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Fire Exclusion And Birds In Yosemite

By Ted Beedy

In 1915 Joseph Grinnell, T. I. Storer and their associates initiated an extensive study of the animals inhabiting the Yosemite Sierra. These naturalists spent many years observing and collecting reptiles, amphibians, birds and mammals which inhabit the region. Their book, *Animal Life in the Yosemite*, was a thorough synthesis of their observations taken during these years.

Grinnell and Storer travelled throughout the park from the low elevation oak woodlands, through the high alpine zone to the shores of Mono Lake. At the head of Lyell Canyon they discovered a species new to science, the Mt. Lyell Salamander. This species has only been found in a few other localities, such as at the top of Half Dome. Also in this period, these researchers made hundreds of bird censuses throughout Yosemite. Their careful field notes provided a baseline for the study which I undertook for my doctoral research.



At about the same time that Grinnell and Storer were studying the animal life of Yosemite, the National Park Service began a program of fire control throughout the park. In the absence of naturally occurring fires, meadow areas were replaced by dense stands of younger trees.

Photographs of the Yosemite Valley taken during the last century give evidence of the changes which have occurred in the vegetation. (See Fig. 1-6) Today the open pine forests of the valley are dominated by groves of young firs, cedar and other shade tolerant species. Many of the formerly open areas of the valley are now forested. Thus, during the past 70 years, the vegetation of Yosemite has been altered dramatically by the exclusion of periodic ground fires.

Despite the millions of visitors to Yosemite each year, very few detailed observations of birds have been made since the days of Grinnell and Storer. In the summer of 1976, I began a systematic research program on bird populations in Yosemite. The primary purposes of the study were to provide a thorough analysis of present day abundances and distribution of birds, and to determine the effects of fire exclusion upon vegetation and bird populations of Yosemite. I observed birds at different elevations, in all seasons for a period of three years.

I carefully reviewed all of the field notes of Grinnell and Storer to determine specific localities in Yosemite where their bird observational work was concentrated. I spent several weeks hiking in forests at different elevations looking for the landmarks they described. Many of their study sites were impossible for me to find due to changes in the vegetation through time.

Eventually, I did locate several spots which fit their written descriptions. I selected three of these areas to use as study sites, so that I could compare my data with the notes of Grinnell and Storer. I also chose three other sites at different elevations to give more complete coverage of the vegetation types existing in Yosemite. All of the study sites were located in different conifer forest types adjacent to the Tioga Pass Road. They ranged from the low elevation ponderosa pine forests near Hodgdon Meadows (1,450 meters) to the lodgepole pine forests near Tuolumne Meadows (2,600 meters). The study areas were all situated in unburned conifer forests, and each was a kilometer long and 40 meters wide, an area of 4 hectares (about 10 acres). I tried to choose areas that had a minimum of human disturbance, but occasionally I found people camping along my census routes. One early morning, I encountered a backpacker asleep on my study site. He had removed all of my markers from the trees because he feared the Park Service was planning a new road through the forest! Several days work were required to get them back in their proper places.

I began to census the bird populations in June 1976. At first it was difficult getting out of bed at 5:30 each morning. As the study progressed I looked forward to the peace and solitude of the early hours, and the indescribable beauty of sunrise in the Sierra. It was a quiet time, but many animals were active and feeding. My early risings were often rewarded by encounters with species overlooked by most visitors to Yosemite, such as the great gray owl, pileated woodpecker and pine marten. I censused each of my study sites twice weekly during the nesting seasons of 1976, '77 and '78. I also tried to visit all of the low elevation sites at least twice per month during the winter. Travel to the high elevations such as Tuolumne Meadows in this period required a major effort, and I managed to visit these areas only once or twice during the snow season.

One such visit during January of 1976; my destination was the Snow Flat cabin in the vicinity of May Lake. I got a late start from the Yosemite Valley, and began the long climb up the Snow Creek trail. At about 4:00 P.M. snow began to fall and I still had about 5 miles to ski before reaching the cabin. I travelled on and finally reached the Tioga Pass road in almost total darkness. Eventually, I made my way through the deep, powdery snow to the cabin. I lit a fire, sat down and resolved to never again travel in the high country in winter.

The next day I skied on to meet Tina Hargis, a winter ranger at Tuolumne Meadows. During the snow seasons of 1976-1978, Tina took detailed notes on the flocking and foraging behavior of the birds on the Tuolumne Meadows site. Tina's observations were tremendously helpful in piecing together the life-histories of birds which spend the winter in the Sierra.

Birds depend, either directly or indirectly, upon plants for their survival. Thus, it was necessary to sample and make measurements of the vegetation on each of my study sites. Unfortunately, Grinnell and Storer did not make such measurements, so this aspect of my study focused primarily on comparing the vegetation conditions between the areas I was censusing. In the summer of 1978, I did extensive sampling of trees, shrubs, and herbs in each of my study sites. I measured the sizes, diversity of species and distances between trees on each plot. I also estimated the percent coverage of trees and understory plants, as well as the number of vertical layers of foliage within each forest. Photographic records were also taken of each plot for future reference.

My field work in Yosemite was completed in September of 1978. During my years in the park I filled many binders with information. But, I have yet to complete a thorough analysis of the vegetation data or bird observations. However, I have some general conclusions to report. As compared with the historical work of Grinnell and Storer, I noted increases in some species and decreases in others. In the absence of fire, most conifer forests in Yosemite have become dense and overgrown; most are lacking in substantial growth of shrubs, herbs and grasses. In forests of this type, species such as juncos, sparrows and finches which feed primarily upon seeds on the ground have declined in numbers. In contrast, species such as kinglets, chickadees and warblers which search for insects in conifer foliage are more abundant. Flycatchers catch flying insects in midair by sallying from exposed perches. In overgrown forests, these species have declined due to the reduction of forest clearings. Woodpeckers and other bark foragers such as nuthatches and the brown creeper which drill and search for insects on the bark of conifers are more abundant, especially in areas where snags are numerous.

Due to variations in slope, soil conditions and drainage, each of my study sites contained within its boundaries a considerable variety of canopy conditions and forest structures.

My measurements of birds indicate that the greatest numbers of species and individuals occur in forests with widely spaced mature trees, open canopy conditions and abundant ground cover. Such forests have visible vertical layers of foliage, and provide increased foraging opportunities for a greater number of bird species. It seems that most birds select their habitats more by the physical structure of the forests than by the types of trees which grow there. Most of my study sites had about 35 species using the trees during the nesting season. The red fir area, in contrast, only had about 25 species, and very few individuals. This area contained dense stands of mature red firs, and had very little undergrowth. It was obvious that it had not been burned for centuries. Due to moist conditions which persist through the summer in sub-alpine forests, fires tend to be infrequent under such conditions.

Depending upon snow levels, spring nesting activities for most species begin in late April at lower elevations, but not until late May in the high country. As the summer progresses, the lower forests become dry, and many of the annual plants die back by mid-July. At this time most nesting activities are completed, and the birds abandon their nesting territories for more productive areas. By the late summer and fall the high altitudes have increased abundances of birds. These areas certainly have more water, and probably more insects. The high forests are used as feeding areas by local birds, and as migratory corridors by species which nest in northern latitudes. By late summer most of the nesting birds have left for their wintering grounds. Many, such as the western tanager, fly as far as the tropics of Central and South America. By late September the only birds remaining in the Yosemite Sierra are the resident species and a few others which winter in California.

In the winter a typical census at any elevation might include Steller's jays, a few mountain chickadees, golden-crowned kinglets, red-breasted nuthatches, brown creepers and perhaps a hairy woodpecker. Some mornings it was difficult to find any birds at all!

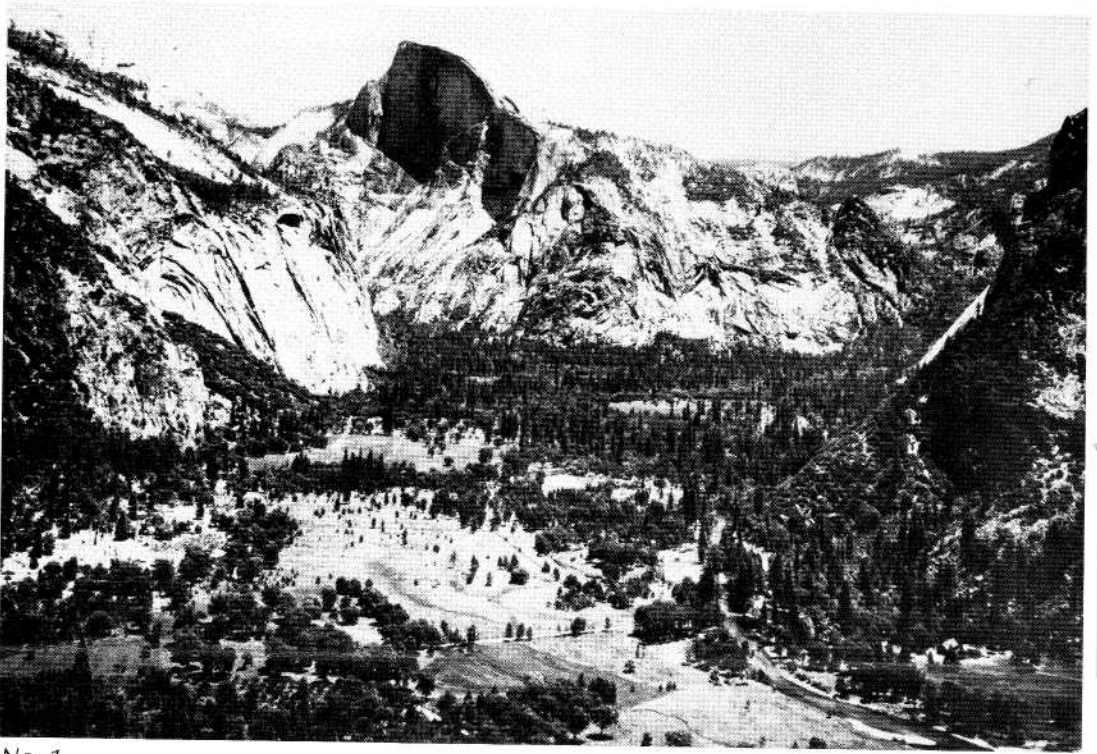
Occasionally I would encounter mixed-species feeding flocks with kinglets, nuthatches and chickadees calling to each other. Most of the wintering birds nest in woodpecker holes and tree cavities which they maintain all year. Birds usually return to their holes at night in small groups to share and conserve body heat; outside temperatures are usually well below freezing. The kinglets, in contrast, have open cup nests. It is a mystery how these tiny birds (less than six grams) survive when exposed to such cold conditions for long periods. To maintain their body heat they search for food, usually insects and spiders, almost continuously during the winter days. Kinglets are abundant in the Sierra, so they must be very efficient.

During my three years in Yosemite population levels of birds varied considerably from one year to the next. 1976 and 1977 were severe drought years, whereas 1978 had a tremendous snowfall.

Surprisingly, the spring and summer populations of 1978 were lower than the previous two drought years. My notes indicate definite declines in the numbers of resident birds, but only slight decreases in most migrant species. Perhaps this pattern was caused by poor nesting success in the drought years, or possibly many of the resident birds were killed by the heavy snows. The temperatures during the winter of 1978 were relatively high, but perhaps the frequent storms reduced the amount of feeding time available for small birds below some critical level. There are so many interacting factors that it is hard to attribute the decline to any one of them exclusively.

Bird populations in Yosemite are extremely dynamic. Changes occur from season to season, year to year and from forest to forest. Birds respond to weather, insect abundances, seed and cone crops, and the general structure of the forest. Fire is extremely important in providing a mosaic of habitats for birds. The results of this study lead me to strongly support the control burn policy which has been recently initiated by the National Park Service.

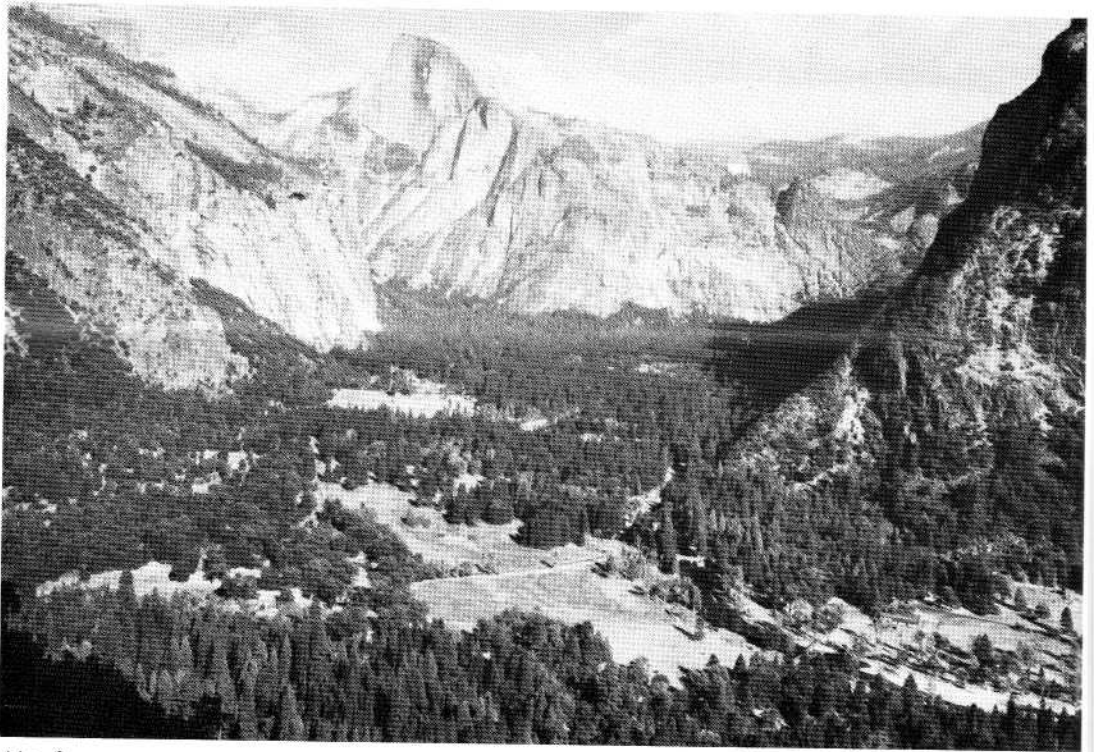
I hope that my research will be a contribution to the scientific literature as well as a useful reference for resource managers throughout the Sierra Nevada. My study will be particularly useful if it is duplicated at some point in the future.



No. 1

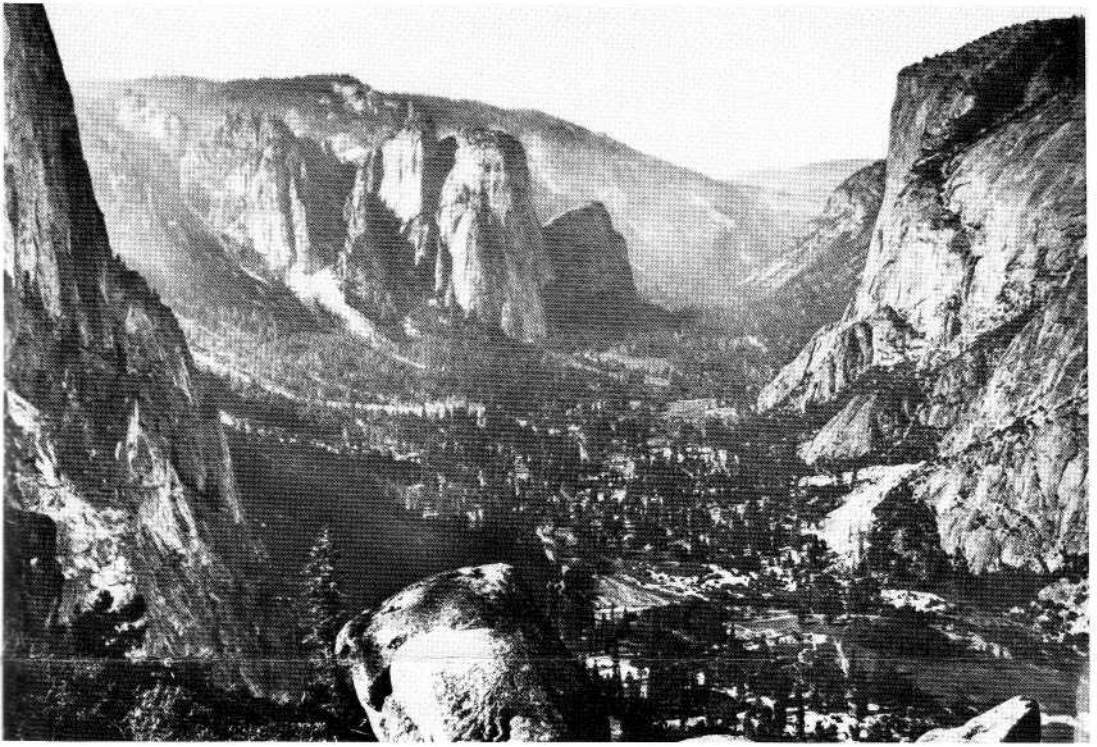
This remarkably clear Peabody photograph taken in 1899 from Columbia Point shows the upper end of Yosemite Valley. The buildings of the time in the Old Village and the present Government employee's residence area are clearly shown. The Hutchings' orchard and the Sentinel Bridge road can be picked out. Fences enclosing the meadows can be easily distinguished. The trees and the two-storied effect of the old and the young forest show up plainly in the present Tecoya residence area and in that part of the Valley in which public campgrounds 6, 7, 11, 12, 14, 15, and 16 are now located. This photograph should be compared also with the Eagle Peak photograph.

(The Peabody plates, which included this one, are the property of the Yosemite Museum having been purchased from Mr. Peabody.)



No. 2

The upper end of Yosemite Valley as seen from Columbia Point in September, 1943 in the photograph taken by Ralph H. Anderson. Note how the meadows of the 1899 period have decreased in size, how much more dense are the forests on the floor of the Valley, and how the composition of the ground cover has changed from an open grassland type to a cedar-ponderosa pine type.



No. 3

The Big Oak Flat road can not be picked up in this Carleton E. Watkins photograph from Union Point and Watkins is not known to have visited the Yosemite Valley between 1866 and 1878 so the date of this photograph is 1866. The Folsom Bridge shows up plainly along with the trails leading to it and the Folsom Ford. For a 77 year change from open, park-like and extensive meadows condition to a dense forested area compare this photograph with that one of 1943, No. 4

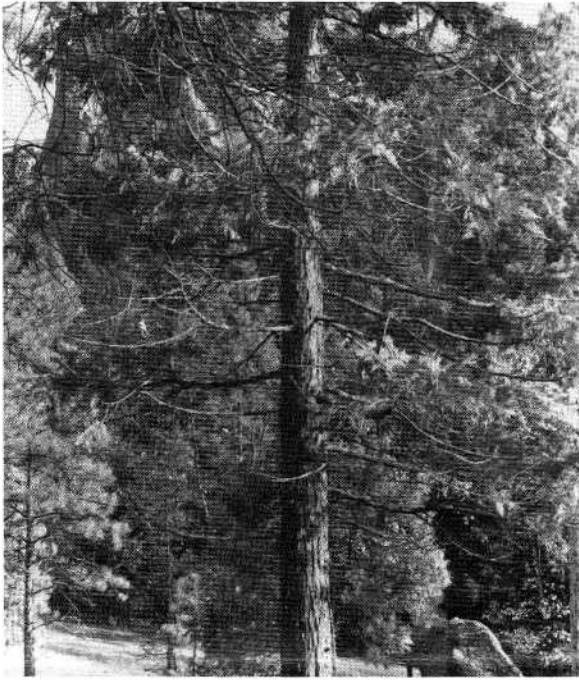
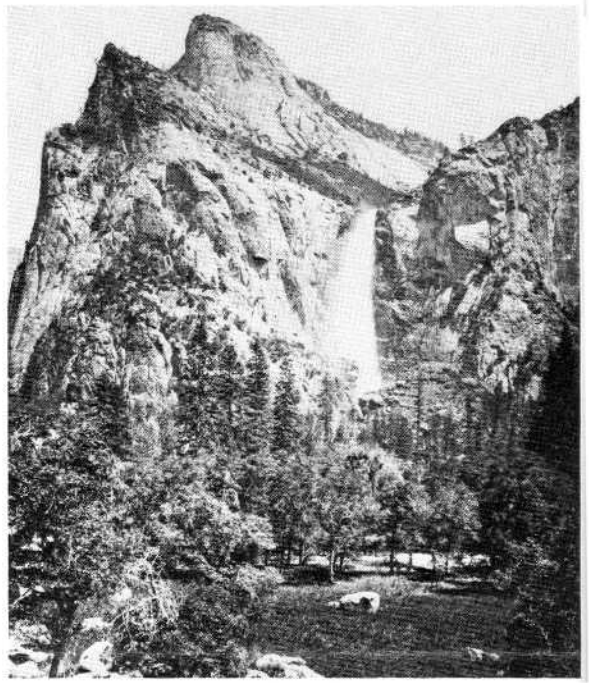


No. 4

The Ralph H. Anderson September, 1943 photograph from Union Point. Shows the remarkable change wrought in 77 years by the encroaching forests with full protection. The open meadow-like area in the center of the picture is man-made, the area having been cleared for a sewerage farm which has been abandoned with the completion of a modern plant. The cleared strip is the location of the power line servicing the Valley. The old Big Oak Flat road can be seen on the talus slope beyond El Capitan.

No. 5

In 1866 Carleton E. Watkins took this photograph of Bridalveil Fall from a point now just above the All-Year Highway between El Capitan and Valley View. Note the open character of this portion of Yosemite Valley, the loss of which is so often bemoaned about in the writings and reports of early visitors and administrators. Compare this beautiful view of Bridalveil Fall with No. 6, taken from the point used by Watkins.



No. 6

Ralph H. Anderson's U.S.N.P.S. photograph taken in November, 1943 of Bridalveil Fall from a point just above the All-Year Highway between El Capitan and Valley View shows only the highway and the power line. Bridalveil Fall can only be picked out with some difficulty in the branches of the incense cedar above the large rock. This is one example of the loss of a beautiful view through forest encroachment.

Acknowledgements:

The preceding article was prepared for this *Members Bulletin* by Ted Beedy.

We first met Beedy in 1975, when YNHA provided him a research grant to start his program in Yosemite. Then, in 1976 and '77, we administered a grant to Beedy from the William and Flora Hewlett Foundation.

So, we've had several occasions to chat with him. While we haven't grasped all the technical aspects of his words and work, we've enjoyed Beedy. He's an electric sort of person, alert and quick-gestured; perhaps like one of his kinglets.

Beedy's in the final stages of acquiring his Ph.D. from U.C. Davis. His article represents a condensation of a part of his dissertation, re-written in terms more familiar to the layman.

Useful References:

Gaines, D. 1976. *Birds of the Yosemite Sierra: a distributional survey*. California Syllabus, Oakland, California. 153 p.

Grinnell, J. and T. I. Storer, 1924. *Animal Life in the Yosemite*. U. C. Press, Berkeley, California.



THE PARK'S NEW SUPERINTENDENT, Robert Binnewies, has been here about 2 months. We've heard him talk twice before Park employees, and when we went to his office to pay our respects, had a chance to chat for a few minutes. We've known Park superintendents to one degree or another for thirty years. In our opinion, Binnewies projects more enthusiasm, optimism and determination than the predecessors we've known. The General Management Plan is the bone in his teeth, so to speak, and we look forward to its aggressive, orderly, and sensible implementation under his direction.

N.P.S. Director Whalen announced Binnewies' appointment in July. In Whalen's remarks, he was quite clear in his statements regarding the relocation of certain facilities to El Portal, where the N.P.S. has an "administrative site". When Binnewies moved himself and his family to Yosemite, they took up residence in El Portal rather than in the "Superintendent's House", which has housed 11 superintendents since 1912.

FOR SOME TIME, we've been giving members 25% discount on the price of those books, etc., published by YNHA, and 10% off on those we purchase from other publishers. The two discount schedules complicated sales, particularly at our sales places in the Park. So, we're now offering members 15% discount on *all* publications, effective October 1, 1979.

WINTER ECOLOGY, SPRING FLOWERS: Our summer seminar season ended with Bob Stewart's Bird-banding class. All in all, the classes were well-attended and those participants who wrote had high praise for the program.

Now, we're looking at winter and spring plans. Dr. Sharsmith will conduct Winter Ecology classes for us on February 16 & 17, 23 & 24, and will lead Spring Botany classes on March 29 & 30 and April 5 & 6. We encourage those interested to enroll soon. Tuition for each class is \$35. Winter Ecology is accredited by U.C.B. for one quarter unit; credit fee is an additional \$25.

THE OSTRANDER LAKE SKI TRIPS are *tentatively* set for April 5, 6, 7 and April 19, 20, 21. The Trans-Sierra Ski Trips are planned for March 16-22 and March 23-29. We'll be telling you more about these in the winter activities catalog, out within a month.

RON ORITI, who directs our "Stars over Yosemite" summer classes, will have a weekend class on Friday and Saturday, January 18 and 19. The heavens in winter reveal entirely different scenes than those visible during Ron's summer class. Fee \$35.



TO AID the growing number of non-English speaking visitors to the Park, the YNHA Board of Trustees approved a donation to N.P.S. for the production of the Park's "mini-folders" in the French, German, Japanese and Spanish languages. Within the amount budgeted, we printed a total of 20,000 copies. We are told that the German version is in greatest demand, followed by that in Japanese, French, then Spanish.

We generally have occasion to be on the Mall several times a day. In the last two months, we became conscious of hearing foreign languages spoken frequently. We began to listen more attentively, and have come to the conclusion that we hear a foreign tongue more often than English.

NEW MEMBERS. We welcome to membership in Y.N.H.A. the following good people.

Andrea Adams	Heather Kane	Harry E. Rahlmann
Ann Alton	Martha Kaye	June M. Ransom
Chris & Paula Andress	Marvin Kientz	Dana C. Reed
Mary N. Asher & Family	Kenneth R. Klopp	Lawrence Reinecke
Benjamin Atkin	Jack & Kathryn Knieriemien	Julie Reuben
Mary Barich	Fred Koegler	Lyn Dearborn Richardson
Lori Bellue	M. Kojiane	Elsie Richey
Irene S. Berg & Family	Kim Kopff	Katherine W. Rindlaub
James M. Berry	Mike Korell	Juanita R. Rodriguez
June Bilisoly	Rachel Lamoureux	Jack Rose
Irma L. Blanchett & Family	Tim Latham	Jane N. Ross
Alan Bragg	James Lee	Sister Sara Sanders
Kane Brightman	Cheryl Lemoine	Jacqueline Heather Sandler
Craig Brown (L)	Margaret Leong	Martha Schimbor
Mario V. Brunasso	Larry Liebman	Walter A. Schmidt, III
Robert Butler	Tony Ty Lim	Barbara A. Schumacher
Hillary N. Chan	Fran Lindquist	Susie Scott
Marilyn Chin	Jeanne Lis	Sandra Shure
Eleanor Cobarrubia	Richard Little	Carrie Siedenburg
Kathleen Collier	Carolyn Lynch	Eric Smith
Carol Coy	William F. McDonald & Family	Deborah Spector
Karen D'Attilo	Shanda McGrew	Thomas C. Spinrad
Michael Ray Deal	John H. McLaughlin, Jr.	Valerie R. Staples
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Jeff & Diana Dunker	Mary M. Manuele & Family	Edward A. Stein
Judy Dunn	F.F. Marinaro	Karen & Kris Stephens
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Susan Eaton	Max & Sheba Martel	Michael J. Sullivan (L)
Mr. & Mrs. R.A. Eibling	Lorraine S. Mason	Russ Tanaka
Daphne Elliott	Yuko Matsumoto &	Mary Lawrence Test
Sharon Elliott	Al Fleischman	Patricia A. Tokuda
Sherry Essrey	Marsha Melone	Phil Tyler
Janis & Larry Ford	Sherril Ann Miller	David Urrutia
Harvey Freed & Family	James Milner (L)	Marian Vadas
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Pam Gardiner	Annette Mount	June P. Vieira
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Thomas Hicks	Ruth M. Pereira	Keith Woodcock
Dr. Gordon Hofberg	Clifford J. Phillips	Christopher T. Wong
Amber Jayanti	Michele Pinet	Eric Yetter
Shirley Joe, M.D. &	Ada Lee Plattus & Family	Anne Young
Henry Poy & Family	Kenneth Pratt	William E. Zagotta
Matthew Johnson	Aaron R. Priven	Stan & Ellen Zemon
Penelope A. Johnson		
Walton Kabler		

(L) indicates Life Member



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Dan Anderson