Rock is more ideal for the purposes of the refuge, its average depth over an area of several thousand acres being about fourteen inches. Swan Lake, adjoining the upper basin, is the shallowest of the three lakes.

Viewed basically, the story of Red Rock Refuge is the narrative of America awakening to the passing of its wildlife; of science striving for the perfecting of a management technique; of the response the wild is making to intelligent aid and whole-hearted protection. 'The livest the most widespread, and perhaps the most socially significant activity in the field of American biology to-day," writes W. L. McAtee, research specialist of the Survey, "is the technology known as wildlife management." It is these many factors that are so remarkably well typified at Red Rock in the person of A. V. Hull, its first and present manager.

Prior to his eleven years in the Survey, Mr. Hull did notable work in the field of ornithology. He is now collaborating with Clarence Cottam, chief of the Division of Food Habits Research of the Biological Survey, who in conjunction with the University of Utah and the Bureau is producing a state list, *The Birds of Utah.*

It is the tragic story of this largest of North American waterfowl—one that may yet have a happy ending—that has become the epic of Red Rock. Will it continue, we wonder, to be a story of vanishing glory?

"Exterminated by gunfire!" Thus W. L. Dawson voiced the consensus of opinion respecting the diminution of the great bird whose former range occupied the larger portion of the continent.

"Wherever in settled regions," wrote Edward A. Forbush, "swans were seen to alight, every kind of a firearm that could do duty was requisitioned, and all turned out to hunt the great white birds." Indeed, from early historical accounts, we find that many swan skins were taken at Red Rock itself. Yet to-day, the range of the larger of the two species in this country is restricted to northwestern Wyoming and southwestern Montana, and to the Henry Lake District in Idaho, which lies between. And it is only within a few years that it was definitely learned that a remnant still bred in this region.

No other trumpeter swans exist, save a last surviving company in the rugged wilderness of Canada's western-most province. Through the courtesy of J. A. Munro, Chief Federal Migratory Bird Officer for British Columbia, the following statement regarding their present status has been prepared for this article, and by the permission of F. H. H. Williamson, Controller, Department of Mines and Resources, Lands, Parks and Forests Branch, Ottawa, is here included:

"According to the best information available the number of trumpeter swans in British Columbia is in excess of five hundred birds. This estimate is based on the annual enumeration of wintering bands which assemble on certain waters situated both on the coast region and in the central interior. In the latter district, where winter conditions usually include periods of sub-zero temperature, the feeding grounds are restricted to limited areas on certain rivers where a swift current prevents the water from freezing. Elsewhere the birds usually have a wide choice and their feeding grounds may include several different lakes. The more important wintering grounds are guarded by Assistant Migratory Bird Wardens appointed by the Canadian Government. The duty of these officers includes the feeding of swans when this is rendered necessary by severe weather conditions. Barley is the grain chiefly used for winter feed.

"Losses in trumpeter swan populations are mostly due to lead poisoning* and to starvation. Loss through shooting has been reduced to a minimum in recent years.

"As most of the wintering bands under observation contain sufficient cygnets to insure the perpetuation of these populations the future of the species would seem to be reasonably secure so long as adequate protection is afforded."

In 1937 trumpeters in the United States were known to have numbered 158 birds, an increase of 43, more than 37 per cent., from the year before. The 1938 census reveals a decline to 148 individuals, despite the large number of cygnets produced this same year at Red Rock. indicating that over-optimism is not warranted and that only rigid protection will save the species.

The methods employed at Red Rock Lakes to assist increase are interesting. Twenty-four artificial nesting islands were first constructed and anchored in place to encourage the swans to nest in places where they could best be pro-

*Note.—Lead poisoning in waterfowl is caused by the birds taking up shot pellets along with gravel and is invariably fatal.