COLLECTING IN SONORA, MEXICO, INCLUDING TIBURON ISLAND

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In the summer of 1952 (July 1 to August 16) the authors were sent by the Department of Insects and Spiders of the American Museum of Natural History to collect in the coastal region of the state of Sonora, including the rarely visited island of Tiburon. The main purpose was to gather further data on the distribution of tiger beetles (*Cicindela*) and to make a collection of other insects and spiders from this western region that is so little known entomologically, especially from Tiburon. Our collecting did, in fact, fill in the distributional gaps of a number of species of *Cicindela* and extended the ranges of others. Four new subspecies of *Cicindela* were discovered in this material by Dr. Mont A. Cazier, chairman of the Department of Insects and Spiders, who is describing them in a paper on the tiger beetles of Mexico to be published shortly in the bulletin of the American Museum of Natural History. Identifications of the other tiger beetles mentioned in this paper were checked by Dr. Cazier, whose assistance is greatly appreciated.

We are grateful to the United States Consuls at Nogales and Guaymas for the information and help given by them, and to Mr. William N. Smith, who has spent a number of years living with the Seri Indians on Tiburon and vicinity. We are particularly thankful for the cordial cooperation extended to us by Professor Manuel Quiroz Martinez, Rector of the University of Sonora at Hermosillo, and to his colleagues, without whom we could not have reached some of the places we wanted to visit.

Our equipment consisted of a Jeep and Bantam trailer, the latter being essential in enabling us to carry extra gasoline and water in the coastal area away from the highway and to the island of Tiburon. The highway, which is modern and in excellent condition, extends from Nogales south to Hermosillo and Guaymas, then east through Obregon and Navojoa; it ends at present about 27 miles south of Navojoa, but will eventually

reach Mexico City. A paved spur extends from Navojoa to Huatabampo and others are under construction from Navojoa to Alamos and from Hermosillo to Puerto Kino. With the exception of another paved road from Sonoyta to Punta Peñasco, all other roads are either coarse gravel, stones and dirt, or pure sandy wheel tracks, most of them becoming impassable once the summer rains begin (on July 19 in 1952). Travel on these unpaved roads and tracks is often hazardous even during the dry season because many are very poorly indicated, and it is surprisingly easy to lose one's way even after local inquiry or with the services of a guide. The roads shift as often as fancy dictates, but generally speaking most of the choices offered lead eventually to the same place. In addition to extra water and gas, one should be equipped with ropes, a shovel, and old burlap bags.

Collecting localities are indicated by name or number on figure 1, but for the purpose of description they are separated below into coastal localities, islands, inland localities, and localities in the foothills.

COASTAL LOCALITIES

The gulf coast is exceedingly dry and arid, and in places is very rugged, with steep capes or rocky promontories shelving abruptly to the sea. In other places it is low lying, with beautiful curving beaches, and is indented more or less deeply by shallow bays or inlets called "esteros." These esteros, a typical feature of the coast, usually end in tidal marshes with extensive mud flats, ideal situations for many tiger beetles.

At La Cholla, reached by a sandy road through low cholla cacti wastes from Punta Peñasco, a fishing town, four species of *Cicindela* were taken on August 16, *C. gabbi, beneshi* and *californica mojavi* on the outer beach, and *digueti* (a new subspecies) at the edges of the tidal marsh behind the beach. In June, Drs. M. A. Cazier, W. Gertsch, and Mr. R. Schrammel had collected three additional species at this same spot (*C. latesignata parkeri, C. nevadica,* and a new species), and also had found the beetles far more numerous. At their visit the *beneshi* were so thick along the beach that twenty or thirty were caught in each few sweeps of the net and a total of over 1900 specimens were col-

lected in a few hours whereas we found only one specimen of this species.

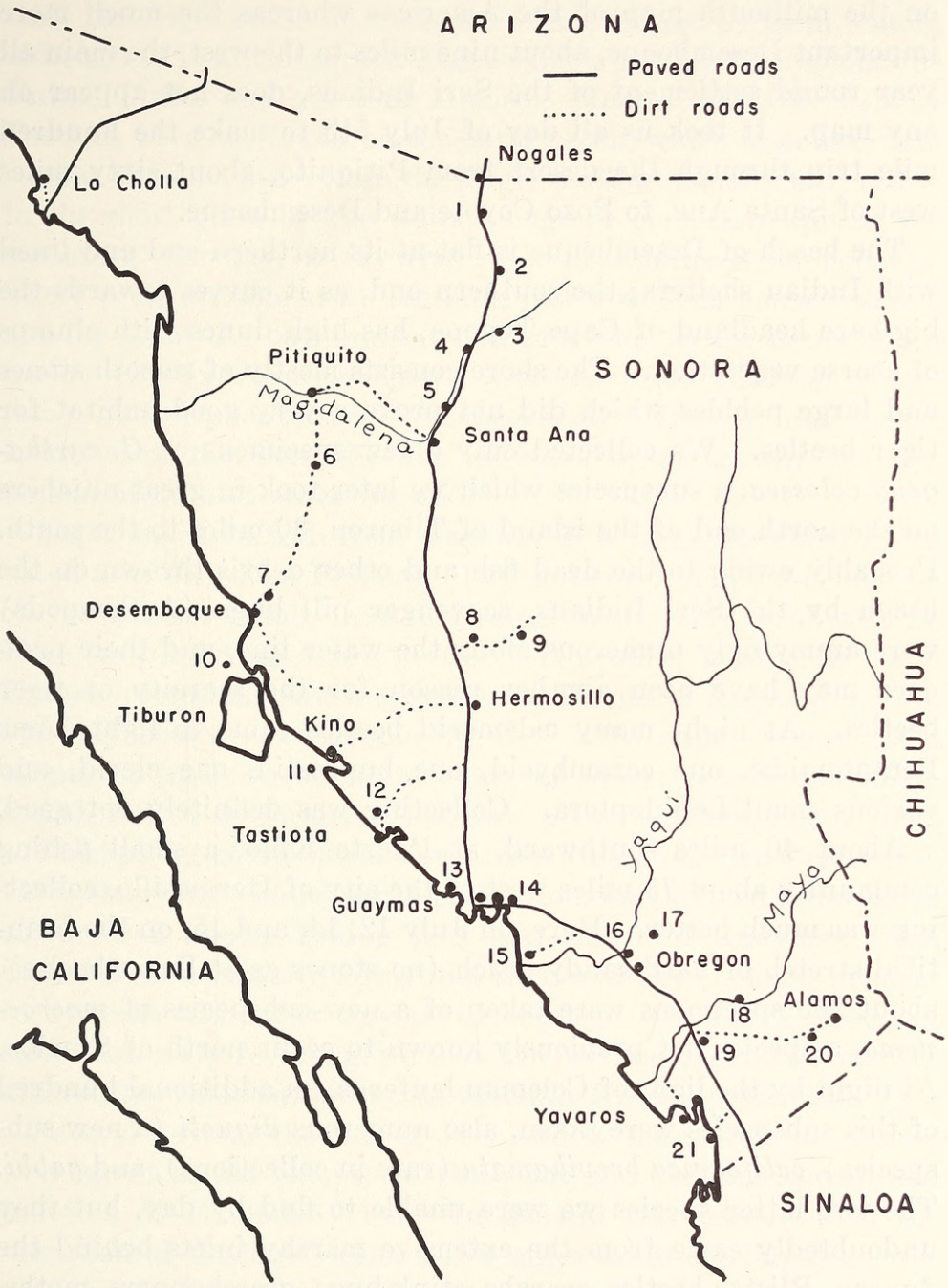

FIGURE 1

A small white roach, some green stink bugs (*Thyanta*), two *Tetracha* (Cicindelidæ), and a few other insects were collected

at night at Pozo Coyote (7) about 150 miles south of La Cholla. This place, which is now but a semi-abandoned ranch, appears on the millionth map of the Americas whereas the much more important Desemboque, about nine miles to the west, the main all year round settlement of the Seri Indians, does not appear on any map. It took us all day of July 5th to make the hundred mile trip through the desert from Pitiquito, about sixty miles west of Santa Ana, to Pozo Coyote and Desemboque.

The beach of Desemboque is flat at its northern end and lined with Indian shelters; the southern end, as it curves towards the big bare headland of Cape Tepopa, has high dunes with clumps of coarse vegetation. The shore consists mostly of smooth stones and large pebbles which did not prove a very good habitat for tiger beetles. We collected only a few specimens of *C. carthagena colossea,* a subspecies which we later took in great numbers on the north end of the island of Tiburon, 30 miles to the south. Probably owing to the dead fish and other debris thrown on the beach by the Seri Indians, scavenger pill bugs (Arthropods) were annoyingly numerous along the water line, and their presence may have been another reason for the scarcity of tiger beetles. At night many œdemerid beetles came to light, some Pentatomidæ, one cerambycid, one buprestid, one clerid, and various small Lepidoptera. Collecting was definitely not good.

About 40 miles southward, at Puerto Kino, a small fishing community about 75 miles west of the city of Hermosillo, collecting was much better. Here, on July 12, 14, and 15, on the beautiful stretch of hard sandy beach (no stones as at Desemboque), about 200 specimens were taken of a new subspecies of *macrocnema,* a species not previously known to occur north of Sinaloa. At night by the light of Coleman lanterns, an additional hundred of this subspecies were taken, also numerous *digueti* (a new subspecies), *californica brevihamata* (rare in collections), and *gabbi.* The two latter species we were unable to find by day, but they undoubtedly came from the extensive marshy inlets behind the dunes. Blister beetles, scarabs, stink bugs, grasshoppers, moths, and other insects were also abundant at night.

Another thirty miles or so southward, at Tastiota, where we stayed July 17 and 18, collecting was also excellent. Four of

the species of tiger beetles were the same as those of Kino, and and there were two additional ones, *carthagena* and *trifasciata*. Only three specimens of the latter were collected by us in Sonora although it is a widespread and common species throughout the United States and much of Mexico. Most of the *Cicindela* at Tastiota were not found on the outer beach, which is as beautiful as that of Kino, but within the large, shallow, marshy bay, either in the short grass by the water's edge or on a bare spit at the mouth of the bay, a favorite roost of hundreds of pelicans. There is no settlement at Tastiota, just a modern house situated not far from the bay under a low ridge of organ cactus, giant cactus (*Pachycereus pringlei*), creosote bush (*Larrea tridentata*), and elephant trees (*Pachycormus*). Here at night some Lamiinæ of the Cerambycidæ were taken, along with scarabs, tenebrionids, and other insects.

Eight miles inland from Tastiota is a large irrigated cultivated area called La Floresta (12), so named, no doubt, because of its screen of tall trees enclosing fields, mostly of alfalfa. Here we picked up a few beetles (Malachidæ, Anthicidæ), and Hymenoptera, and saw a specimen of *Cicindela lemniscata*. On our way back to Hermosillo by way of El Zapo we got lost a couple of times through the maze of desert tracks and abandoned, fenced in former fields, now a swirl of fine, floury dust.

Two species of *Cicindela* were taken July 25 at San Carlos Bay (13), about forty miles south of Tastiota and sixteen miles north of the well known fishing port and resort of Guaymas. San Carlos is an unusually lovely and sheltered bay enclosed in sheer rocky walls with a few tiny sandy beaches. On one of these, not more than sixty feet long, we took 116 *carthagena* and about fifty *digueti*, the same subspecies as taken at Kino and Tastiota.

Several days at the end of July and in the middle of August were spent in the vicinity of Guaymas and the nearby railroad junction of Empalme (14). In general this region, with the exception of Cochore Beach a few miles south of Empalme, was not very good for tiger beetles because the many mud or alkaline flats, inlets, and beaches that seemed so promising at first sight yielded very few specimens. The beach at Miramar, where we camped, is crowded with bathers and is much built up, but on a

small strip of sand inside the inlet at the northern end of the beach we found *C. carthagena* in good numbers both by day and night, also a few *digueti*, and a single *trifasciata*. Two specimens of *gabbi* were finally found on a large tidal flat across the inlet after a search of a couple of hours. At night *C. wickhami* came to lights in the town.

On our two visits to Cochore Beach we took good series of *macrocnema*, also a few *carthagena*, *digueti*, and *tenuisignata*, the latter usually being a river species. The long legged *macrocnema*, as we had already noted at Kino and Tastiota, were difficult to collect because they usually spread themselves out flat on the moist sand and were missed by the scoop of the net. At Cochore they were even more difficult to capture because of the strong breeze that springs up in the forenoon. A specimen of the weevil *Calendra phœniciensis*, a billbug common in Arizona, was found in the low sand dunes, but insects in general were not plentiful.

The coast can be reached also by way of Potam (15), about forty-five miles south of Guaymas, and at Las Bocas (21), about thirty miles southwest of Navojoa (19). At Potam, an interesting Yaqui community where we arrived August 10, the rains which had begun at the end of July made further progress impossible. At Las Bocas we saw but one tiger beetle, a *macrocnema* that we failed to collect, and, although the shores of an estuary at this locality looked ideal for tiger beetles, no others were found despite long search. A specimen of a buprestid, *Polycesta* sp., however, was found.

The southernmost coastal locality visited, in addition to Las Bocas, was Yavaros, close to the border of Sinaloa and reached by way of Huatabampo. It is a picturesque but forsaken little fishing village at the end of a long narrow spit of land projecting into a huge bay, sheltered in the lee of a large sand dune which cuts off any breeze. At the end of July it was a good locality for night collecting, the few lights of the village attracting *C. lemniscata*, *gabbi*, and *californica brevihamata*, and more cerambycids than were taken at any other place on the coast. On the tidal flats of the bay in the daytime about 150 *gabbi* were collected in a short time and on another immense flat a few miles

north of Yavaros a large series of *californica brevihamata.* On this flat, however, the wind was even stronger than it was at Cochore and made collecting very arduous.

ISLANDS

We collected on three islands, all uninhabited, on Tiburon, on Patos (10), a few miles to the north of Tiburon, and Alcatraz or Tassne Island (11) in Kino Bay. Patos lacks suitable habitat for tiger beetles but one lone specimen of *digueti* was captured. On Alcatraz a long sand spit seemed suitable, but we found only one specimen of *carthagena.*

Although Tiburon, which is thirty miles long from north to south by fifteen miles wide, is separated from the Sonoran coast by a narrow channel only a few miles wide, it can only be reached by way of either Desemboque or Kino, which are both about thirty miles distant, respectively, from the north and south ends of the island. In character Tiburon is very similar to the bare headlands of the coast and consists of two rugged, barren mountain ranges separated by a central valley, the mountains on the west coast rising abruptly from the water. The island is exceedingly arid, and there is virtually no drinking water except for a small hole of strongly brackish and debris-filled water near the Seri Indian camp of Tecomate at the north end (the Fresh Water Bay or Bahia de Agua Dulce of maps). A few other water holes and springs are said to exist elsewhere, in the mountains, but are known only by the Indians. The scrubby and scanty vegetation gives no shade, and the thermometer reaches 150 to 160 degrees Fahrenheit.

We spent July 8 to 10 at Tecomate, and July 13 to 14 at Ensenada del Perro, a large bay at the southern end. An 18-foot rowboat with a five horse power engine, handled by three Indians, took us and all our equipment over thirty miles of water from Desemboque to Tecomate. Here, when the tide is out it exposes large rocky flats interspersed with sandy, gravelly patches. The dry part of the beach is narrow, with high clay banks and shell mounds rising steeply from the high water mark. The women and children of a couple of families of Seris had built their open shelters on the shelf of sand cliff, but the usual

summer influx of Seris from Desemboque to Tiburon had not yet begun. The first night, while we were waiting on the sand cliff for the Seris to cook the big pot of rice which was to be mixed with some of our assorted canned food, the Coleman lanterns attracted some small green pentatomids, Orthoptera, miscellaneous Coleoptera, and 11 specimens of *C. digueti.* The next night we took some tenebrionids (*Eleodes*), sand spiders on the beach, and assorted scarabs, œdemerids, tenebrionids, curculionids, and more pentatomids in the dry wash near the water hole. By day, at low tide, beyond the belt of rocks, good series of *digueti* were taken on the moist sandy spots and near shallow pools, also many specimens of the large subspecies of *carthagena* (*colossea*).

At the southern end of the island, which we reached via Kino with some Mexican fishermen, we did not find *carthagena,* but took some *digueti* which were found later by Dr. Cazier to belong to the same subspecies that occurs in Baja California. The tigers here were not found on the hard sandy part of the beach, but to one side of the bay, on and among large rocks and hard clay-like outcroppings; they were often confused with some small brown, shiny marine arthropods that scuttled over the rocks.

INLAND LOCALITIES

Our first collecting stop in Sonora, on July 1, was at a large cattle tank at Agua Zarca (1), about twelve miles south of Nogales. Here *C. sedecimpunctata* was swarming by the thousands at the edge of the water, and was equally abundant a little farther south a Cibuta (2) and Imuris (4), and was also collected near the towns of Magdalena (5) and Santa Ana. Near Magdalena some fig beetles (*Cotinus*), elaters, and other insects were swept from mesquite. The highway from Imuris to Santa Ana follows along the Magdalena River which comes down from the Sierra through the canyon of Cocospera and flows west at Santa Ana, passing through Pitiquito. At the time of our visit the river had only a very scant flow of water or was dry for long stretches, the wet places always having good numbers of *sedecimpunctata* which is most abundant in this region.

At Santa Ana the character of the country changes rather

abruptly. To the north the land is high, varying between 2000 and 3800 feet, and is relatively well watered, but to the south it is much lower and becomes very arid. From Santa Ana a rough road swings westward via Altar and Pitiquito, and this is the only road from the highway to the coast in the 150 miles between Santa Ana and Hermosillo.

Pitiquito, a small town about sixty-five miles west of Santa Ana, proved to be an excellent collecting locality. Along a small canal dug in the otherwise dry bed of the Rio Magdalena, five species of *Cicindela* were taken, as follows: rather large numbers of *fera, sommeri* and *sedecimpunctata* and considerably less numbers of *flavopunctata* and *sperata.* The first named species was not known to occur so far north, and the last, which was found by Dr. Cazier to represent a new subspecies, had not been reported from Sonora. On the arid mesa above the river bed the first bumble bees of the trip were collected, also some large and small bugs (Coreidæ, Pentatomidæ), elaters and coccinellids in Coleoptera, and at night, on the feathery stalks of a river plant, a hundred or more specimens of the big grey-brown, mottled weevil, *Cleonus saginatus* or *dentatus?.* We spent three days at Pitiquito and on the 5th of July left for Desemboque, passing through La Cienaga (6), about thirty miles south where, on the banks of some large ponds fed by springs, we collected more *C. sedecimpunctata,* as well as some Hymenoptera, Diptera, and Neuroptera. From the small community of La Cienaga on through the desert, the "road" becomes a few vague sets of tracks through an immense uninhabited region in which the Sonoran desert is at its most varied and beautiful.

Hermosillo, the capital of Sonora, is a very modern and attractive city, but being low (693 feet) is very hot. We stopped there on several occasions and collected at night on store fronts. Orthoptera, especially crickets, Scarabæidæ (gold bugs), and Meloidæ, were especially numerous one night, and Malachidæ, Pentatomidæ, Reduviidæ, small scarabs, and tenebrionids could always be found. Series of *C. lemniscata* and *wickhami* were also taken. By day on the shores of the large dam at the edge of the city we took four of the same species of *Cicindela* as at Pitiquito, El Gavilan, and north of Navojoa: *fera, sommeri,*

sedecimpunctata, and *sperata.* On our last visit, on August 12, the rains had filled the dam to overflowing, destroying the habitat of the tiger beetles.

The Sonoran desert south of Guaymas is poor, with little variation in its vegetation, and it ends finally at the Yaqui River. From there on, the low lying land is under intensive irrigation, the waters being derived from the permanent Yaqui and Mayo rivers through a series of modern dams and canals some of which are still under construction. The centers of this rich agricultural region are the thriving cities of Obregon and Navojoa (19). At the end of July we collected on both sides of the Yaqui River north of Obregon near the little Yaqui Indian town of Cocorit (16). The fording place was not too deep for trucks and even where the ferries operated the water was not more than three feet deep. Thus quite a large area of sand and mud flats was exposed, and *C. sedecimpunctata, flavopunctata, tenuisignata,* and *fera,* also a member of the cicindelid genus *Tetracha,* were caught near small pools on the flats, or at the river's edge. On the high sandy banks among the vegetation many specimens of the small grey weevil, *Trichobaris,* were collected, also cinch bugs, chrysomelids (*Chrysochus*), coccinellids and Hymenoptera and Diptera.

In Obregon itself, where we collected at night only, at the lights of a motel and on store fronts, we took *C. tenuisignata* again, also *lemniscata* and *wickhami.* The night of July 29, after a terrific rain and thunder storm the day before, proved about the best night we had for all insects. Among those collected were *Eburia* and *Hippopsis* in the Cerambycidæ, *Trox* and other Scarabæidæ, Bostrichidæ, Meloidæ (*Pyrota akhurstiana* and others), Hydrophilidæ, Curculionidæ, Reduviidæ, and others.

A few more specimens of *C. tenuisignata,* also of *sedecimpunctata,* were collected on a short excursion of about 13 miles from Esperanza (near Obregon), past the village of Los Hornos, to Agua Caliente (17), a hot sulphur spring and lake in the hills. Hydrophilids and some Hymenoptera were also taken on the lake shores.

Navojoa is about an hour's drive south of Obregon and is situated on the far side of the Rio Mayo. But on August 1 and 3

the river was so high that there was no habitat for *Cicindela.* At the ranch of J. J. Dow, off the highway between Navojoa and Huatabampo, two species of buprestids (*Acmæodera*) were taken from within the yellow flowers of the cotton plants, also some chrysomelids (*Diabrotica*), and curculionids (*Anthonomus*). Northwest of Navojoa and of the village of Tesia, at the Santa Rosa Ranch (18), the Rio Mayo makes a wide bend and here on one side there were low sandy banks exposed on which were taken *C. sedecimpunctata, fera,* and *sommeri,* the great majority being *fera,* and at night *wickhami* and *lemniscata.* There was some rain at this time (August 1 and 2), and the area was very moist, hot, humid, and very good for insects. The large *Cleonus* weevil taken at Pitiquito on the Magdalena and later at Pesqueira on the Rio Sonora, was present here also in good numbers, also another weevil, equally large, a variety of *Cratosomus punctulatus,* white with variable black transverse markings, which was picked from two mesquite trees in the river bed. Although this weevil is said to be common throughout Mexico, we encountered it once only. Other insects taken at night included some *Monilema* taken on cholla and beaver tail cacti, also other smaller Cerambycidæ, *Diplotaxis* and other Scarabæidæ, some Cleridæ, Elateridæ, Bostrichidæ, and many Neuroptera and Lepidoptera.

LOCALITIES IN THE FOOTHILLS

In some places the foothills of the Sierra Madre Occidental come very close to the highway, and the Sierra itself is always in sight. We first penetrated into the foothills on the evening of July 1 when we went part way to Cananea, camping in Cocospera Canyon (3) a few miles above the village of Puerta del Cajon. Here along the Magdalena River we took the ubiquitous *C. sedecimpunctata,* and some chrysomelids, curculionids, malachids, coccinellids, and Diptera.

Another canyon, about forty-five or fifty miles northeast of Hermosillo and through which flows the San Miguel, an affluent of the Rio Sonora, was visited at a very beautiful spot called El Gavilan (9), on the road to Ures. Here, at the fording of the river we managed to collect a few specimens of *C. fera, sommeri,* and *sedecimpunctata* and see a *sperata* before the first heavy

raindrops of the season chased us and the tiger beetles off the sandbanks (July 19). El Gavilan will always remain vivid in our memory as one of the wildest nights we ever spent in the open. The torrential rain which began at 6 p. m. as we attempted to leave the canyon kept up until 3 a. m. with constant lightning, thunder, and driving gusts of wind, while we sat shivering and soaked in the open jeep, marooned on the side of a fast flowing wash. The next day we woke to a grey dawn and a wet motor, but were eventually rescued by some truck drivers who, like us, had been caught by the storm in the mountains. The trucks and ourselves continued laboriously through a number of minor washes to find our way finally cut off by the impassable Rio Sonora which, though bone dry the evening before, was now a swiftly running, handsome river some 200 to 300 yards wide.

Near the village of Pesqueira (8) on the shore of the Sonora, while we were waiting for the river to go down, we picked up about sixty cicadas, one hundred *Cleonus,* elaters, coccinellids, the spectacular orange and black cerambycid, *Dendrobias,* and other insects. We were finally pulled across the river by a team of four mules, whose owner was making a good business with the vehicles waiting on both sides of the river at ten pesos a crossing.

Quite different country was encountered at the southern end of Sonora at Minas Nuevas (20), 1700 feet high in the Sierra de Alamos, and at Alamos itself which is somewhat lower at 1200 feet, and not far from the border of the state of Chihuahua. Around Minas Nuevas and Alamos the vegetation is semi-tropical and more varied, with morning glory trees and wild figs, although quite a few of the typical Sonoran desert plants still persist. At the time of our stay (August 4 to 8) it rained nearly every day. Hundreds of butterflies, not seen before on the trip, clustered about the pools and moist mud along the paths and roads. The first Lycidæ and Lampyridæ of the trip were also taken at Minas Nuevas, and on a flowering tree hordes of small cerambycids (*Rhopalophora,* etc.), clerids (*Enoclerus, Cymatodera*), Hymenoptera, and the large black cerambycid (*Stenaspis*). Two inch long, spiny legged Coreidæ were mating every-

where on the mesquite, and small black and red Chrysomelidæ were taken from a mesquite in flower. At night *Monilema* cerambycids were picked from the beavertail and cholla cacti and many insects came to light. Small dung beetles rolled their pills on the paths, and on the vegetation large green elaters were taken, brilliant green and golden buprestids (*Agæocera*), curculionids (*Trichobaris*) on *Solanum,* and the large *Cactophagus.* Other beetles included *Trox, Diplotaxis, Bolboceras, Acmæodera, Eburia, Epicauta* and members of the Cucujidæ, Lucanidæ, Carabidæ, and Anthribidæ.

Minas Nuevas is a silver mine no longer under operation where we were the guests of Mrs. Clara Yaeger, the owner of the mines. On a wooded, gravelly, and shady path at one side of the mine, the small tiger beetles *lemniscata* and *wickhami* were collected by day and night, also a few *sedecimpunctata,* and six specimens of *hydrophoba taretana,* a subspecies known previously only from farther south in Mexico. Alamos, six miles east of Minas Nuevas, is a sleepy colonial town with fine old buildings and arcaded streets where time has stood still. Once the capital of all northwestern Mexico with a population of 25,000, it has now only about 1000 inhabitants, many of them retired Americans. In the arroyo at the entrance to town bumble bees and a cetonid beetle were collected from the white flowers of a tall bush, and other Hymenoptera in nearby poppy fields.