a people who used bolas weights and made stemless triangular stone lance points. They, in turn, were followed by people who used the first points which can positively be identified as intended for arrows. These have stems and barbs and are accompanied by broad, stemmed, hafted knives. Then appear small arrow points, identical with those used by the Ona Indians of Tierra del Fuego. Although the two types of arrow points are found together at the surface of the refuse our work at other sites indicates that they are typical of two distinct groups and that the Ona type is not derived from the early one, at least in this region.

Late historic, horse-using, Tehuelche material is almost totally lacking so that the last occupation of these caves was presumably prior to this historic period. Pottery and polished stone work are lacking from all levels.

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QUOTATIONS

THE PROPOSED IRRIGATION TUNNEL UNDER THE ROCKY MOUNTAIN NATIONAL PARK

WHEN any group tries to put through legislation in a hurry, by unusual means and without full opportunity for the opponents to bring forward their arguments, the public has a right to be suspicious. It happens that this is just the fashion in which the plan to drive a power and irrigation tunnel under the Continental Divide and through the Rocky Mountain National Park has been handled in Congress both this year and last.

Last year the project was tacked on to the Interior Department Appropriation Bill on the floor of the Senate, was slipped through and was killed only because strenuous opposition in the House developed during conference. This year a separate bill was regularly introduced by Senator Adams, of Colorado, reported favorably by the Committee on Irrigation and Reclamation, but passed without public hearings or debate. The House has now announced a hearing, but there is danger that the bill will again be hooked on to the Interior Department Appropriation Bill, which has already passed the House, and that it will thus be jammed through without the consideration it deserves. The parliamentary procedure so far used certainly does not reflect confidence on the part of the measure's supporters that it will stand close scrutiny.

There are, indeed, arguments in its favor, as may be learned from the report of Senior Engineer Porter J. Preston, who directed the preparation of preliminary plans and estimates with the aid of a $150,000 PWA allotment. There is little doubt that the ranchers in the Big Thompson Valley on the east side of the divide could make profitable use of the water. There is not much doubt that the hydroelectric power which the scheme would produce could be sold. But the probability that some persons would gain is not a conclusive argument. Some persons would gain, perhaps, if Central Park were taken over for low-rent housing, but certainly the general public would lose.

Whatever the arguments for the project, which will cost anywhere from $24,800,000 for irrigation facilities alone to between $43,000,000 and $60,000,000 if there is a full power development, they should be subjected to an exhaustive public inquiry before they are accepted. Unless they are far more convincing than they now seem to be, the project ought to be dropped. It is not certain that it will be worth while to add to irrigation facilities in the Big Thompson area—or for that matter in any area under present conditions of agriculture. And it is certain that we ought not to add to them at the risk of setting a precedent which will lead to the despoliation of our national parks.—*The New York Times.*

SCIENTIFIC BOOKS

ADVENTURES IN BIRD PROTECTION

Adventures in Bird Protection. An autobiography. By THOMAS GILBERT PEARSON. Pp. xiv + 459. Appleton-Century, N. Y. $3.50.

IMPORTANT as the topic is yet one may rightly say that this book is far more than its title implies. Its opening chapters paint a vivid picture in plain colors of the early life of a Quaker boy reared under simple circumstances in the South and struggling against adverse conditions to win an education and at the same time follow up the study of birds on which his heart was set. Out of this grows the story not merely of bird protection but even more that of wild life conservation, which has assumed such large proportions in the last fifty years.

Many men see opportunities, but few grasp them. Probably others have recognized as clearly the value of college museums, but he sold the idea to the president of a struggling institution and built up the first college museum in North Carolina. Deeply impressed by the unrestrained slaughter of song birds he appealed alone

to the state legislature, drew up a bill to control the destruction, aroused public support and secured the establishment of the first game warden system in any southern state along lines at once so sane and so successful that the plan was followed for many years in other states as well.

Out of such achievements grew naturally the National Association of Audubon Societies in 1905, in which he was first its secretary and then president, but always at the front of the fight for the conservation of wild life. His tact, his resourcefulness and his persuasive power served to carry through successfully measures in many states, north and south, for game protection, despite powerful opposition. Probably the best known as also the greatest of these battles was that in New York state and later in Congress to put an end to the traffic in bird plumage sold for millinery. This carried his work beyond the limits of the United States and resulted in similar movements in many other countries and in the organization of the important International Committee for Bird Preservation in which he still retains an influential position. The origin and growth of these and numerous other valuable scientific movements are sketched by Dr. Pearson in accurate and unassuming fashion.

The quaint style of the author, the vein of quiet humor which runs through the book, the frank attack upon excesses wherever manifested and the tolerant spirit which has characterized his attitude throughout all the controversies in which he has been engaged are responsible in large measure for the remarkable success which has attended his efforts. This feature stands out clearly in his book. It is a veritable mine of information concerning men and movements in conservation. It covers well the history of the movement during the last fifty years, and the material is presented with a frankness and fairness that is unusual and that makes this record of permanent value.

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DIESEL ENGINEERING

Elements of Diesel Engineering. By ORVILLE ADAMS. Pp. xvi + 478. 250 figures, New York, Henley, 1936. $4.00.

THE book presents the elements of the subject in a clear and concise manner—from the earliest design to the most modern development. The operating principles of the various forms of Diesel construction are presented with a minimum of mathematics and irrelevant detail, consistent with a clear presentation of the subject. Topics of such major importance as fuel injection, fuel pump design, injection nozzles, combustion chamber designs, etc., are treated in such a way as to give a new man in the field an understanding of many of the fine points as well as the basic principles and the present status of development.

The many and varied problems that have been encountered in the development of the Diesel are outlined, and their solutions—or the progress that has been made toward these solutions, with particular emphasis upon the development of the high-speed Diesel—are discussed at length. Such topics as selection, installation, inspection, operation and maintenance of the automotive Diesel engine occupy a relatively large space, which is in keeping with the importance of this phase of the subject, particularly to those persons looking to this field as a means of livelihood.

One gets from studying the book a very good picture of the entire field and the great development that has been made in the Diesel engine, without getting the impression that all the problems have been solved. It is a record of the important background and present state of an industry which, although still in its infancy, has already developed to a place of great importance.

The subject-matter is particularly well selected and organized to serve as a text in a classroom or for individual use in obtaining a thorough picture of the elements of Diesel engineering.

THOS. C. POULTER

SPECIAL ARTICLES

THE ORIGIN OF THE AFTER-FEATHER[1] IN FOWL: A PROCESS OF TWINNING

IN 1932[2] we emphasized the origin of the barbs of the definitive feather from a single center situated at or near the mid-ventral line of the formative ring of cells ("collar") surrounding the base of the feather germ and enclosing the neck of the pulp. From this results the invariable seriation of barbs both as to time of origin and apico-basal order in the definitive feather. Though Hosker[3] has questioned this conclusion, farther study has served only to confirm it. We shall designate the place of origin of barbs as the *ventral locus;* it has a central position in the "ventral triangle" of our former paper. The other postulates of our pre-

[1] We use Studer's term "after-feather" (Afterfeder) for the small fluffy feather emerging from the superior umbilicus of the contour feathers of most carinate birds. The commonly accepted designation of this feather as aftershaft or hyporhachis is confusing, because the after-feather is a complete feather with its own shaft, barbs and barbules, though of course without a separate calamus of its own. (For current terminology of the feather see Asa C. Chandler, *Univ. of Calif. Publ. in Zool.,* 13: 243–446, 1916.)

[2] Frank R. Lillie and Mary Juhn, *Physiol. Zool.,* 5: 124–184, 1932.

[3] Anne Hosker, *Philos. Trans. of the Roy. Soc. of London,* Sec. B, 226: 143–188, 1936.