ago. The third section, a full bibliography of California fossil birds, completes the work.

To the specialist in the field of paleornithology this paper is of exceptional value, supplying in one volume all essential data relative to the published work on the subject for the state of California. As a matter of fact, information is not limited to this state, for in many instances, reference is made to similar occurrences elsewhere. Inclusion of all recorded avian fossil material even if only generically or tentatively assigned —with appropriate comments as to status—is welcomed. Such records, which may lead to important future correlations, might otherwise be easily overlooked.

The paper is more than a check-list or bibliography. It carries throughout its pages interesting and illuminating sidelights on avian habits, structure and the like, reflecting Dr. Miller's long experience in ornithological research.—HILDEGARDE HOWARD.

Inaugurating a new series of publications, the National Audubon Society has issued its Research Report No. 1, "The Ivory-billed Woodpecker," by James T. Tanner (October, 1942; 111 pp., 22 figs., 20 pls., colored frontispiece). The admirable plan of the Society for careful study of vanishing species with a view to ascertaining underlying biologic causes for their precarious states could have selected no better subject for the initial effort. Tanner evidently made good use of his opportunity for field work supported by the Society and he has rendered an informative and worthy report; the only criticism that need be levied is that it is somewhat repetitious in places.

It turns out that the Ivory-billed Woodpecker has an extremely narrow ecologic niche, in that it is dependent for food on insects living just beneath the bark and these may be obtained in sufficient quantity by this large bird chiefly in trees that are still standing but that have been dead from two to four years. Maintenance of the necessary succession of suitable dead trees conflicts sharply with timber interests and with customary practices in forestry. With this economic conflict, the Society and others interested in saving the Ivory-bill face an exceedingly difficult problem in conservation. The prospect for the Ivory-bill is not good, especially in Louisiana.

Apart from the applied aspect of the study, sight should not be lost of another service it performs. A record of the natural history of this species has been made which may never again be possible. More could have been found out about the biology of a less rare species with the same expenditure of time and money, but there is a real satisfaction here in having grasped a research opportunity that may some day be beyond reach. This also is conservation.—ALDEN H. MILLER.

Joseph Grinnell's Philosophy of Nature (University of California Press, 1943) is a compilation of twenty-eight of the shorter papers of the great California naturalist, with a four-page preface by Alden H. Miller. In this preface we are told of Grinnell's plan, that upon retirement he would write a book of general scope which would present his outlook on geography and evolution, the aspects of natural history most related to his own research. He had, in fact, outlined chapter headings for such a work, these headings, ten in number, being listed by Miller. It was undoubtedly a great loss to science that this plan was ended by Grinnell's untimely death.

According to the Grinnell Club Newsletter of February, 1943, Jean M. Linsdale was primarily responsible for the idea underlying the present volume. After studying Grinnell's lengthy bibliography, Linsdale submitted a tentative list of papers that might be used in the projected compilation. This list was carefully studied by Mrs. Joseph Grinnell, Alden H. Miller, E. Raymond Hall and Seth B. Benson and suggestions were made which resulted in some titles being added. It was decided that the order of the papers should be chronological, and that, instead of including only those of definitely related subject matter, the selection should be illustrative of the wide scope of Grinnell's interest in and knowledge of many different features connected with the science of vertebrate zoology.

The elapsed time between publication of the first and last papers is thirty-three years, from 1903 to 1936. As would be expected by those familiar with Grinnell's work, a majority of titles (fifteen) and even greater preponderance of subject matter pertain to geography, evolution and kindred subjects.

Control of the range of a species by atmospheric humidity, and variation within the species due to the same influence is demonstrated in "The origin and distribution of the chestnut-backed chickadee" (1904). In "Composition of the Prince William Sound avifauna; discussion of its origin" (1910) typical birds of the Hudsonian and Alpine-Arctic life-zones are listed, and the affinities of the avifauna with the Yukon region to the north and the Sitkan district to the south are discussed. Two discussions published in 1914, "The Colorado River as a highway of dispersal and center of differentiation of species," and "The Colorado River as a hindrance to the dispersal of species," present many facts substantiating the claims set forth in the titles. An example cited in the latter paper is the case of two species of ground squirrels (*Ammospermophilus*), the ranges of which in one section are

divided by only 850 feet, the width of the river. Along similar lines is "Barriers to distribution as regards birds and mammals" (1914). Here barriers are divided into two classes, tangible and intangible. Under the former are land, to aquatic species, and bodies of water, to terrestrial species. Intangible barriers are listed as zonal (by temperature), faunal (by atmospheric humidity), and associational (by food supply, breeding places, and temporary refuges).

In "Field tests of theories concerning distributional control" (1917) it is contended that careful study at *all* points of the periphery of an animal's range is necessary to demonstrate the factors responsible for range limitation, for, while temperature may often exert the greatest influence, other factors always appear at some point. "The English sparrow has arrived in Death Valley: an experiment in nature" (1919) records the occupation, about 1914, by *Passer domesticus* of a portion of Death Valley 178 feet below sea-level, and points out the opportunity for future naturalists to determine the length of time necessary to produce any perceptible physiological changes in these birds, which are isolated under a climate of extreme high temperature combined with low relative humidity. "The role of the accidental" (1922) is considered by Grinnell to be that of the "pioneer," crowded out of the normal range of its species by overpopulation. In the great majority of cases such individuals are foredoomed to early destruction, but in rare instances two birds comprising a pair may come together under such favorable conditions that a new outpost of the species is established. As a side light on the occurrence of "accidentals" in California, it is estimated that, on the basis of the rate of recorded occurrences in the state for the previous 35 years, theoretically all the species of birds known to North America should be on the California list by the year 2331.

In "The trend of avian populations in California" (1922) it is contended that although a certain few species of birds have become extinct in the state during the past 75 years, these, so far as number of individual birds is concerned, have been compensated for by introduction of foreign species; furthermore, though drainage of swamp lands has reduced the totals of some kinds of birds, increase in other kinds through irrigation of previously barren regions has more than offset such loss numerically. The theme of "Geography and evolution" (1924) is that evolution of animal life is the direct result of evolution of environments. "Geography and evolution in the pocket gopher" (1926) is accompanied by a distributional map and a colored plate showing eight different types in the genus *Thomomys*. The 33 kinds of pocket gophers accredited to California at the time this paper was written are discussed as regards their origin, variation, range, and habits, and reasons are advanced to account for many peculiar features of their distribution.

"Presence and absence of animals" (1928) is a very comprehensive and important contribution to knowledge of the factors governing distribution and control of animals. The continual attempt of a species, due usually to overpopulation, to expand the boundaries of its habitat or "ecologic niche," and the resulting destruction of pioneering individuals, usually the young of the year, is emphasized, as is the removing or rendering permeable of natural barriers through the various activities of man. Introduction of foreign birds and mammals, either fortuitously or otherwise, is regarded as usually dangerous to our native fauna. Nine separate areas in Lower California, two of them insular, each possessing species or subspecies of birds peculiar to itself, are defined and mapped in "Differentiation areas" (1928). Also, affinities of many Lower California birds and factors causing differentiation are discussed, together with such related subjects as barriers to emigration and potency of differentiating centers.

"Significance of faunal analysis for general biology" (1928) stresses the value to the student of evolution of the barely discernible subspecies, because of its being in the critical, formative stage, whereas the full species is no longer of similar significance. After discussion of various factors that have been advanced as causes of differentiation, the author concludes with the opinion that the problem of speciation lies much closer to the provinces of the geographer and climatologist than to that of the geneticist.

In the field of ecology, "The burrowing rodents of California as agents in soil formation" (1923) is, by far, the best exposition of its particular subject that has come to the attention of the reviewer. Illustrated by photographs showing soil disturbance by burrowing rodents, this article points out clearly and convincingly the surprising effects of work of these animals in untilled sections of California. Among these effects are listed the hastening of the weathering of the sub-stratum, the bringing to the surface of the sub-soil, the piling up of loose earth which, moved by wind and water, fills up depressions and creates meadows, the conservation of water by retarding the spring run-off, and rendering the soil more fertile by loosening as well as by burying accumulated vegetable debris. And, according to the geological record, this has been going on for at least 200,000 years! Study of this paper should be compulsory in every agricultural school.

"Tree surgery and the birds" (1927) voices the feeling of antagonism that comes to all lovers of wild-life in its natural state when human ideas

of orderliness conflict with natural processes. An oak tree just outside the author's office window has submitted to pruning of all dead limbs and plugging of cavities with cement, resulting in destruction of favorite nesting, feeding and roosting places of several species of birds. "Linnets and dandelions" (1930) recounts the invasion of a city lawn by the lowly dandelion, with resultant disgust to the owner of the lawn and pleasure to some of the neighbors, who delighted in the songs of linnets attracted by dandelion seeds. The opening question of this short paper, "Is it feasible to blend sentiment with natural history and at the same time maintain fairly high factual and rational standards?" is typical of Joseph Grinnell, as his friends knew him, sentimental at heart, but ever on the alert against any betrayal of the fact. "Up-hill planters" (1936) propounds a very logical theory in reforestation. As acorns falling from oak trees on steep hillsides almost invariably roll down hill, some agency is necescary to prevent gradual altitudinal shifting of the forest itself. This agency is believed to be found in jays, squirrels, and other animals, through their habit of carrying away acorns, often up-slope, to be deposited in crevices or buried in the ground for future use.

"Call notes of the bush-tit" (1903) describes several types of notes of these birds, that almost invariably travel in flocks. The simple notes usually heard are believed to be the means of keeping the group together, while what is called the "confusion chorus," a shrill, monotonous trill, chanted continuously by all members of a flock in unison, is used only during the presence of avian enemies, and is thought to confuse a predator as to the definite location of any individual. "Sequestration notes" (1920), used by birds that forage singly, such as the Audubon warbler and kinglets, are believed to act to keep individuals apart, in such a manner as to avoid duplication of territory already scrutinized. "The principle of rapid peering in birds" (1921) advances the theory that birds that feed on small, stationary objects find them more easily by frequently changing their angle of vision by movements of the head and body. "A possible function of the whiteness of the breast in crevice-searching birds" (1924) calls attention to the white breast of the canyon wren and other birds that search crevices for much of their food, and suggests that reflection of light from white plumage may aid the vision of the searcher.

Among the miscellaneous papers included in this book are two on museum functions and ethics. "The methods and uses of a research museum" (1910) sets forth rules for the field collector, particular stress being laid on the amount and character of data to be recorded; also many uses, both educational and economical, to which preserved material may be put, are listed and discussed. "The museum conscience" (1922) emphasizes the need for absolute accuracy in labelling and arrangement of museum materials, such to be obtained only through curatorial work of a high standard.

"Bird netting as a method in ornithology" (1925) relates the arrest of four "Italians" and seizure of their nets illegally used in capture of song birds for the pot; 133 birds of thirteen species were turned over to the Museum of Vertebrate Zoology. A study of these having shown that, with one possible exception, no injuries had been inflicted on them during the process of netting, Grinnell applied to the Fish and Game Commission for permission to use the nets for collecting and banding birds. This permission was denied on the ground that it would set a bad example to "Italians," and surprise was expressed at the "audacity" of the request.

"A conservationist's creed as to wild-life administration" (1925) expresses belief that the fullest use should be made of our wild-life resources; that game birds and mammals belong no more to the sportsmen than to non-hunters; that collecting specimens of vertebrates for scientific purposes is right and necessary; that the best known way to conserve animal life is to preserve conditions favorable to our native species; that grazing by domestic stock, particularly sheep, on the greater part of our national forests should be discontinued, and that administration of our wild life resources should be kept as far as possible out of politics. Opposition is expressed to attempts to exterminate any native vertebrate species; to permitting the public to shoot crows or other presumably injurious animals during the breeding season of our desirable species, and to introduction of alien species of either game or non-game birds or mammals.

"Conserve the collector" (1915) is a sane and logical argument against the fallacious reasoning of some sentimentalists, game commissioners and others, that properly regulated scientific collecting has any affect whatever on the permanent numbers of any species of bird or mammal. Furthermore, judicious collecting is considered absolutely indispensible to serious ornithological research along certain important lines, namely, faunistics, systematics, migration and food studies.

A perusal of these carefully selected papers of the man who for many years was California's leading vertebrate zoologist leaves the reader with no shred of doubt that Grinnell was not only in the front rank of keen observers of wild life in its natural habitat, but that he has had few equals in ability to correctly interpret the many widely different phases of natural history as seen in the field.

The compilers of this book are to be congratulated for having rendered more available by putting into compact form a well chosen group of publications of very high scientific and educational value.—G. WILLETT.

## MINUTES OF COOPER CLUB MEETINGS

### NORTHERN DIVISION

OCTOBER.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, October 22, 1942, at 8:00 p.m., in Room 2503, Life Sciences Building, University of California, Berkeley, with Alden H. Miller presiding and about 125 members and guests present. Minutes of the Northern Division for September were read and approved. There were four proposals for membership: Grace Irene Crowe, 1420 Henry St., Berkeley, by May Titus; Marjorie Lillian Peterson, 2725 Ridge Rd., Berkeley, by Winifred M. Smith; and Donald Lynn McKevnan, 810 24th Ave., Seattle, and Albert Wolfson, Museum of Vertebrate Zoology, Berkeley, both by Alden H. Miller.

A letter from George Willett to Mrs. Hilda W. Grinnell was read, which expressed appreciation to members of the Cooper Club for his election to Honorary Membership.

Mr. Follett reported a Mockingbird from Modoc County on September 12. Mrs. Allen reported recent arrival dates of several migrants and winter residents in Berkeley, and Dr. Miller contrasted these, in general terms, with earlier arrival dates along the coast of Humboldt County.

Mrs. Dorothy Dean Sheldon, speaker of the evening, presented five excellent colored motion picture films. The major subjects were (1) shearwaters and other Pacific Coast birds, (2) American egrets in the San Joaquin Valley, (3) marsh birds in the Carson River Valley, Nevada, (4) common garden birds, and (5) desert birds in the Imperial Valley of California.

Adjourned.—FRANK A. PITELKA, *Acting Secretary.*

NOVEMBER.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, November 19, 1942, at 8:00 p.m., in Room 2503 Life Sciences Building, University of California, Berkeley, with Alden H. Miller in the chair and 37 members and guests present. Minutes of the Northern Division for October were read and corrected. Minutes of the Southern Division for September were read. Names proposed for membership were: Mr. Dean Amadon, American Museum of Natural History, New York City, N. Y., by W. Lee Chambers; Warren Fischer, 106 Magnolia Avenue, Piedmont, Calif., by Brighton C. Cain; William V. Mayer, Route 2, Box 3125, Del Paso Heights, Calif., by Alden H. Miller; Daniel F. Tillotson, Museum of Vertebrate Zoology, Berkeley, Calif., by Frank A. Pitelka.

Mr. Miller reviewed "Wildlife Portfolio of the Western National Parks" by Joseph S. Dixon, a recent publication of the U. S. Government Printing Office, Washington, D.C. He commented on its pleasing form, and its usefulness in presenting to the park visitor the birds and mammals he would be most likely to see.

Mr. Dixon brought a heartening report from among his field observations. In one region of California there was a great increase in the number of White-tailed Kites, two pairs present in April apparently having been able to rear two broods each. This was correlated with an abundant population of *Microtus*. Mr. Covel spoke of the annual duck banding at Lake Merritt on November 5, and Mrs. Austin noted that 1105 birds were handled, 600 of these being banded for the first time.

The speaker of the evening, Mr. Joseph Dixon, entitled his talk, "Fading Trails," from the book of that name, dealing with diminishing wildlife forms. Reproductions of the colored plates originally planned for the book were shown as lantern slides.

Adjourned.—FRANCES CARTER, *Recording Secretary.*

DECEMBER.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, December 17, 1942, at 8:00 p.m., in Room 2503 Life Sciences Building, University of California, Berkeley, with Alden H. Miller in the chair and 55 members and guests present. Minutes of the Northern Division for November were read and approved. Names proposed for membership were: Florence Anne Henderson (Mrs. R. N.), 3922 Broadway, Sacramento, Calif., by E. L. Sumner; Mrs. Blanche Wallace, 750 Pine Street, San Francisco, California, by Junea W. Kelly. A standing order of business calls for the appointment of a nominating committee at the December meeting. A telegram from the president, E. Lowell Sumner, named Jean M. Linsdale, John T. Emlen, and Mrs. J. T. Allen, chairman.

A letter was read from Dr. T. Eric Reynolds who finds opportunities to study birds of south Pacific islands in spite of his naval duties.

As speaker of the evening, B. C. Cain described his summer's field work at Camp Phillmont, in the Sangre de Cristo range of New Mexico, illustrating his talk with Kodachrome slides of exceptional beauty. This camp, the largest in the world devoted to youth, comprising some 127,000 acres, was presented to the Boy Scouts of America, together with the means for maintaining it, by Waite Phillips.

Adjourned.—FRANCES CARTER, *Recording Secretary.*