

A CONTRIBUTION TO THE EXPLORATION OF MEXICO

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Less than thirty driving hours from this campus lies the northern border of the Republic of Mexico. Not only have Mexico's old world civilization and majestic scenery attracted thousands of awe-inspired tourists during the last few years, but its rich and varied flora and fauna have lately attracted an increasing number of biological investigators.

Early in the nineteenth century, several European explorers made classical collections in southern Mexico, and in the latter part of the century, Godman and Salvin's magnificent set of illustrated volumes, *Biologica Centrali Americana*, summarized most of the biological knowledge of Mexico and Central America existing at that day. During the last ten years of the same century, Nelson and Goldman traversed Mexico from north to south and from east to west and returned with huge collections of mammals and birds. At the same time, Cyrus Pringle was invading many parts of Mexico and returning with large botanical collections which were promptly studied and distributed among the herbaria of the world.

The knowledge gained from these expeditions was kept alive only in scientific publications, since for many years little further progress was made in the exploration of Mexico. Biologists were well aware that at our very door flourished a tropical flora and fauna as luxuriant and as diverse as is to be found in almost any part of the earth. They knew, moreover, that the high central plateau of Mexico and the massive mountain ranges which border the plateau harbor plants and animals which are either the same or related to those of temperate North America, and that a thorough study of the natural history of Mexico would be necessary before many of the phenomena concerning our own animal and plant life could be adequately explained.

In recent years, this spark of interest has burst into a flame of renewed exploration and research. With closer cooperation between the scientific institution of Mexico and the United States, improved

traveling facilities, and peaceful internal and international conditions, more and more American investigators have been going to Mexico for a few weeks or a few months, and even more have been engaged in the study of their collections and findings. The Mexican students themselves have been exploring their land more assiduously than heretofore, and have created several excellent journals for reporting their results and those of their American colleagues. In our own country, scarcely a single issue of many of the leading biological journals appears without one or more articles devoted in whole or part to Mexican specimens, observations, or research.

In Mexico City, in buildings furnished by the Mexican government, the U. S. Department of Agriculture maintains an excellent laboratory for study of the fruit fly. There it can determine the fly's importance should it become established in our own orchards, and suggest methods of combating it and preventing it from crossing the international border. Field laboratories in various parts of Mexico contribute additional information towards this study. Other investigators have been exploring Mexico for rare or valuable plants for breeding or cultivation, or to encourage their cultivation in Mexico for the mutual benefit of both nations. Entomologists interested in the biological control of insects have gone to Mexico in search of parasites of Mexican insects which have become important pests of our crops, for with our modern commercial activity and agricultural practices it is often simple for such inadvertently introduced insects to become economic liabilities.

If only to increase the volume of scientific knowledge, museum and university researchers have been combing Mexico for new or rare species, or to secure distributional or ecological data for those which are already known. The proximity of Mexico and the United States, together with the intergradation and interdigitation of this continent's temperate

and tropical biotic elements there, make these investigations of pertinent interest, more so than if they were done in some far-off land.

For the last four years, the speaker has taken expeditions, each involving three months of time and a staff of from five to eleven persons, into Mexico to contribute in a small measure to the increasing wealth of knowledge concerning Mexican plants and animals.

Our stopping places have been chosen, so far as possible within the limits of time and financial resources, to provide us with as adequate a conception as possible of the various biotic units that characterize the Mexican region. In the eastern lowlands we have made numerous stops between the northern scrub forests and the more humid central forests. Our first stop each year has been in the thick semi-desert scrub, similar to that of Texas, less than a hundred miles south of Laredo, and the second in a mesic, temperate forest, less than a hundred miles farther south, which greatly reminds us of some of our Illinois ravine forests. Then we have worked farther south in the various transitional forests that grade into the tropical jungles characteristic of Central America. At other times we have stopped in the mountains and traveled up and down through the various altitudinal zones, and then crossed the great divide and gone down to the high central plateau which occupies the whole central part of Mexico. Visiting these places year after year gives those of us who can make the trip again an opportunity to profit from our previous experiences there and from what we have learned during a winter of studying our notes and specimens.

The composition of our party is designed so that we may gain as complete a picture as possible of the biotic complement of each region in which we spend a few days, weeks or months. The membership of our fourth expedition consisted of two entomologists, a mammologist, a herpetologist, an ornithologist, a parasitologist, and a botanist, besides two helpers for these men. In addition, we brought our own cook to sustain them, and a native student to make many of the necessary and time-consuming arrangements. The close cooperation between the various members of the party is of mutual benefit. For instance, the ornithologist, mammologist, and herpe-

tologist provide specimens for the parasitologist, or the latter, in turn, assists each one in obtaining animals. The botanist surveys the region, and after consultation with the others who have traveled through it in search of other specimens, announces the vegetational outlines and affinities of the locality under study. Or he cares for plants from which the entomologists have taken certain insects, so that these hosts can later be identified and the data recorded with the names of the insects. The herpetologist is sometimes so busy caring for the specimens which the others bring in in their searches that he cannot find time to go into the field himself for days at a time.

This method of procedure and organization, we believe, is an ideal way to study any new region. We have succeeded in obtaining several hundred new species of plants and animals in Mexico, and almost two dozen new genera of animals. In addition, the known range of hundreds of animals and plants have been extended, and many rare forms have been brought to the attention of students interested in them. But best of all, we have secured records of thousands of already known species of plants and animals which help us to correlate our findings with what is already known about the biogeography of Mexico. To make this information available to other students, each of our men has reports of his work in progress or in press. In addition, scores of papers by others who have studied our specimens have appeared or are in preparation or in press.

Our results after four years of effort might have been much more impressive had we had expensive equipment and ample financial backing, but with dependence mostly on collecting equipment and our own five senses for specimens and data, and with only some pecuniary assistance from Chicago's Field Museum and a few other interested colleagues, besides the limited personal ability to finance these trips, our efforts have been restricted more than we have liked. In addition, our gross inexperience and lack of guidance on the first and second trips greatly reduced our results, and it has only been with increasing experience and knowledge that we have begun to accomplish that which we first hoped to do. The loss of much of our insect collection the first year and a serious accident early

the second year greatly hampered the work, but the "breaks" on the last two trips have been as good as the early ones were bad.

Our most ambitious research problem is now in progress in the mountains at the southern end of the great Mexican plateau. We have already spent four months there in an investigation of a swath of land, or transect, some fifty miles long, which begins in a wide, sweltering river valley only a thousand feet above sea level, and progresses upward through the various transitional zones to the temperate forests at six thousand feet elevation, and then up the cold, damp slopes of the adjacent mountain to its summit at about twelve thousand feet. In an isolated village at the halfway point, seldom if ever before visited by Americans, we have made our headquarters in the many rooms of one of the town's largest adobe houses. The local people are our good friends and perform many services as we spend happy and busy weeks climbing up the mountain to its peak, just a day's journey above our house, or down to the hot lowlands, just a day's journey below our house. On the mountain, we work from base camps which are supplied by frequent visits of the expedition's mule driver and his balky animals. The middle region of this

steep transect, we easily work with the house as a base, and in the lowlands we lodge with a well-educated Dane who makes our work easier with his many years of experience in that section of the country. In the lowlands, our work is speeded since we are able to bring in our truck, after a slow and treacherous drive, and dash from place to place over the hard valley floor, but in the mountains we are connected with the world only by forty miles of narrow, slippery, and winding mule paths and a single noisy telephone that operates only for one or two hours a week if we are lucky after yelling into its scratchy recesses for several hours beforehand.

After four months of work by eleven people and many retainers, we have secured the records of part of the invertebrates, many of the birds, and most of the mammals, reptiles, and amphibia which are found in this steep fifty mile stretch of Mexican mountain country. Our future plans, once the war is over and traveling for nonbelligerent purposes may be resumed, is to establish ourselves in this region for a whole year, not only to continue to study the altitudinal differences there, but also to observe the seasonal variation in the flora and fauna. Thus we hope to contribute our bit to the exploration of Mexico.