drapery of green, and the great mountains that rise above the Yosemite. Over there where the storm king reigns upon his granite throne; over where the eagle builds her nest; over there where the rivers fall from towering heights and the rainbows paint the sky—from there we go down into Tehipite Valley. I hope you will all go there and look at the great dome that rises 5,000 feet perpendicular, washed and smoothed by the winter storms and the winter winds. There the fishes swim, eager to grasp the hook, the wild deer feeding on the hillside, and high pine trees overhead will just simply shame your heart.

Go right across the way to the great Sequoia Grove, with its old monarchs of days long since past and gone; go to the forests on Mount Whitney, which is only 100 miles from there, and it lifts its snowy, ancient head above all other mountains on that range; see its great trees, standing without kith or kin, sentinels of an age that is past and gone. Oh, if they could only speak, what stories would they tell; but they can not speak. Did I say they can not speak? Why, in days gone by they have spoken in silvery tones to me. When I was a child I tried to climb their rough, rugged trunks. They spoke to me. And in after years when I went there and camped amid their groves and heard the forest wind sigh through the branches of the trees as the great moon drifted overhead, they spoke to me; and in after life, in the wintertime, when fond memory constrained me to visit my ancient friends, I found them there, standing as they had stood for all the ages, these sullen, sulky giants, clad in their overcoats of snow, and they spoke to me. They taught me my lessons that I have never forgotten. I have never asked them a question in my life that they did not answer, and just three lessons to me that they have imparted—they taught me to love the lesser trees; they taught me to love all the mountains and woods; they taught me to love my fellow man. They made me wander, and as I wandered I thought of God, the destiny of my country, and the human race.

The mountains are full of wonders, and a man who is in love with the mountains can not stay out of them if he would. Some people like the cities, with their noise, their woes, and their great white ways, but give me the mountains, clad in verdure of green; take me to their canyons, deep, dark, and steep, down which mighty waters rush and plunge and fall into great pools flooded with daylight, in which speckled fishes swim, around which masses of ferns and wild flowers grow. Up there there are waterfalls, where bluebirds fly and snow-birds mate, and the rainbows are charmed and wooed and won to captivity by the mists. Up there the mountain lion shrieks and the great owl hoots at night, and the voice of God can be heard murmuring in the highest branches of the trees. Up there the crystal dew is as pure as angels' tears, falling gently as the night. Up there the skies are blue, the stars are big, the days are calm, and the nights are filled with peace. I am in love with the mountains. I am in love with the national parks; and after taking it into consideration, I do not care where the park is located or where the great mountains in this country are located, I am in love with them.

I believe the national parks ought to receive greater attention than they have in times past, and I am encouraged, ladies and gentlemen, to find these men, who are full of this subject, uniting shoulder to shoulder for the betterment of our national parks, uniting upon plans to get people to come to the national parks to visit them and see the mountains of our great land. It is nonsense for the people of this country to go to other lands when we have the great Sierra Nevada Mountain Range here upon our east and our great Rocky Mountains and parks in the northwest, mountains that you can not see in any other land. I say that I am very much encouraged with the thought that these men have united upon the proposition and that a new era has dawned for the development of the national parks for the purpose of getting people to come to our national parks. It is gratifying to know that everybody is working harmoniously to bring about the same great results. I am glad to have had the privilege of just saying these few words to you, ladies and gentlemen, upon this great subject and to lift my voice and say "God bless you" and "God speed you."

ASSISTANT TO THE SECRETARY MATHER.

If one does not get the spirit of the parks and the mountains in his soul after that it is not worth while. About those two moons. I have not seen those two moons, but I have seen something up there that is a whole lot better. I have been up in the Kings River country, in the region of Rae Lake. I have seen the sunset over in the west, and just as the sun went down I saw the full moon come up

in the east. The sight of the great, full sun going down on the west side and the great, full moon coming up on the east is far better than any two moons you could possibly see from any lamp-post in San Francisco.

We are now going to hear something about the business of our most easterly national park, not merely a national park in name only, but at the same time a part of that great system in which we are all interested, the Hot Springs of Arkansas, with an original Government reservation of but a few hundred acres. We counted in hundreds then, where we now count in hundreds of thousands in our parks. Notwithstanding the fact that it has been known in the East for many years for its curative waters, it has not been thoroughly appreciated. Some years ago the then Secretary of the Interior, Secretary Hitchcock, was in charge of the Hot Springs, and asked an architect in New York to see if he could not work out some idea for the broad-gauge development. Mr. Hitchcock thought there were great possibilities in the Hot Springs and that they could be made to line up along with the great baths or spas of Europe if they were properly presented to the people and if it were possible for the people to have an opportunity of enjoying themselves there as they do at the spas abroad.

There was prepared at that time, at Mr. Hitchcock's request, a comprehensive scheme, worked out by means of topographical maps. This was the work of Mr. Howard Greenley, of New York, but at that time he had not seen the park. I was very fortunate in having an opportunity of meeting Mr. Greenley a few weeks ago in Washington, when he revived this scheme. Mr. Greenley consented to come out here to San Francisco and attend this conference, and also agreed on the way to stop at Hot Springs and study the matter thoroughly and then give us the ideas that occurred to him, visualizing the possibilities of the park along the lines suggested.

Here were these plans originally made lying away in the department, as many a good scheme has been treated before. I do not know whether this one can be resurrected or not, but we are going to try it. Mr. Greenley is very much alive to it. He will do his part toward resurrecting that scheme he put before Secretary Hitchcock several years ago.

MR. HOWARD GREENLEY.

Mr. Secretary, ladies, and gentlemen, I feel, after the last speaker, somewhat at a disadvantage in having been born in the East.

I have had the honor to be asked by Mr. Mather, the Assistant to the Secretary of the Interior, to present to you a report embodying a suggested improvement for the Government reservation at the Hot

Springs of Arkansas. I greatly regret that it was impossible for me to be present at the conferences which have already been held. It is very stimulating to learn of the admirable work which is being carried out by the Department of the Interior in its projects for the intelligent development of the national park reservations along lines of permanent improvements.

My acquaintance with the Hot Springs Reservation began in 1906 and 1907, during the term of office of the Hon. Ethan Allen Hitchcock, then Secretary of the Interior. He was greatly interested in this reservation, and asked me for suggestions which would make for the physical improvement of the locality as well as simplify the problems of administration. I therefore submitted a plan and a report based on such information as I could obtain. This plan, which I shall show you later, might at that time have been largely carried out. At present, however, improvements of such substantial character have been made as to require a very considerable modification of it. I am encouraged to believe, however, that with Mr. Mather's and Mr. Daniel's enterprise and activity some admirable results may still be possible.

I shall refer briefly to the history, geographic location, and topography of the reservation and to the Hot Springs and their therapeutic quality.

These Hot Springs are situated in the geographical center of the State of Arkansas at the easterly base of the Ouachita Range of mountains, a southerly extension of the Ozark Range. They are associated by legend with the visit of De Soto on his expedition to the Mississippi River. He may have discovered in them the mythical fountain of youth of which he was in search. The lands were ceded to the Government by the Indian tribe in the vicinity of 1818. By act of Congress in 1834 the springs and the territory adjacent thereto were permanently reserved for the United States Government, thus creating the first national park reservation of the country.

In 1877 the Government appointed a commission which recommended a permanent plan of improvement. Under that plan (the report states) the land which was unessential to the reservation was subdivided and the lots assigned to various individuals. By reason of this generous distribution the extent of the original reservation, amounting to 2,529 acres, is now reduced to 913. I regret not having a lantern slide of the map showing the way the plotting of the streets and alleys was done at that time, but it is quite evident that the plan was not submitted to any art commission. And this is where all our trouble began back in 1877. The conclusion of the work of the commission resulted in the retention of the Hot Springs Mountain, North Mountain, West Mountain, and Sugar Loaf Mountain as the permanent reservation.

The hot waters issue from the base and the lower slopes of the Hot Springs Mountain, east of the valley. The area is a narrow strip a few hundred feet wide and a quarter of a mile long. There are 46 springs, of which 44 are hot and 2 cold, with temperatures for the hot springs varying from 95° to 147° F. and 46° to 55° for the cold. The hot springs seem to be more abundant in their flow than the cold springs, and the total estimated amount of water is nearly 1,000,000 gallons a day.

There was no chemical analysis made of the waters until 1899. They contain various elements in combination or as acid salts, but in very small amounts. The hot springs are radioactive to a marked degree, but as a radium emanation or gas in solution and not from the presence of a radium salt.

The source of the waters is meteoric. They correspond closely to the ordinary springs of the neighborhood, except in the element of heat. They derive their heat, in all probability, from still heated igneous rocks, which convert deep-seated waters into vapors, and these in turn ascend through fissures toward the surface, meeting spring waters, which are thus elevated to the existing temperature. There is no indication that these springs are dying. The flow remains constant, and the loss in maximum temperature is inappreciable, amounting to 1 degree Fahrenheit in a little over 50 years.

The curative value of the waters of these hot springs is very well known abroad, and in not a few instances have been recommended by foreign physicians to patients seeking relief from ailments who have visited European resorts with this object in view. This demonstrates the need of disseminating more general information regarding them in our own country.

The Government administration of the reservation and the regulation of the baths and bathing privileges show constant improvement. In contrast to this the municipality of Hot Springs, the greatest beneficiary, shows almost no inclination to assist in the Government's regulative policy or to enforce civic improvement along æsthetic lines in conformity with the Government's policy on the reservation. There has been cooperation on the part of certain associations and private persons and lessees which, fortunately, has been of value in adding to the attractive appearance of the reservation and immediate neighborhood.

The charges for the use of the waters by the various bathing establishments, supplemented by rentals and other sources of income, is disbursed variously in salaries of the administrative force, in the maintenance of the free bathhouse, and the improvement of the reservation.

So much for the description of the Hot Springs Reservation, as it is. In the report submitted to Secretary Hitchcock I described

a program given at the Ecole des Beaux Arts, which shows a French interpretation of a problem of this character. This program presupposes ideal conditions and the solution is naturally an ideal solution, eliminating the element of the sea baths, the requirements of the program might perfectly well suit conditions for the conception of any thermal establishment. Make it a center of attraction.

Having had the opportunity on my way out of seeing existing conditions at Hot Springs, I can not recommend this scheme as practical at the present time. It is to be regretted that the commission appointed in 1877 did not have the foresight to retain sufficient property to permit of it in their impartial distribution of land. I present this scheme as though it were practical if only to furnish a basis for discussion and from which a modification may to a great extent still be carried out along lines of least resistance.

One of the dozens of reasons why I think this was advisable is from a clause I read from the superintendent's report on the Hot Springs in 1905. This report goes on to say:

In my opinion, experience has demonstrated that the present system of operating the baths through the medium of private lessees is in conflict with public opinion and is incompatible with local conditions, and that the Government should, as soon as practicable, consistent with existing conditions, assume absolute and complete control of this reservation and operate the bathing interests under Government supervision and control, thereby eliminating the spirit of commercialism which is manifest under present conditions, and through scientific equipment, perfection of system, order, discipline, and intelligent direction, extend the benefits to be derived from the healing waters, with rates adjusted to cover prudent operating expenses and necessary improvements. The present system, if it ever had any meritorious features worthy of consideration, has outlived its usefulness and should be supplemented by full Government control in the management, operation, and supervision of the baths. The present bathhouses should be replaced with substantial, extensive houses, built upon approved plans with perfected detail as regards system of bathing under proper medical direction, trained service with modern equipment and furnishings, preserving all sanitary and hygienic features of light and ventilation.

That, I think, was the idea that Secretary Hitchcock had and which I attempted to carry out.

(Mr. Greenley exhibits series of lantern slides, during which Mr. Greenley said: The public free bathhouse should be separated from the paying bathhouse on the Government reservation.)

ASSISTANT TO THE SECRETARY MATHER.

Now, if there is anyone who would like to ask a question, I would be very glad to hear from him.

MR. W. T. S. CURTIS.

You suggest the removal of the old free bathhouse. Where would you suggest it be removed?

MR. GREENLEY.

My idea was to remove it to some other part of the reservation.

MR. CURTIS.

Beyond the superintendent's house?

MR. GREENLEY.

Yes. That is one of the things I think should be done.

MR. CURTIS.

I understand the property on the left-hand side of that avenue you exhibited, Fountain Avenue, is privately owned?

MR. GREENLEY.

Privately owned on that strip, on one side; but nearly all of the property which is located on the east of this scheme of development, with the exception of that on the west side of Central Avenue, is a very inferior type of property. I mean by that that it is not improved to any great extent, and it looks as though it might be acquired for a comparatively small expenditure. There are buildings there of the type I exhibited to you, and all that sort of thing, on the other side of what is called the Opera House.

MR. CURTIS.

This general type of architecture that you have spoken of would cause a pleasing effect in the sky line, would it not? If that plan were followed, the sky line would be very pleasing?

MR. GREENLEY.

Yes. There is only one thing that I regret that was done back in 1888 or 1889, and that was the covering up of Hot Springs Creek, which ran directly through the main street, and which was simply used for surface water drainage. One of the features of the baths at Carlsbad is that through the central street runs a very beautiful stream, with bridges and various landscape effects, making a very attractive view. At the Hot Springs this was covered up with a solid concrete tunnel, and I have no doubt that stream is going to be buried in that tunnel permanently, because it is a very substantial piece of work.

ASSISTANT TO THE SECRETARY MATHER.

Have you a word or two to say, Mr. Daniels? We would like to have your thoughts on this matter so far as they have occurred to you.

MR. DANIELS.

I do not believe there is a place in the United States which the Federal Government has anything to do with that cries out so much for remodeling as Arkansas Hot Springs. We hear a great deal about the planning of the landscape architecture in Europe, with the idea of developing the picturesque there. Absolutely the reverse has been done in Arkansas. I think the place has been allowed to grow up much like Topsy. If there is anyone who is interested or who has a sincere regard for the holdings of the Federal Government throughout the country, and especially at Arkansas Hot Springs, I am sure that he will go back with the firm determination to do all that he possibly can to bring about the execution of such plans as Mr. Greenley has presented to us here to-day. It struck me while I was on the ground that almost the exact plan that he has presented here to-day is the only thing that would fit the conditions there. I do not wish to claim the honor of having thought of the same thing that he has thought of, but in sketching out some of the possible arrangements at Arkansas Hot Springs I drew almost the same diagrammatic plan that he has here. I do not believe that there is any other plan that could be successfully worked out. As to the details, of course, I know nothing; but it is hoped that some such plan as has been shown here will be adopted by the Federal Government. One hundred and forty-five thousand people annually go to that place, and each one goes away with a very depressed feeling and a great deal of disgust instead of admiration for our Federal Government.

ASSISTANT TO THE SECRETARY MATHER.

I want to thank you, Mr. Greenley, on behalf of the department, for the time and attention you have given to this work. You have been very valuable to us, and I hope it will be possible for us to develop something from this later on. If we can not reach this particular problem right now, I hope we shall be able to get to it before very long.

We shall begin our afternoon sessions at half past 2 to-day. We will have a chance then to hear from Mrs. Sherman on behalf of the General Federation of Women's Clubs, and the work that it is doing in the furtherance of our aims.

After we adjourn I would suggest that you look through some of the exhibits in this building of the various parks which the Southern Pacific Co. has installed. The superintendents and others will arrange to gather at the Old Faithful Inn for lunch.

We have with us here now a representative of Mayor Rolph, Mr. Edward Rainey. I am going to ask Mr. Rainey to say a word or two to us on behalf of the city's executive.

MR. EDWARD RAINEY.

Mr. Chairman and friends, when those pioneer ancestors of ours were called to the great beyond, just a little farther west, as your representative in Congress so beautifully put it a moment ago, they left behind them in hearts of all men in California and the West what is known as the spirit of the West, which is typified, we think, more in California than any other part of the West, and it is in that spirit of the West that I want to briefly welcome you gentlemen representing the Government of the United States to our city of San Francisco.

We are certainly pleased to have this conference come to our city. We want you men who have come from other parts of the United States to feel that you are as welcome here as though you were our kith and kin. We want you to enjoy your visit to San Francisco, and we hope that you will profit by your visit to this exposition. We hope the cause which you represent will profit by the papers and discussions which are to be heard during your conference. I have nothing more to say, because I know you are anxious to get over to Old Faithful Inn for lunch. We welcome you sincerely and hope that this will not be your last visit to San Francisco.

As a municipality we touch your branch in the Federal Government only at one point in the Yosemite National Park—in the development of the Hetch Hetchy Reservoir and Lake. I want to say to you that the city of San Francisco is going to and will continue to carry out its agreements in regard to the Hetch Hetchy to the letter. We are not going to destroy any of the beauties of the park. We are going to improve the beauties there. We are going to live up to everything we promised to do, and I want to say to the superintendent of the Yosemite National Park, if he is here, that he will receive the hearty cooperation of the city authorities at any time and upon any subject which he wishes to bring before us.

Just one word more of welcome, which comes from the mayor of San Francisco, and from the people of San Francisco. We wish you well in all of the things in which you are interested.

ASSISTANT TO THE SECRETARY MATHER.

We will now adjourn. I want to say right now that there will be two or three more of the parks taken up this afternoon. Also the concessioners will have an opportunity to be heard during the afternoon. I want them to feel that they are a part and parcel of the parks and that they will have a full opportunity to be heard.

AFTERNOON SESSION, MARCH 13.**ASSISTANT TO THE SECRETARY MATHER.**

The conference will now come to order. We are going to have the pleasure now of hearing from one who has taken an interest in national parks for some years and who is now doing some intensive work through the General Federation of Women's Clubs. Mrs. John D. Sherman has been very active in the work of women's clubs and has recently been appointed chairman of the conservation department, and I now take great pleasure in introducing Mrs. Sherman to you.

MRS. JOHN D. SHERMAN.

Mr. Chairman, and friends of our national parks. With nearly 2,000,000 women already at work for our national parks it is particularly gratifying to the conservation department of the General Federation of Women's Clubs that the Interior Department of the United States Government is also going to work for an adequate national park service. The General Federation of Women's Clubs directs its activities through 11 departments of work. The conservation department has to do entirely with the conservation of our natural resources. The work of this department is subdivided under eight division heads—natural scenery and national parks, forestry, soils, water, and waterways, the establishment of good roads, and the roadside planting of the Lincoln Highway from New York to San Francisco. The conservation of natural scenery and the development of national parks is a comparatively new feature of the work of the conservation committee. The club women have undertaken this work because they recognize the growing and imperative need for more recreation places out of doors. A nation progresses largely according to the use that is made of the leisure time of its people. As Stevenson so well puts it, there is nothing that should be so much a man's business as his amusements. Now there is one of the strongest of forces that controls the people during their leisure hours. It is a splendid antidote for the conditions growing out of a civilization that has become too complex to be wholly sane and wholly safe. Outside of home influences the intimate acquaintance with nature is one of the strongest and greatest that can be brought into the life of a child. It has an influence that lasts all through life. Because of this we are asking the public schools all over the country to give more attention in the future to the study of the things of interest in the natural world out of doors.

Every community should have a place in which the people may spend some of their leisure time, where they will be brought in direct contact with things of beauty and interest in the outdoor world.

For this reason we need more city parks, more county and State parks, and especially more national parks. There never was a more fitting time than the present to arouse the people to a greater appreciation of the value of America's natural scenic beauty. These natural scenic areas are rapidly decreasing in number and size. Those that remain of them are in increasing danger of two kinds; one danger is that they may become privately owned and the public be excluded, and the other danger is that they may be used for commercial purposes and their beauty destroyed.

The women of the General Federation—and there are nearly 2,000,000 of these—believe that the first step in this campaign for natural scenery is the development of the national parks that we now have. We believe that the people will make use of their great public playgrounds when they are made ready for the traveler, and the club women of the country stand ready to do their share of the work in getting them ready to be seen; but we are not willing to stop here; we are not satisfied to stop; we want more national parks, and we are going to keep right on working for them. We had a share in the making of the new Rocky Mountain National Park, and we are now engaged in making a natural scenic area survey of the United States. It is our aim to have the women make a list with a description of all of the scenic areas in every State that are now being used for park or recreation places, and in addition, we are to have a list of those areas of natural scenic beauty or scientific interest that should be preserved. Some returns have already come in along this line of work, which show that the women of Arizona are going to work for the Grand Canyon National Park. The club women of Utah have indorsed the Sawtooth National Park project, and the women of New Mexico are particularly alive to the value of the conservation of natural scenery, and at the next Congress they will ask that three of the national reservations in New Mexico be created national parks.

Another feature of the campaign for natural scenery that we are conducting is to urge all of our clubs, the clubs all throughout the country, to have one program, at least, during the club season devoted to natural scenery and national parks; and we furnish the programs of the bibliography for such programs, and the State federation at its annual conference will have an afternoon or evening devoted to this subject.

The Government now owns many scenic areas that are splendidly fitted for park purposes. These areas are of nation-wide interest, and are better suited for park purposes than for any other use. Can the American people do a more rational thing at the present time than to help make these places national parks? The general federation has conservation committees working in every State in the

Union. Through these committees, we shall reach nearly 2,000,000 club women, and, through them, we shall arouse public opinion to the value, both ethical and economical, of the natural scenery of our national parks.

We shall bring to the people the message of John Muir, the greatest of all nature lovers and nature writers, to come to the mountains and get their good tidings.

ASSISTANT TO THE SECRETARY MATHER.

We were to have Mr. Henry S. Graves, the Chief Forester. But Mr. Graves could not come, hence he sent Mr. Potter, associate forester, who will read Mr. Graves's paper, "National Forests and National Parks."

MR. POTTER.

Mr. Chairman, ladies, and gentlemen, I am sure that Mr. Graves regrets very much that the need for his personal attention to important matters in Washington made it impossible for him to be here with you to-day; but it is an ill wind that blows no good. Therefore it is my good fortune to be here to visit California, which I also have the good luck to be a native of, and it is the State in which I was raised. It is a great pleasure to see this beautiful exposition, which has grown up where I used to stroll along the beach and tramp over the barren sand hills.

Mr. Graves's paper is as follows:

"The development and administration of the national parks and of the national forests are related in the most intimate way. Both classes of reservations have been established to be retained permanently in public ownership and to be administered for specific public benefits. The parks are nearly all either contiguous to national forests or surrounded by them. Many of the present national parks formerly constituted a part of some national forest; most of the parks that may hereafter be established will cover areas now within national forests. The parks contain great areas of forested land, which present problems of protection from fire, insects, and disease identical with some of our national-forest problems. Both the parks and the forests are in considerable part still in a state of wilderness and require improvements to make the different parts of them accessible for protection and for use and enjoyment by the using public. Physically interlocked, they call for a correlated system of fire protection and a correlated system of transportation and communication.

"Just as there are in the national parks very definite forestry problems, so also in the national forests there is a definite and fully recognized problem of development and use for recreation purposes. The

national forests are chiefly in mountain regions and contain areas of unsurpassed scenic beauty and interest. Scores of such well-known mountains as Baker, Olympus, St. Helens, Jefferson, Shasta, Hood, Whitney, Pikes Peak, Ouray, Washington in New Hampshire, and Pisgah in North Carolina, are in the national forests; but there are also many hundreds of little-known mountains and innumerable lakes, streams, and other scenic features that afford ideal spots for the use of those seeking health and recreation. Already these areas are becoming more and more used. Probably not less than one and one-half million people visit the forests every year for recreation purposes; and this is a use of the forests that is being fostered and developed by the Forest Service just as other uses are encouraged. In the national forests the recreation problem, or, if you please to call it so, the park problem, is not confined merely to certain large areas of extraordinary and spectacular scenic character, which may some time be considered as desirable for national parks, but it is one that concerns thousands of points throughout the forests—a problem that is being handled with forethought and in a constructive way, just as are handled the development and use of other resources like timber, forage, water, and land.

“These considerations point to the fact that the national park problem is not confined to certain areas set aside under that name and administered with the recreation resource as the dominant if not the only resource to be considered. We have a much bigger problem—that of properly handling the recreation resource as one of the inter-related resources which are combined in a vast public property now held permanently by the Nation. That resource is a very great one. It must be protected, fostered, and developed for its maximum use. But in the case of the forests it can not be handled as though it were either the sole or ordinarily the dominant resource. Along with it must be handled other natural resources whose proper use and development are essential to the industrial upbuilding of the regions and of the country at large. There are places where the recreation resource overshadows all other and the property must be handled with this form of use primarily or exclusively in view. But, as a rule, the timber, forage, and other resources must be regarded as dominant. Nevertheless, they should be developed with such restrictions as to provide for the protection of scenic values.

“This large conception of the problem, on the one hand, of the recreation resource as a whole, and, on the other hand, of its relation to other economic resources, is essential in laying the foundation for a sound policy of national-park development. It underlies the proper selection of areas to be set aside as national parks. It underlies the determination of boundaries of these parks. It underlies a correlation of the development of the parks themselves with the development

of the recreation resource in the national forests, or, if I may express it thus, with the development of thousands of miniature parks in the forests, each of which on a small scale is serving the same public benefit as the national parks themselves.

"An essential element in this broad conception of the problem is what I would call a national viewpoint, combined with a constructive spirit. It is necessary to look far ahead, to foresee what the best public welfare is going to call for, and to make such plans and such provisions that the needs of the people of the country as a whole will have been most effectively provided for. The second-best or third-best or fourth-best thing should not be done instead of the best merely because it happened to be proposed, was believed to be good, and was therefore accepted without inquiry to learn whether there was something else still better. It is a waste both of money and of opportunity to develop as a national park an area which will be less valuable to the public at large than some other area in the same general region. The question of accessibility and probable use should be considered not from a local but from a national standpoint. Every national park should contain natural attractions worthy of national fame and of development by the use of national funds. On the other hand, provision for needs of a more local character should be made through the development of the recreation resource of the national forests, where national forests are in existence and available for this purpose.

"A failure to recognize these broad principles leads inevitably to a haphazard selection of areas as national parks, mistakes in boundaries, and unnecessary obstacles retarding progress in park development. The narrow view is at the basis of the mistaken idea held by a good many that the recreation resource can not be conserved and developed in a national forest, and that every area of special scenic interest must be put into a park if it is to be handled properly. Personally I regard the national parks as very necessary, but I regard them as meeting but one part of a greater problem that involves not only our great natural wonders, but also a vast number of less striking yet locally important areas which the public controls and which ought to be developed in the interest of the public.

"In the administration of the national forests it is a cardinal principle that each class of land should be put to its highest use and render its greatest service by use. In some cases certain areas are either suitable for a single use only or susceptible of proper protection and development only when devoted exclusively to one purpose. Ordinarily, however, with a certain measure of restriction here and there the different resources can be developed side by side. The forage is used for grazing, but it is made secondary to

timber production and is not allowed to be so handled as to injure the forest. In some places the protection of the water resources and prevention of erosion and slides is the most important matter. In such places cutting of timber is not carried on. In some places grazing is prohibited on city watersheds to insure the prevention of erosion and the safeguarding of the purity of the water. In some cases the grass is held for the use of the elk and other game. And, finally, the protection of scenic roads, lake shores, and other points of special esthetic value is carefully safeguarded in the cutting of timber and in other forest work. In short, consideration is given to the use which will accomplish the greatest public benefit.

"As occasion arises to consider establishing national parks from areas now in national forests, the fact that protection of the scenic features is one of the purposes of the present administrative control should be borne in mind. Roads and trails are being developed, as this can be done in connection with the protective work and development of other resources. As the funds available for road building increase through increasing receipts from the sale of timber, there will be possible much more attention to the needs of scenic sections of the forests for road development. Where, however, there are areas that should be devoted exclusively to public recreation, and that can be more quickly opened up as national parks, they should be made such. But that action should be based on the larger consideration of a national system of recreation development. Parks should not be established merely because of a local demand for roads or for advertising some city or town or to boost real estate near the proposed park. Only such areas should be selected as are to be devoted practically exclusively to park development, and then only as a consistent and orderly part of a large plan. Otherwise the areas should remain in the national forests, and be handled from the standpoint of recreation development side by side with other resources.

"If this principle is followed, there will not arise any difficulty about conflicting use of resources, because only areas are included in parks in which the recreation development so overshadows other resources that they may remain unused or entirely subordinated to park purposes. It would be a great mistake to include in parks great bodies of commercial timber merely to include some mountains or canyons of scenic interest. This would result either in preventing the use of the timber or having a national forest under the name of a park.

"The same principles should be followed in laying out boundaries of parks. It should be remembered that the forests are carefully laid out units of administration. Each is handled along lines of forward-looking working plans. To establish a park or draw the boundaries of a park with thought only for the park problem and forgetfulness

of other public property that is being handled on long-time plans is to fail to understand the larger public purposes of both forests and parks. To illustrate: I have for four years been urging that the Grand Canyon be made a national park. I have urged this because it is one of our greatest natural wonders, one of the greatest in the world, and because it should be handled exclusively for park purposes. In drawing the lines, however, there should be considered not only the needs of administration of the park but the needs of administration of the Kaibab and Tusayan National Forests and the enterprises that have already been initiated upon them in the use of their resources and in developing the industries of the region.

"Wherever national forests and national parks are contiguous their administration should be very closely correlated. This is especially important in fire protection and in building roads, trails, and other improvements. In fire protection there should be the same tying together of lookout and telephone systems, trail and patrol routes, and patrol and fire-fighting organizations as between two contiguous national forests. Much is already being done now in that direction; it should be more. In the matter of roads, many of the approaches to parks are through national forests. At present the road funds of the Forest Service are absorbed in construction primarily for fire protection and to aid in community development. There is but little available for strictly tourist travel. With the increase of receipts this condition will later on be much improved, and contributions can be made for highways which will develop chiefly the recreation resources of the region. Meantime most of these park approaches will have to be built from funds specially appropriated for the purpose. In my judgment, when money is appropriated by Congress the approach to the park through the forest might well be included; and authority should be granted to use park funds when the roads cross into a forest here and there. Provision for this could be made merely by adding a few words to the bill. It would avoid the embarrassment of present lack of authority and prevent the effort to change the park boundaries merely to cover a few miles of road.

"My final word is to emphasize that there are not two separate and distinct problems—parks and forests. There is one great problem of development of the scenic features of our public lands for recreation use and enjoyment, and both the parks and the forests are contributing to it."

ASSISTANT TO THE SECRETARY MATHER.

That is certainly a very interesting paper. That keynote of cooperation is very interesting. There have been one or two specific matters in which we have already cooperated with Mr. Graves since

I have been in Washington. One of them is the matter of a road to Lake McDonald in Glacier National Park. That is practically all within the park boundary, but the land along the park is in private hands. It becomes necessary, if we are going to save the lake there for its scenic value, to arrange for an exchange of timber in the national forests, just as was done in the Yosemite National Park. We worked out an arrangement that was satisfactory both to the Department of the Interior and the Department of Agriculture. If it had not been that the settlement was brought about near the close of Congress, we would have had the bill through. It was impossible to get it out of committee. It would have passed if it could have only reached the floor, having already passed the Senate. We will have to wait over until the next Congress before we can bring it up again.

Also at Mount Rainier there is another condition there outside of the park—the beautiful road that leads from Tacoma up to the entrance of the park, with its splendid Douglas firs along the road. Work is now being done by Tacoma and Seattle people upon a bill that will make possible an exchange of the land owned by the lumbermen along that road for other land so that a strip along that road may be preserved for all time.

Mr. Daniels, have you a few words of comment on the paper read by Mr. Potter, or any features of it?

MR. DANIELS.

Mr. Secretary, it is particularly gratifying to hear Mr. Graves, who is the Chief Forester of the Service, reiterating the slogan of the national park service regarding those particular characteristics which should determine the selection of a national park. It is gratifying because it is an encomium on the skill and good judgment of those who have selected all of the national parks in the past, for there is not one exception to the rule that these areas should be selected for exclusively scenic purposes. Every national park we have in the United States is primarily for recreation in its character.

There are, of course, in the national parks some problems relating to forestry. I find that I can not entirely agree with Forester Graves that the park administration and the national forest administration should be unified. The prime purpose of the development of national forests is commercial, and if it is ever successfully consummated and carried on the spirit of commercialism must pervade the organization. The prime purpose of the development of the national park service is quite the antithesis of commercialism. It is idealism. The problems in the administration of a national park are as foreign to the problems of the administration of national forests as a com-

mercial enterprise as anything could possibly be. It is quite true that the national forests involve problems that are similar to the problems of the national parks, and it is also true that in the administration of a national park the problems that are common to foresters are quite frequently present. However, the recreational features in the national forests are incidental, and the forest problems in the national park administration are incidental.

I had several discussions with Mr. Graves while in Washington, and together we worked up a scheme for cooperation in which the National Park Service was to give its advice predicated on its rather intensive experience in the problems of parks to the Forest Service in those occasional instances where they have recreational features. On the other hand, the National Park Service was to call upon the Forest Service for their administration in such problems as the sale of timber, for instance. I believe that this will eventually result in a simplification of the problems of each of the two departments. I do not believe I have any further comment to make upon this paper, Mr. Secretary.

MR. POTTER.

I am sure that Mr. Graves agrees with every word Mr. Daniels has stated. It is exactly his idea of the way the two great reservations should be handled—national forests and parks—and what Mr. Graves had in mind in the suggestion of working together was in those things where our interests are identical, such as in fire protection and in fighting the enemies of forests. I am sure we shall be able to cooperate.

ASSISTANT TO THE SECRETARY MATHER.

We are on the right road. Let us only keep going on that road. We will now have the opportunity of hearing from Mr. Robert B. Marshall, chief geographer of the United States Geological Survey. Now, Mr. Marshall is not a Californian. I want to state that right now. He is a Virginian. But in the course of surveying this country from one end to the other he also surveyed the ladies of the land. So when he came to survey California he happened to survey one of the fairest ladies of California. His fate was settled forthwith. He married the California lady. For that exhibition of excellent taste we consider him at least three-quarters Californian.

MR. R. B. MARSHALL.

Mr. Chairman, ladies, and gentlemen, as Mr. Mather has stated, I did find the most fascinating girl of my life here in California in the Yosemite National Park when I was making the topographic map of that

wonderful and beautiful country in 1893, but I want to assure you that when I got to the point of asking her to share the rest of her life with me I was not much more embarrassed than I am right now. You have heard many interesting talks during the Third National Park Conference, and other far more able speakers than I are here. Mr. Mather knew when he was in Washington that this would be so, and I am therefore still wondering why he insisted on my attempting to address you on such an important subject. However, I was told yesterday that I would be next to the last speaker. That gave me consolation, for I know that we carry away with us our last impressions, and I was to precede Mrs. Sherman. I knew she would clear the atmosphere and that my simple words would be forgotten in remembrance of hers. But here I am at the end of the program, following Mrs. Sherman's all too short and most interesting talk.

Where shall I begin? To tell you of the 20 years of my life spent in God's glorious mountains, partly in our national parks, is a task too dear to my soul to rush through thoughtlessly. There are so many pleasant memories that come to mind of which I would like to tell you. I want each of you to know and to love our national playgrounds as I do, to feel their inspiration, to have worlds of friends in the old storm-seared peaks, the trees, the birds, the flowers, the streams, the animals, all beckoning, calling to you to come and live among them. And when you can rush away from the busy life and go to them they will greet you smiling and laughing, swaying all about in genuine glee as do children greeting their favorite playmates. Oh, it is glorious beyond description, and so satisfying. The wonders of the parks can never be told; you must go to them and absorb their influences.

For many years I have looked forward to the time when the national parks would be recognized by the people and the Nation, and I have been deeply discouraged until very recently, when Secretary Lane announced the appointment of Mr. Mather as his assistant, with the care of the national parks as his principal duty. My joy was beyond control. The Secretary believed in the parks and wanted to handle them himself, but he could not give the time, and so he selected the one best man in the whole country, Mr. Mather, and turned the work over to him. Thereafter, during the last four months, the light has been creeping in. I am sure that you gentlemen of the park service are feeling his masterful influence, and that each of you will go back to your station determined to make your park the best of all; that you will impart the inspiration to others; and that our guests in attendance will pass the word along until we shall have thousands and thousands of people thinking and talking national parks. The more the better. Get everyone you know to go to one park once; they will go again. Talk parks all the time.

Briefly, this is my message to you after 20 years' acquaintance with the parks. Details and stories I will tell you another time.

But don't forget that we must all pull together. That is the object of this conference—to bring us together so that we may unite in the endeavor to get just as many of the people as we possibly can to visit the parks. One reason why we can not get legislation in Washington is that to the majority of the Members of Congress the parks are practically unknown. They are too far away. I believe everyone who heard the talk this morning of Congressman Church got the impression that there is one man who is going to be of great service to us in Washington. He is going to win a lot of people for us. The only way that we will ever get the money needed for the parks is to get Congress to come and see for itself; then we will get the money we need.

We heard Mr. Ford Harvey over at Berkeley the other day make some very telling statements. He recalled to my mind the first time that I went into the Yosemite and observed how the people were handled there. They were pulled and hauled from one place to another, from the camp to the hotel, then from the hotel to the camp. Mr. Harvey said that all concessions in any one park should be under one management and that for the protection of the people the Government should control that management. Some of you may not agree, but Mr. Harvey is right. That is the only way in which the people can enjoy the full benefits of the parks, the purpose for which they were created. We must have roads and trails planned from a scenic as well as from a get-there point of view. Many people want to get there fast, but more of them want to see as they go along. In the past one superintendent would build trails and say they were all right; then the next superintendent that came along would say they were no good and go some other way. In the Yosemite country you can start in any direction and see blazes everywhere. It used to be said that when the soldiers went into the parks they were afraid they would get lost when they turned off the roads onto the trails or across country, and so they blazed each tree they came to. I have gone through sections of the country where almost every tree was blazed. I did not blame the soldiers. They did not know the way and had no signs to guide them. Mr. Mather will tell you himself that he made a trip through those glorious mountains of the Kern River country and got lost because there were no signboards.

One thing we must not forget when we get down to working together, and that is we must have all the friends we can get, both in and out of the parks. I sympathize with the owner of private holdings in the parks. He is entitled to his rights and must have them.

We can get what we want far more easily by persuasion than by fighting them.

I might go on for hours talking on this fascinating subject, but there are others who are to talk and I want to hear them.

ASSISTANT TO THE SECRETARY MATHER.

The thought has just occurred to me that perhaps Mr. Colby, secretary of the Sierra Club, might have a word or two to say. He has not been with us during this conference until to-day, but he has always been tremendously active in our line of work. He has taken a tremendous interest in our work, in our own Sierras in California, and in other parts of the country.

MR. WILLIAM E. COLBY.

Just give me a few moments to collect my thoughts. If you will defer for a few minutes, I would be very glad to say a few words.

ASSISTANT TO THE SECRETARY MATHER.

Very well, Mr. Colby. We would like to hear a word or two from Mr. Yard. He has been attending our conferences very faithfully all over the country, and I think perhaps he can give us, from his own standpoint, some of the impressions he has received as to whether this conference has been really worth while or not.

MR. ROBERT STERLING YARD.

Mr. Secretary and friends, I have no business to be here, as I think you all know, for the reason that I am a tenderfoot. I have no right to stand up here talking to mountaineers. Why, they showed me trained dogs at Albuquerque and told me that they were tame coyotes. They joshed me all the way across the continent. When it came to putting our names down in the visitors' book at the Sigma Chi House in Berkeley, where we have been living as a happy family since we have been on the coast, they insisted upon my writing down the name of my park. I entered my park as "Central Park, New York." I have been hammering the streets of New York for a good many years. It is a dozen years, at least, since I have cast a fly in any water inhabited by anything of a finny character.

Nevertheless I have got the stuff inside of me. When I am in the woods I feel closer to God than anywhere else. I think the hour of the deepest devotion and the highest spiritual uplift of all my life was an hour I spent all alone, solitary and silent, in a great beech

woods in the northwestern corner of the Adirondacks. I have not qualified for the Rocky Mountains. But I know I shall qualify, because the qualification for the mountains, as I well know, lies inside of one, lies in the soul, and not in one's accomplishments. So it is that I, the treader of dusty city streets, boldly claim common kinship with you of the plains, the mountains, and the glaciers. For the love that is in your hearts is also in mine. There is the human appeal that is our common possession. We share the human point of view.

It is largely from the human point of view that I have looked at this conference that we have been having at Berkeley for the last two days. I have looked at its results, too, also from this human point of view. And I think there is one result that stands out with tremendous force, and I think it is the greatest thing of all. This conference, no matter what else it has produced, has produced this one unconquerable thing—it has brought about solidarity.

When we first got to Berkeley and sat down to breakfast in the morning, there were a lot of people there from the parks. Very different kinds of people, indeed, were those who sat down to our first breakfast; while it was a crowd gathered for a single purpose, it was not a crowd that spiritually was together. Every one of us was an individual; every one of us had his own purpose and had his own point of view; and each one sat there looking more or less askance at his neighbor. There was a new chief in the park service, too, and each man looked askance at the new chief. What manner of man was he? It was one of those nervous gatherings so full of strain and discomfort.

But when we broke up last night over there in Berkeley that same silent, nervous group had become as closely bound together in bonds of sympathy and common effort and affection as any crowd of 24 men I have ever seen. It was a great idea of Secretary Mather's getting us together in Berkeley in the atmosphere of that old college, his alma mater, which he loves so dearly.

Past conferences such as this have been held in the parks, under the inspiration of the trees themselves, but Mr. Mather's idea was to get us all together, living under one roof, and eating at one common board. He was fortunate in securing the clubhouse. It was an ideal spot to gather and eat together, talk together, and work these problems out from different points of view. The object was to have everybody express himself.

Now, as to the results of this conference, I do not believe anyone can speak at this time; and last of all I. But there are several important things besides solidarity which have been accomplished, and there are several things, I perceive, that inevitably are coming.

One of the things that I see coming is this: That the dream of the motorist is coming true. The national parks are going to be opened to the motorist. The roads are to be connected up and highways put through across great sections of our national parks, and they are to be opened up for the common use of our people who drive any kind of a machine.

Another thing that I perceive is coming is the business development of these parks, and by a business development I mean the development of these parks as a system on a big, broad scale. The man who is in charge of the situation to-day is a business man. He is a man who has for many years met all kinds of situations, all sorts of emergencies, and met them promptly and successfully. Such a man is the only kind of a man who is fitted by years of experience to take hold of so big a problem and meet it successfully from a business point of view.

Now, the parks should not be dependent entirely upon the generosity of our National Congress. The parks are a great business proposition, which should pay every year a handsome revenue to be turned back into capital and spent upon themselves. I know that that is our dearest dream. I do not know of anyone who is better fitted to bring that about than the man who is at present in charge of this work.

There is another thing that I perceive is coming, and that is the real popularization of the national parks. When everyone working in the parks and in the Congress and throughout the Nation are all united together for one object, then, as in every great business undertaking, things will move with a vim and speed that will bring about the results that we have dreamed about for years, but which have never so far been even in sight. At last the people are coming into their mountain heritage.

When I was a boy an old man died whom everybody thought was the richest man in town. He left a widow and she went about town as if she enjoyed her former prosperity. She grew thinner and paler with the weeks and months, but she held her head high and no one suspected that she was starving to death—too proud to confess her need. She died, and the tragedy of her pride was bared. And then, too late, \$40,000 was found stowed away in the chimney of that house of which even she knew nothing.

I recalled that the other day when I was thinking of the real magnitude and value of the wonderful mountain heritage of our people. To-day they are dying of starvation because they know nothing of it.

Before I started West I asked myself how many national parks there were, and I could think of two—Yosemite and the Yellowstone. Then, after some hesitation, I thought of Sequoia, and that is all that

I could remember at the time. I considered myself thoroughly well informed. Coming out on the train I told this to some people I met, and one of them told me that among a large number of men of broad education and knowledge of the world of whom he had asked that question—I think he said he asked about 20—there were none that could name more than two. But I perceive that the time is coming when the people are going to know what they possess.

With a business administration, an administration that will make the parks make profits, these profits to develop the parks, charges inevitably will come down, because cheaper prices always result in bigger business. The greater the patronage the lower the costs, and the lower the costs the greater again the patronage. It is a problem in practical business—a familiar, practical problem. That time is coming, just as sure as the sun is going to rise to-morrow, and it is coming reasonably soon. It is beginning right now; and the reason it is coming is that the man is here to bring that about.

ASSISTANT TO THE SECRETARY MATHER.

I will say this, that there is a big opportunity for service, and service in the last analysis is the greatest thing one can offer.

Now, the Sierra Club has rendered us a tremendous lot of service for the parks, those particularly in California, and if Mr. Colby has now collected his thoughts, I think a word or two from him would be in order.

MR. COLBY.

Mr. Secretary and friends, my mental processes the last few minutes have been rather complex, trying to listen to the outline of the talk by Mr. Yard and at the same time trying to outline something that would be worth while saying to you here; but I have talked so often on the mountains I feel that I should not be at a loss to say something on the subject.

When I heard that Mr. Mather had been appointed Assistant to the Secretary of the Interior I had a feeling come over me of more genuine pleasure than any information that has come to me in a long while. The reason for it was that I have known Mr. Mather so intimately and so well that I knew he was thoroughly in sympathy with everything that appertained to the welfare of our national parks. I knew that the star of the national-park idea was in the ascendency, and I wrote him to that effect. At the same time I wrote him that I felt that he was making a sacrifice in taking hold of this kind of work, because I knew of his business connections. He felt, on the other hand, that, instead of it being a sacrifice, it was one of the greatest opportunities that had ever come to him. He was

glad of it, proud of it, and the only thing that worried him was the fear that he would not be able to live up to it.

I know Mr. Mather well enough to know that he will live up to it. I feel that his sympathies with the needs of our national parks is something that we have not had really in the administration of the work of our national parks. We must have some one at the head who is in sympathy with this work and has the time to devote to it. There are a great many who have been in the control of these matters in the past who have had the right spirit, and intended to do right, but somehow or other too many other things have demanded their attention. I feel especially glad, too, that Mr. Daniels is the assistant of Secretary Mather, because he, too, has the artistic idea. We are going to have a wonderful day in the national-park idea and the development of that idea.

My presence at this meeting to-day reminds me of the last annual park meeting that I attended. It was held in the Yosemite Valley, and it was presided over by a great friend of Mr. Mather's, Mr. Walter Fisher, of Chicago. I know that Mr. Fisher was in sympathy with everything that pertained to National Parks, but you could see that he was so rushed that he hardly had the time to come out here and attend the meeting. Many other things were driving him all the time.

You who were present at that meeting will remember John Muir. I think one of the most brilliant talks that were made there was made by him. True, it was one of his characteristic, rambling talks, but I remember very well one little story that he told. It will appeal to some of you. It is about an Englishman who started out to visit the Yosemite Valley. He started from the Raymond region, as you had to do in those days, and the mode of travel was by stage coach, and it took a very considerable time to make the trip; in fact, it took a couple of days to reach the valley. There were no roads at all at that time and they had to go on muleback over a trail. This Englishman rode down one gulch and one ravine after another, and you will remember the canyons through which the river runs by Wawona and Grouse Valley, and a number of others—pretty good sized canyons, each one of them. This Englishman had traveled across canyons until he was nearly worn out. Late in the evening they got to Inspiration Point, where they could look out over the Yosemite Valley. The Englishman was so tired that he did not realize where he was. He simply took one look at the valley and said to his companion: "My God! Have we got to cross that gulch, too?"

I think nowadays you will find a greater appreciation and a more sympathetic attitude toward the national-park problems. We find it so in the Sierra Club, of which I have been the secretary for a

number of years, and it has kept its hand, as it were, on the pulse of the public in reference to national-park affairs. We believe we are creating a sentiment which is bringing about an indorsement of these projects more and more as the days go by.

This national-park idea is developing tremendously. We have had a good many fights on our hands. I remember the Yosemite concession fight, which was bitterly opposed here in the State by a great many. At the same time, the general public sentiment was in favor of it. There were many that were interested there that opposed it most bitterly, because it would destroy some interest of theirs there if it should be ceded, and they felt their welfare was in danger. When the Yosemite Valley went back to the Federal Government we were told all about what a difference it would make in the administration of that valley if it were administered away back in Washington instead of from Sacramento. We were told that we might just as well take the valley bodily out of the State and put it somewhere in the East in the vicinity of Washington. I am sure that all of those who are fair-minded and appreciate the situation will realize what a difference in the administration has taken place since the Federal Government has come under control. Of course there are a great many things to be criticized, but we can not do everything at once, but as far as the relative administrations of the valley are concerned there can be no question whatsoever.

Every once in a while a problem of that kind comes up, and the Sierra Club is always ready to help it along. We have now a problem which is very interesting to us, the building of a trail in honor of our late president. John Muir was the president of the Sierra Club during all the years of its existence, from 1892 up to the time of his death, in 1914. We felt that the State in which he lived and the glories of which he wrote so much about should do something to honor his memory, and for that reason we had a trail bill introduced into the State legislature with the idea of appropriating a sum of money which will help to build a trail to connect Yosemite Valley with the Mount Whitney region, a region in which he spent so much of his life and which was so dear to him. Those who have expressed themselves on the subject have felt that no more appropriate memorial could have been thought of than a trail of this character, because if John Muir's spirit dwells anywhere it dwells in those mountains where this trail will lead, from the Yosemite Valley down to the heights of Mount Whitney. I remember a short time ago of reading the address of President Eliot on his return from a trip around the world to his students at Harvard. One of the thoughts he expressed was to devote yourself to those sports that will be the most lasting and which will give you the greatest pleasure for the greatest period of your lifetime. He named a great many which

brought pleasure, but Dr. Eliot could not have been familiar with mountain climbing as a pleasure, because if he had he would have mentioned that also, as it so vitally typifies and expresses the very idea he was talking about.

Those of you who have been up in the mountains will realize the benefit that is derived from it in your memory. If there is anything in the world that can bring an individual more genuine pleasure that will last a longer time, I do not know what it is.

Finally, I am reminded of a letter that I received this morning from a member of the club who has been very active in spreading the gospel of the mountains and our national parks—Mr. Gleason, of Boston. Some of you will be interested to know that he is going to lecture here this summer. The Southern Pacific Co. has asked him to come here and give some of his wonderfully illustrated lectures. They will be given right here in this theater. I received a letter from him this morning. In one of his recent lectures he spoke of the Sierras of California, and he used as his text one of John Muir's: "Going to the mountains is going home." John Muir, above all others, expressed that in the most beautiful language in the wonderful books that he has written. The idea that going to the mountains is really going home is a true one, because we all know that there we get the greatest amount of pleasure, quiet, and rest, away from the everyday cares of the business life. That is what our national parks are for—to get us away from the business affairs that press upon us. Go out into the mountains and see these wonderful things that appealed to John Muir, and you will see that those things are really worth while, and you will come back to your business with a purer and freer thought than you had before. I thank you for your kindness.

ASSISTANT TO THE SECRETARY MATHER.

I am now going to turn the meeting over to Mr. Daniels.

MR. DANIELS.

Down in Los Angeles the Automobile Club of Los Angeles and Southern California is working very hard on a plan to build a road from Mariposa, or, rather, from Merced to El Portal. That means, if such a road is ever built, that Yosemite Valley immediately becomes an all-year-around resort. It is now impossible to get into the valley with an automobile except a few months in the year, due to the extreme elevations that have to be climbed before reaching the rim of the valley. I do not know of anything that could be more interesting to the concessioners on the floor of the valley and all

others who are interested in the Yosemite Valley than the eventual accomplishment of this plan. Before asking any of the concessioners to speak, or any of the supervisors, I would like to see if we can not have the unanimous vote of this conference indorsing the plan of building the road from Merced to El Portal up the Merced River. If there is anyone here who does not feel that he will be justified in indorsing such a plan, I should like to hear from him. Since there are none, I shall communicate with them that we have unanimously indorsed their plan.

I am now going to ask Mr. Martin, secretary of the Intercity Club of Tacoma and Seattle, to please tell us something of Mount Rainier National Park and its problems.

MR. T. H. MARTIN.

Mr. Chairman, Mount Rainier National Park has many problems; in fact, too many to review here this afternoon. I am much gratified however, to have an opportunity to bring to your attention, and to the attention of the park officials here, some of the things that relate very closely to the interests of the entire Northwest.

Mount Rainier National Park, although counted among the older parks, is probably less known than any of them. Three hundred square miles and 45 miles of that is a solid ice field. You have, no doubt, heard comment upon the beauties of that park, the beauties of our flowers and our magnificent forests, so I will not take up the time here to discuss those beautiful features, because, let me frankly say at the outset, that my interest in national parks and in that particular national park is purely commercial. I have no other interest. That park is not known to-day as it should be nor are its many attractions, and, Mr. Chairman, that is largely our own fault. I say our fault, but it is because of a long-continued dispute over the name of that most majestic mountain. It is close to two aspiring municipalities, and because of a desire of one to gain an advantage over the other, because of that great overshadowing peak, there has arisen a great controversy and jealousy. I have heard of a man in my home country that came down from the North and went among our people and held some discussion, and told us that the war was over and that we should forget it and take up the problems of the day. My dear sir, people who have lived through a fight that has been a fight do not forget it very quickly. But this is another generation. We have passed now to another generation that appreciates the beauty of that great mountain, a generation that believes that these bitter fights should be forgotten, but there lingers yet in the hearts of the old settlers an intense feeling, and, if I may say it, it is a real problem; and if I might take just a minute or two to

tell you what the community is doing to get Government support, public support, for the development that we seek in Mount Rainier National Park.

Three years ago this bitterness was very intense. A Congressman could not appear before a committee in Washington and advocate anything without feeling that he ran in danger of stepping upon the corns of some one from Seattle or Tacoma. There the situation rested. Through the invitation of a commercial organization, the commercial organization of Seattle and the commercial organization of Tacoma appointed delegates, and they met in conference to consider this vital matter of the name, because we knew it was the real beginning in the consideration of national park development matters. When we came together we did not sit intermingled. We sat, the Seattle men on one side and the Tacoma people on the other side, and a very solemn meeting it was—all marvelously courteous. When the meeting was finished the chairman asked for Seattle's suggestion, and a gentleman arose and read off the first name and then glanced around to see where the brick was coming from. No objection was made, and he read off all of them, and, when he had finished, Tacoma was asked to express its views; then Mr. Denman, who had been appointed as our spokesman, arose and said that he could not express Tacoma's views better than to indorse every word that Mr. Curtis had said. Then tumbled immediately all of the obstacles that had been surrounding us for years, and the men who were there came to the front for us. No longer was there any question of getting an appropriation, and we have to-day an appropriation for the development of Mount Rainier National Park.

There are some problems that we have common to all parks. I will mention only one or two of them, but I wanted in this way to let this conference know that we have made a good start. We have not quite yet got to the point where we can take up and discuss what the name shall be, but we are getting so that we can discuss it. It must be settled soon, because we are losing thousands and thousands of dollars in publicity; because the railroads can not touch the question as yet. They are still in great danger; but we have started on the way, and we bespeak your help and we bespeak the help of the department at Washington, and we bespeak the confidence and help of all of these park officials, as they meet strangers who ask questions. Tell them that the community about Mount Rainier National Park is making headway in one of its great problems, and that some day soon it will be adjusted.

Now, as to some of these park problems. We suffer along with some of the other parks in this matter of hotels. There is no coordination of any concessions in our park. We have some very definite plans, but as yet they have not been carried into execution.

We have some great problems in the way of road construction, because in all these years there has been constructed in Mount Rainier National Park only something like 20 miles of road. Since that time we have done nothing but repair and maintain those roads, and just since our last appropriation we have been able to build other roads, but the dream of the committee is to have a highway that shall encircle the entire mountain. We know we can get that in one way only. Our present approach leads into the south side of the mountain, at what is called Paradise Valley. There is another approach being built by the State coming from North Yakima, going into the east side. That will develop some of the beautiful natural parks on the east side. Now, one of the things we are working harder for than all else, because it seems to be the most direct approach, is from the northwest side of the mountain, up the Carbon River Valley. That will open up other splendid national parks, and will go up by that wonderful wall over which avalanches fall constantly. There you will find one of the most magnificent lakes and one of the most inspiring spots you have ever seen. That will be by the east approach.

One county has spent a quarter of a million dollars in making an approach on the south side. The State has expended now fully \$200,000 in making approaches, and has authorized an appropriation of a hundred and eighty thousand dollars more to be expended on an approach on the north side and an approach on the east side. But here is the difficulty: Our State laws provide that those approaches shall be from the east side to connect with the Government system inside of the park when built at the most desirable location. Now, we know nothing of where those connections are going to be, and when we go before our legislature, and when we take up the discussion of an appropriation, and are asked the question regarding the definite location of these approaches, why, we are met with the difficulty of not knowing where the Government roads will be inside of the park and we do not know what is going to be done in that regard.

Four engineers discussed that question and every one of them differed in their opinion about where those approaches should be. We want to bring about a cooperation between the State and the Government engineers regarding where those roads are to be located inside of the park, so that we may plan ours outside of the park. Our approaches on the north side and our approaches on the east side are largely imaginary, because we do not know where to put them.

We have in mind a great highway crossing from Puget Sound to the southern border of the Mount Rainier National Park, down into the great fruit valleys, and it will be an inspiration that one will never forget, when, after a comfortable breakfast, he can get into

an automobile and take that morning drive through those heights, always with this magnificent dome in sight, and have his dinner in the great fruit valleys of the Yakima. What an inspiration!

MR. DANIELS.

Yesterday Mr. Charles S. Fee, of the Southern Pacific Co., made one of the most beautiful speeches I have ever listened to. I think he spoke kindly of me, and, since that reflects credit on the railroads in so far as it goes, I was wondering if it would not be quite in order to hear from some other railroad official who is interested in some other park. I see Mr. Charlton is with us. Perhaps he would be willing to say something about travel to the Yellowstone National Park.

MR. CHARLTON.

Mr. Chairman, ladies, and gentlemen, the Northern Pacific Road I represent is merely interested in Yellowstone Park, but we claim for the Northern Pacific Road that you can see more national parks by using our service than perhaps any other road. We claim all of the national parks are on the line of the Northern Pacific. You start with Yellowstone, then you go to Glacier Park and Mount Rainier, then you come down to Mr. Steel's park, Crater Lake, and then the Yosemite. We think they are all on the line of the Northern Pacific. For that reason our interest in national parks is very great.

I listened to what Mr. Martin had to say in connection with Mount Rainier Park with a great deal of pleasure. This past summer we had quite a delegation in Mount Rainier Park. They entered from the north side, and what Mr. Martin says in regard to Mount Rainier is beyond dispute. You have got to circle that entire park, or the entire mountain, and give an opportunity to reach it from almost any direction before you are going to make a success of it.

My own opinion in regard to Yellowstone Park is this, and I speak from an experience of 31 years. I first visited Yellowstone Park 31 years ago this summer. That was the year that the Mammoth Hot Springs Hotel was completed. It was then in the hands of the laboring men who built the hotel. We were not allowed to put foot on the veranda or look into the hotel, for the reason that they had not yet been paid for the work they had done there. The Northern Pacific at that time dug up the money and paid for the labor before the hotel could be opened. From that day to this I have been in touch with travel to the Yellowstone Park and have come in constant contact with the tourists making the park. They started out 31 years

ago with the idea of inducing tourists to go through Yellowstone Park in some five and a half or six days. A tourist should go through Yellowstone Park in from 30 to 60 days. You can not rush through it. The greatest pleasure you can have in the park is by camping out. You have got to make it a playground. It is no place to rush through as though you were going to a circus and wanted to get back again the same day.

The transportation in Yellowstone Park is excellent. The roads are good and the hotel accommodations are fine. What we really need is a systematic development of the park, and I believe that we are getting closer to it from what I have heard at this meeting here the past three days. It certainly seems now that all of our national parks are going to have some chance to be opened up the way they should be, and the people induced to go into them and make it their outing place for the summer; not go in and right out, but spend the entire summer there, as you really should do. It requires considerable time to properly see the scenic beauties of Yellowstone Park.

With regard to the question of transportation, whether automobile or stage, I am not prepared to say, as far as Yellowstone Park is concerned. It looks to me as though there would have to be a great deal of work done on the roads if you are going to introduce the automobile. I do not know whether the automobile is a good thing or not. Personally I will regret to see the day when the stages pass out. To my mind, they are one of the features of travel in Yellowstone Park.

ASSISTANT TO THE SECRETARY MATHER.

Could not we possibly have a word from Col. Brett about the scenic beauties of Yellowstone Park, which the average tourist does not see at all?

COL. BRETT.

Down in the southwest corner last year we built a trail leading right into the heart of the moose country. Last year we completed a trail over the mountain, and in traveling over that trail I went through three bands of elk, each one of which I should say contained at least 1,500. We have also completed a trail down the west boundary through the Braley country, and parts of that are very similar to the mountains of Maine and Vermont. You would almost believe you were in Maine or Vermont. We have trails also into the Hell Roaring Mountains and the mountains on the north and east boundaries, in which the scenery is equal to anything you will find in the Sierra Nevadas, in my opinion. The engineer and myself were struck with the view for several miles on each side of the road of the sheer walls, so much like the walls of the Yosemite Valley.

We remarked on them several times. In two years I expect that we will have complete in Yellowstone Park a trail system that will make every part of that park accessible to the tourist either on horseback or afoot.

MR. DANIELS.

I regret Mr. Charlton's comments upon the tourists not staying in the park for a sufficient length of time. I do not think it is entirely due to the tourists. It is very largely due to the concessioners that are in the park. I think the problem is with the concessioner. He should have a bureau of information right in the hotel for the benefit of tourists, so that they may find out what there is to see there by taking a horseback ride of two or three days back into the mountains. All necessary equipment should be there available to the tourist. Our time is getting a little short now, but inasmuch as we have heard nothing about Crater Lake or its problems, it might be well if we had a word or two from Mr. Steel, superintendent of Crater Lake Park.

MR. WILL G. STEEL.

I will state that Crater Lake is about 50 miles north of the California line, directly on a ridge of the Cascade Mountains. Originally it was a mountain 15,000 feet high. At one time it telescoped slightly above the elevation of 8,000 feet, probably at the point which was known as the extreme timber line, and about 17 cubic miles of matter disappeared.

The crater is about 4,000 feet deep, half full of water, so that precipitous walls surround it, the lowest point being about 500 feet high. It was my privilege just 30 years ago this summer to stand upon the rim of that lake in company with Prof. Le Conte; that is one of the brightest recollections of my life, when I stood there with him and consulted with him as to what should be done with that great wonder. The movement to create a national park there was started in the presence of Prof. Le Conte. At the same time I started a petition to President Cleveland to withdraw 10 townships from entry so that settlers could not rush in and take possession of the rim of the lake. Then it took 17 years of hard work and several thousand dollars before that park was created. It was so created on May 22, 1902. Then began the question of its development. Up to the rim of the lake it was almost impossible to drive a wagon. Soon after the park was created \$7,000 was appropriated for a road to the rim of the lake, and the very steep road was reduced to what we then thought was a very good road, a 33 per cent maximum grade.

I felt that we had to have roads and we had to have hotels, so I started a movement by which a corporation was created so that we could get money enough to start a hotel, which will be open this year for the first time. Then the question came up about roads. Finally we got an appropriation of \$10,000 and made a sketch of a system of roads which would lead entirely around the lake for 35 miles. That survey was made and subsequently we built roads. We have in the park at this time about 40 miles of road. This road is being extended this year for the first time, and a large portion of the park to the east and south will be open to automobiles to a point on the east at an elevation of about 8,000 feet. That will be directly above the lake about 1,900 feet. In my opinion that will be a most beautiful road.

Development up to this time has been slow. Underbrush has to be cleared away, fallen trees and other debris removed, and it is a great undertaking and can not be done rapidly. It is being done as fast as possible. My idea with regard to these roads is to scatter the native flowers all along them just as though they were put there by nature, so that the whole park will blossom with the beautiful flowers of which we have a great many there. We are working at this time to get in a telephone system, which is absolutely necessary. We are working also to get in a water system, which is necessary. We have got to put in sewers, which are also necessary. We have got to have some support from the railroads, and as soon as we complete our roads we will be about 15 miles from the railroad track.

The people in the surrounding country take an earnest pride in the work we are doing there. Jackson County during the past year has spent \$500,000 on a beautiful highway on the north side. Many of the other counties there have also spent large sums of money. If Jackson County can appropriate the money it receives from land sold in the forest reserves, it will amount to about \$1,315,000. We hope that law will be passed. If it goes through, the people of Jackson County are willing to appropriate all of that money, and we will be able to do a great deal with it.

MR. DANIELS.

I think Mr. Steel overlooked one feature in regard to Crater Lake National Park that would appeal to everyone who goes there. Emerson Hough, who passed through many of the parks last fall and wrote a series of articles on them, had something to say about the fish in Crater Lake. He is a man who carries a fishing outfit that he assures me cost not less than \$250. I never in my life met a man who is so ardently devoted to the art of angling. It is through Mr. Hough's efforts that we are largely indebted for some of our

national parks and for the creation of many of our national monuments and for the creation of most of our wild-game preserves. Mr. Hough described the fishing in Crater Lake National Park to me in such glowing terms that I thought he was boastful. I fished in the lake myself a month or so later. Around the edge of the lake there is no foliage to entangle your hook and line, and it is the ideal place for the amateur fisherman. When I was there the lake was so clear that you could see to a depth of 40 feet. The fish are greatly magnified through the water, and one is inclined to agree with the farmer who stood before the hippopotamus for a few minutes and then said: "Hell, there ain't no such animal." The first fish I caught I saw catch the fly. I saw every motion of his body until I finally landed him on the bank, which I only did with the aid of one of the concessioners in the park. I do not know of any other place in the world where an amateur fisherman can swing his fly in any direction without danger of catching it on some twig, and when he hooks his fish he can watch every motion of the fish as he fights for freedom. I agree with Mr. Hough in all that he has said about fishing in Crater Lake.

I would like to make an announcement. You will remember not long ago of reading that Mr. Miller, president of the Burlington Route, died of appendicitis in Glacier National Park. There is a possibility that his life might have been saved had we had a good skillful surgeon in the park. In every park where people indulge in mountain climbing there are frequent accidents, some of them more or less serious. In all of our western parks such accidents as sprained ankles and broken limbs occur frequently, and many people are affected by poison oak. In our parks that have been under military control we have had adequate medical service. During certain seasons of the year there are as many as 5,000 people in Yosemite Valley at one time. There is no provision there for medical attendance at all; but we have at last secured the services of a man who has enjoyed for 25 years in the city of San Francisco a most enviable reputation as a surgeon and doctor. We have secured his services. He has volunteered to go to the valley, because he is a mountain lover of the first water, and will take with him an associate surgeon and doctor and establish in the valley a hospital, and also maintain there a trained nurse. The hospital will be equipped with all surgical instruments that are necessary, and in addition there will be maintained and operated a Red Cross automobile. This is Dr. Joseph S. Brooks, and he will be in the valley during the summer time in company with his assistant surgeon. During the entire time either one or the other of them will be there. Under the present arrangements with Dr. Brooks there will be a competent physician and surgeon in attendance at the hospital all the time, as well as a

trained nurse and an emergency automobile. The hospital will be open 24 hours a day. There will be an efficient and capable doctor on the job 24 hours a day. I hope that within the next few years we will be able to find men who have sufficient idealism to do the same thing in the other parks.

We will now hear from the concessioners. It is Mr. Mather's wish that we continue with that where we left off yesterday afternoon. We will devote the remainder of the afternoon now to discussions by concessioners. I should be very glad to hear from any concessioner present who has anything to say regarding his problems to the department.

[A pause.]

I am happy to say to you, Mr. Mather, that none of the concessioners has any complaint to make. Evidently they are all satisfied.

ASSISTANT TO THE SECRETARY MATHER.

In declaring the third conference of superintendents and supervisors adjourned, I want to thank the president of the University of California, the public-spirited citizens of this and other States, and the park concessioners who have attended these meetings and participated in our discussions. Their deep and sympathetic interest in the national parks and their problems has been a source of gratification and encouragement to me. But I want particularly to extend my heartiest thanks to the park superintendents and supervisors. This has been primarily their conference, and they have made the most of it, both in the public meetings and in the many discussions that were held morning, noon, and evening over there in the fraternity house in Berkeley, where we have all been living together. They will go back to their parks now with the best wishes of all of us for success in the administration of our great national playgrounds.

The conference is adjourned sine die.



