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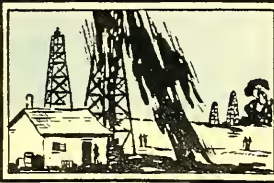
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Louisiana Conservation REVIEW



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LOUISIANA NATURE
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JULY
1935

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NEW ORLEANS, LA., JULY, 1935

No. 7

Death Takes No Holiday

UNDER this striking title the Honorable Ernest Lundeen of Minnesota delivered in the House of Representatives, May 17, 1935, an address concerning the tragic record of automobile accidents in the United States. Since conservation of human life is obviously conservation of the most valuable kind, it is desired to bring to the attention of the readers of the *Louisiana Conservation Review* some passages of this discussion.

Enjoyment of the out-of-doors and the pleasures which so many of our natural resources afford us is today so much bound up with the use of motor transportation that here again the subject comes close to those interested in all conservation.

The figures are appalling. The speaker states:

"Attention has again been concentrated on the terrible toll of deaths and injuries in traffic accidents in this country. Few realize how this toll has been growing. In the last 10 years the number of deaths on our highways has about doubled, reaching the all-time high of nearly 26,000 deaths in 1934. For every 7 persons killed in 1933 in automobile accidents, 8 were killed in 1934. Every 15 minutes someone is killed, and every 30 seconds some person is injured in a traffic accident. It has been estimated that if the present trend of traffic accidents continues, out of each 100 persons born today, 14 will be killed or seriously injured in traffic accidents and 80 will sustain minor injuries. This information comes to me from the director of safety and traffic engineering of the American Automobile Association.

"In the 18 months of the United States' participation in the World War, 50,510 American soldiers were killed. In the same number of months, from July 1, 1930, through December 31, 1931, 53,650 Americans were killed by motor vehicle accidents. The toll for the last 18 months is still higher. The six major

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N. E. SIMONEAUX.....Assoc. Editor
ESTELLE V. COTTMAN.....Nat. Guar. Ed.

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wars in which the United States has participated since its birth as a nation cost less than 300,000 American lives. During 15 years of peace time 1,300,000—over four times as many American people—were killed by accidents, and millions more have been disabled for life.

"One million more people killed on American roadways in 15 years of peace than in all major wars of our history! This and a great deal of additional information has been compiled by Ernest Greenwood in his recent book, 'Who Pays?' . . .

"By far the largest number of accidents are caused by motor vehicles. Of the 99,000 accidental deaths occurring in 1934, 35,500 were caused by motor vehicles; 33,000 accidental deaths were caused in the home; 17,-

Captain Victor Sandras, Veteran of the Bayous

CAPTAIN Victor Sandras last month completed his thirty-first year of service with the Division of Oysters and Water Bottoms of the Louisiana Department of Conservation. This genial, admired and respected officer is known to all who dwell along the bayous.

Captain Sandras himself supervised the construction of the Motorlaunch "Louisiana," the oyster boat of the Department of Conservation, and throughout her existence has safely navigated her in all varieties of clear and stormy weather. Indeed, although it is difficult to induce Captain Sandras to discuss such matters, he has rescued many ships and saved many lives along the coasts during storms. Only those members of the Louisiana Department of Conservation whose work has involved a voyage with Captain Sandras can know his true worth and learn the unusual pleasure of his company.

Thirty-one years of devotion to service for the public good is a proud record.

500 were caused by accidents of a public character, not including motor vehicle accidents; 15,500 were caused by occupational injuries—Preliminary 1935 Edition of Accident Facts, National Safety Council.

"Recurring sensational headlines flaring forth the toll of lives lost in every airplane accident mislead the public, and cause many of our good citizens to shrink from travel by air. As a matter of fact, a report of the Federal Coordinator of Transportation on Passenger Traffic (H. Doc. No. 80) indicates that airway carriers fly 24,700,000 passenger miles for each fatality, whereas private automobiles drive only 11,300,000 miles. There are more than twice as many private automobile fatalities per number of miles traveled as there are deaths on airway carriers. . . .

(Continued on Page 21)

Light Tackle in Salt Water

By

BENJAMIN F. LEEPER

A SOLID steel, four and a half or five foot rod, as large a capacity fresh water reel as you can get and as much pole wrapping linen thread as you can comfortably get on the reel will provide an amazing amount of real sport.

Lose some fish? Oh yes, you will probably lose quite a few for some time until you get enough patience to let the larger fish play themselves out, but after that you need catch very few less than the "derrick and windlass" man, except when they are biting unusually fast, as, for instance, when you run into a school of trout. Then it will probably take you as long to land one fish as your companion takes to haul in three or four, if they are running fair size, but what of it?

Isn't your primary object in fishing the sport and excitement of catching the fish? On almost any fishing ground a casual check will show that the majority of the tackle used for croakers, trout, sheepshead and red-fish is so heavy that it would be barred from a Tarpon Rodeo.

If you are fishing for the harder fighting varieties such as large Reds and Jacks it is much better to have the regular salt water tackle, which differs principally in having a reel capable of holding several times the amount of line that the ordinary fresh water reel can handle.

A couple years ago I was out on Lake Catherine with a friend when we saw some Jacks feeding. Morrell had a light casting outfit with a silk

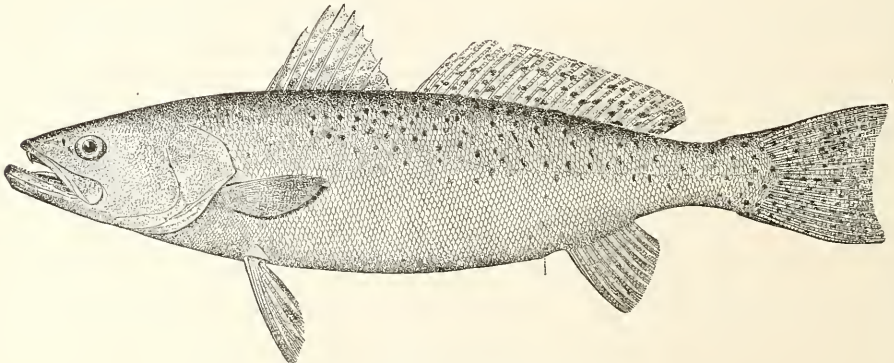
line. He hung on an artificial minnow and we ran the Jacks down. On the first cast or two nothing happened, but about the third, something most decidedly did happen. The line went through the water as though it were attached to a double-charged Whitehead torpedo. Thumbing first with one hand and then with the other, there wasn't the least indication of turning that Jack and in much less time than it takes to tell it, the reel was stripped until the snap of the line interrupted the pitch of its steadily rising scream.

Net results of that cast: one lost minnow with a few feet of line, two enormous water blisters, one on each thumb, the knowledge that fifty yards of silk line was emphatically not enough for a fish with such a disposition and a terrific kick for each of us. In fact, of all the fish we hooked that summer, none made nearly so lasting an impression as those few seconds of hopeless fight.

This brings us to an auxiliary bit of equipment that should be added to your kit for this type of sport, the thumb stall. There are both leather and knitted ones on the market and many fishermen say that the knitted are the cooler and more satisfactory. In any event, if you expect to run into really fast fish, be sure to have at least one along.

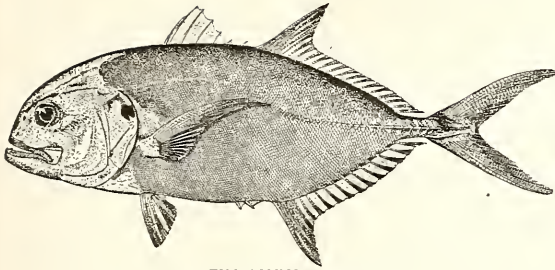
Another item that not all heavy tackle fishermen carry is either a gaff or a landing net.

Of course, most of the fish may be landed by hand, but one of the danger spots with light tackle



THE SPECKLED TROUT

Eriscion nebulosus (Cuvier and Valenciennes).
Universally esteemed for its game qualities and flavor.



THE COMMON JACK
Caranx hippos (Linnaeus).

One of the hard fighting game fishes of Louisiana salt waters.

is the period of lunging when the fish is brought close to the boat. There is no such thing as snubbing a fish of any size and the tendency of the average fisherman to try just this is often the cause of the greatest loss. A properly handled landing net will reduce the loss greatly.

There seems to be a fear among so many fishermen for their tackle when playing large fish. A moment's reflections, however, and it is evident that no greater strain can be put on the tackle than the line itself can stand, and with a line of from ten to sixteen pounds test it requires careless or thoughtless handling to harm a rod or reel in proper condition. The hazards of line breakage are dependent upon the size and type of fish and the strain you put on it. In other words, no matter how large or fast the fish, as long as the reel is running free and no back-lash permitted, there will never be sufficient strain to break the line, but, unfortunately, a free running reel seldom lands any fish, so you put the strain on both the fish and the tackle with your thumb pressure, either directly on the reel when you are allowing the fish to run, or on the handle when you are retrieving.

With a bit of experience you soon become familiar with the amount of pressure that it is safe to apply.

Here is probably as good a place as any to put in a special warning about keeping light tackle in condition when it is being used in salt water. Any line should be washed in fresh water and thoroughly dried after using and the fore end should be tested and broken as far back as it is weak before tying on lures or hooks. This weakness is as much and often more, the result of wear and fraying, than rotting, so no matter how carefully the line is cared for, it should be tested each time before starting fishing and if much casting is done it should be done several times during the day.

A good reel and one properly taken care of often mean all the difference between a pleasant and an exasperating trip. Wiping the water out and oiling it at lunch time will often preserve a lot of profanity during the afternoon for other purposes.

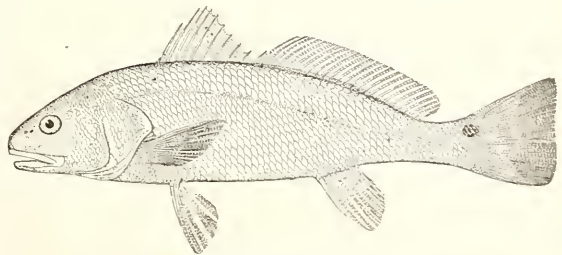
The capacity of the reel should be as great as can be had without its overbalancing the rod. At least a hundred yards of line will be necessary and this amount should go on easily so that swelling or piling-up of the line will not bind the reel when playing a fish.

I have mentioned before a preference for the solid steel rod, though the split bamboo and tubular steel are used satisfactorily by many. With these more attention must be given to their care, and even so I've had several of the hollow steel ones rust so much from the inside that they broke under no more than ordinary strain.

As to the line, a braided line is essential if any amount of casting is to be done. Customarily fifty yards of braided line is attached to a light linen filler and by the time it has worn to about thirty-five yards it is replaced with another. For live bait use, the lightest linen line is sufficient. Of course, in salt water fishing it is more or less necessary to have a wire leader and for this purpose I always carry a coil of light spring brass with a small pair of pliers to make them up as necessary.

Differences of opinion as to the relative merits of the various artificial baits are limited only by the number of people who use them and every sporting magazine is so crammed with "Bests" that any empirical statement simply leads to argument.

The Japanese use a sort of buck-tail arrangement made of hair; some of the South Sea Islanders use feathers skipped over the water with small kites and everything in between these and the proverbial clothespin have



THE REDFISH, CHANNEL BASS OR RED DRUM
Sciaenops ocellata (Linnaeus).

Probably the most popular of all salt water game fishes in the State.

been used in salt water with varying degrees of success.

Most of the fresh water varieties made for use on black bass or Muskallunge are very good, especially where white or speckled trout are running, though many will swear by nothing but a spoon, or pork-rind.

A few words may be said reasonably safely about the use of the different types: sinkers (that is, minnows which will not float) will probably prove more generally effective than the floating variety, but if used in shallow water by a beginner, have the aggravating habit of settling and hanging up on some obstruction while he is untangling the inevitable back-lash, whereas the floater lays safely on the surface until he starts to retrieve; the sinker, because of its greater density will bore better into the wind and give somewhat longer casts; in addition it can be made to reach considerable depth by retrieving slowly, or allowing it to settle before starting reeling. Do not reel a minnow in at a steady gait, rather whip it in in a series of dashes, using both rod and reel for this change of pace, and you will be surprised how often the strike occurs at the time that the minnow is still rather than while it is moving. Remember that the fish will find out as quickly as he strikes that he has been duped and will almost immediately try to turn the minnow loose so as soon as you feel the fish hit it is necessary to strike back sharply to set the hooks and from then on any slack line usually means a lost fish.

These last two points should be kept in mind while working the bait so that the rod will not be brought so far back that there will not be sufficient lee-way for a good sharp strike when the fish takes the bait.

As to the size fish that can be handled with this equipment—well, fish stories are fish stories, so we'll leave out the ones that have been caught—but only on three occasions have I had, or seen, fish take out the full hundred yards and break the line before turning. No attempts were made on tarpon with this tackle, and the only identified Jack was the one mentioned above. Whether a Jack would run out a hundred yard line or not, I do not know, since there was only fifty yards on the reel in this case, but I strongly suspect that he would strip off at least a hundred yards, so more line would probably be needed to handle one. For this fishing the standard light salt water tackle is recommended rather than fresh water equipment. The reels will then have ample capacity to care for the harder fighting fish.

Until you have experienced it a number of times you will be amazed at the small amount of steadily applied pressure necessary to turn a large fish. In reality you use your hook as a horseman uses his spurs: to goad the fish into wearing himself out by constant dashes which are not heavily resisted but just sufficient pressure used to cause him to veer around and keep him from resting.

Sometimes a fish is particularly obstinate, but it is extremely rare that it is necessary to apply so much pressure as to break the line in order to get him to move, especially if patience is exercised during these sulking spells. With a fish that tends to sulk, the periods are generally more frequent and more prolonged at the beginning of the fight, whereas after he begins to tire, about the time that he really needs rest, he usually gets more frantic and rapidly wears himself down.

Keeping a tight line throughout the fight is usually quite as necessary as in fresh water fishing. When the fish runs directly towards the boat, or at such an angle as to reduce the amount of line in play, full use of both reel and rod should be used to keep the line from losing tension, but be careful of the time the slack is taken up and be ready to switch from handle to brake, since the jolt at this time is often very sharp and if the line is not broken, the reel may be pulled out of your hands and before you have time to thumb the reel it will have back-lashed and locked so that the fish can break the line with little effort.

In the event of a tangled line, or all of the line being stripped off the reel, so that a break is inevitable, straighten the rod in the direction of the pull and the only damage will be the broken line, whereas if you try to hold longer just with the tension of the pole and a line that cannot give you have a fair chance of breaking your rod and if he is a large fish, only the providential accident of his turning at that exact moment can save him so it isn't worth the chance.

One problem that the light tackle fisherman faces in deep water is that when there is considerable tide or current the large sinkers used by the more heavily equipped are awkward to handle on a light rod. To reduce this nuisance more care should be given to the selection of the shape of sinkers and one, or more, of those shapes which give the best anchorage for the particular bottom should be used, such as the pyramid, mushroom, flat, etc.

A good kink with sinkers, no matter what tackle is used, is to fasten the sinker to the line with a medium weight rubber band. If the sinker becomes fastened to some obstruction, straighten

(Continued on Page 32)

The Historic Indian Tribes of Louisiana

FRED B. KNIFFEN,
 Professor of Anthropology and Geography
 Louisiana State University

INTRODUCTION.

OUR first picture of the historic Indian tribes of Louisiana must be gleaned from the accounts of the Spanish and French explorers of the sixteenth, seventeenth, and eighteenth centuries: DeSota, LaSalle, Iberville, and others. Excellent as some of these accounts may be, they leave the picture uncertain in many details, and far from complete. Subsequent accounts and compilations of documents and reports carry down to the present day. Within the last fifty years or so professional ethnologists have entered the field, but unfortunately the survivors of the Louisiana tribes are few, and they have retained but little of their ancient customs. The major contribution of these later workers has been their critical evaluations and syntheses of the older accounts.

In this paper the attempt is made to reconstruct the Louisiana scene about the time the Indians were making their first contacts with Europeans, around the year 1700. Free use has been made of secondary sources, in particular the bulletins of Dr. John R. Swanton, of the Bureau of American Ethnology. A list of the principal references is appended.

THE CULTURAL SCENE.

Culturally, the tribes of Louisiana belong to the Eastern Maize Area, that portion of the eastern United States where agriculture takes its place with hunting, fishing, and the gathering of wild fruits as a source of subsistence. The tribes of this area may be classed as a semi-sedentary people, dwelling in villages along waterways, raising crops in extensive fields, and making use of the wild foods offered in considerable abundance.

The familiar tipi or cone-shaped dwelling was missing in Louisiana. Instead there were a number of kinds of semi-permanent houses. In the southern part of the State was the palmetto house, a thatching of leaves over a framework of poles, with a single entrance and a smoke hole through the roof. In the north were still more pretentious houses, with framework of posts and poles, both round and square at the base, with domed roofs, plastered over with mud, and covered with palmetto leaves or grass, and finally with mats.

With a fire inside, a single entrance and no smoke hole, these houses afforded excellent pro-

tection against mosquitoes and other insects. It seems probable that in the Red River region was found the grass house, a well-made, dome-shaped framework of poles, cleverly thatched with bundles of grass.

At least during the winter months the fire was built inside the house, in the center. Around the walls were arranged the beds: four forked posts set in the ground, with a frame of canes covered with a cane mat. During the good weather of summer the cooking fire was built outside the door.

Apparently a common feature of the domestic establishment was the granary: ". . . near their cabins, made like dovescotes, built on 4 large posts, 15 or 16 feet high, well put together and well polished, so that the mice can not climb up, and in this way they protect their corn and squashes".¹ Another type was dome-shaped, made of canes, and raised but a few feet off the ground.

Of cultivated crops we find mentioned several varieties of maize, sweet potatoes, pumpkins, melons, squashes, and tobacco. There is frequent mention of beans, but no definite assurance that they were domesticated. Fields were prepared in a manner taken over by the Europeans. The undergrowth and vines were cut and piled on the ground. Then the trees were barked for a distance of two feet above the ground. After drying for a couple of weeks a fire served to consume most of the refuse and to remove the foliage from the trees. A tool which served the functions of both mattock and hoe was made of a bent flattened stick. There were probably other hoes made of the shoulder blades of the buffalo. The planting stick was a straight shaft, pointed at one end, by means of which the ground could be opened to receive the seed.

Of great importance was the gathering of vegetable foods that grew wild. There were seeds of the palmetto and pond lily, wild potatoes, fungi, a wild bean, persimmons, a great variety of berries and nuts. Salt for flavoring was derived in the southern part of the State from sea water and from the near-surface deposits of the Five Islands, while in the northern part of the State it came from the "salines" that are to be found there.

Animal food varied somewhat through the State, though common to nearly all sections were

¹As quoted in Swanton, Bull. 43, p. 315, from Gravier.

the rabbit, deer, waterfowl, squirrel, and bear. Sufficiently abundant in the north to be an important source of food and skins was the buffalo. Of corresponding importance in the southern part of the State were fish and shellfish. Great mounds composed of the shell of the common clam, *Rangia cuneata*, attest to its importance in the coastal sections.

Important domestic utensils were mortars, baskets, and pottery. Mortars, so important to a corn-using people, were made of a short section of log, partially hollowed by burning, and stood on end. Pestles were likewise of wood: poles about four feet in length, made slender in the middle for grasping. A variety of shapes and sizes characterized the basketry. There were tray-like winnowing baskets and sieves of different mesh. There were deep carrying baskets and shallow

baskets with covers. The material used was split cane; the process was generally a simple weave. Of all the Louisiana tribes the Chitimacha of lower Bayou Teche were the most skilled. They still make baskets in the old patterns, with a technique more involved than that of most of the neighboring people, and with an excellence of workmanship that immediately distinguishes their product. The strands are dyed red, black, and yellow with native dyes, and skilfully interwoven to produce various designs. Pottery was made in a variety of shapes and sizes, to serve the same simple domestic uses as do our own pottery and metallic vessels. There were pots for cooking and storage, long-necked water bottles, and those that must have been largely decorative and ceremonial. At least some of the pots were decorated in a manner peculiar to the people making them. In large

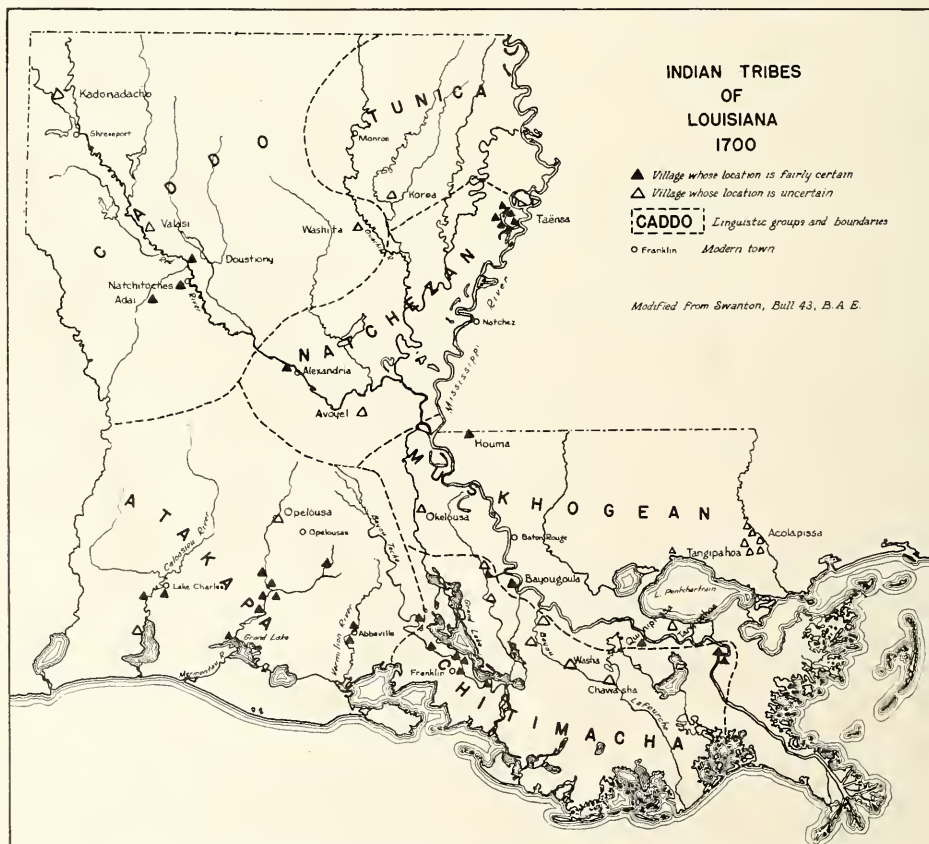


FIG. 1. The map shows the major linguistic divisions, tribes, and village sites. With regard to the latter the map is far from complete, but it does indicate the parallelism between ancient and modern trends of settlement.

measure these distinguishing designs were incised on the clay pots before firing. Painted pottery was definitely limited in distribution, and hardly to be considered characteristic.

Of particular importance to the men were the weapons used in fighting and hunting. The bow was the most important. *Acacia* (possibly *Acaciella*) seems to have been the favorite wood, though at present they are frequently made of hickory. Arrows, particularly those for small game, were frequently not tipped, but the ends of the shafts were hardened in fire. The familiar stone point was used throughout Louisiana, the most common material being the cherty gravels that are found in the central and northern parts of the State. Those living in the stoneless, alluvial lands of the coastal and prairie regions found it necessary to trade with friendly tribes to the north for the desired points. A rough-flaked, hand-shaped blank was the form into which this material was worked for transportation. Other materials often served as projectile points: antler tines for hunting; double-pointed pieces of bone for fishing arrows; great splinters of the same material for bear and buffalo points; and scales of the gar fish to tip was arrows. Splints of dried cane were sometimes used on war arrows. These were especially troublesome to the Europeans, for the points would shatter, and, searching out the joints of plate and chain armor, would inflict painful wounds.

For hunting small game the Louisiana natives used an unusual weapon, the blowgun. Modern specimens seem to be quite similar to the ones anciently in use. They are made of pieces of cane, about an inch in diameter and seven feet in length, which the carefully hollowed and straightened. Darts are made of cane splints from eight to twelve inches in length, feathered with thistle down at one end, and sometimes with a slight twist at the other. In practiced hands the weapon is surprisingly effective at short ranges.

Fishing was significant, and with it went a variety of equipment. We find hooks made of two pieces of bone, lashed securely in the appropriate form. Fish were shot with bone-tipped arrows to which floats were attached, so that weapon and game might be rescued. There was the almost universal fish trap with funnel-shaped entrance. Nets woven of cedar bast were quite common. The dugout canoes were apparently quite similar to our modern pirogues except that they were broad and blunt nosed at either end. Cypress was most commonly used, hollowed with fire, the latter directed with blowpipes and restricted with wet clay. DuPratz² describes a native boat forty feet

in length by three in width. Canoes were always propelled with paddles, the oar being unknown. Swanton³ mentions a canoe made of elm bark, but offers no details regarding its construction. A craft used for ferrying was constructed of bundles of cane, a bottom tier in one direction, a second laid at right angles.

These are some of the more significant elements of which the aboriginal cultural scene was composed. In their separate enumeration they conjure no pictures; we may gather them into one composition and attempt to visualize an ancient Indian village along one of the bayous of south Louisiana.

Irregularly placed on the high ground of the bayou bank are a dozen palmetto houses, each marked by the slow drift of smoke from the smoke hole up through the moss-festooned live oaks. Near each house is a granary, raised several feet above the ground on four posts. One of the houses is somewhat larger than the others; it is the chief's dwelling. Down the back slope toward the swamp is a deadening, with its barren skeletons of girdled trees, and beneath them a heavy growth of tall corn. Pulled up on the bank along the bayou are a number of blunt-nosed dugout boats. Stretched over a pole is a drying fish net, while along the bank sits a scantily-clad man making a fish trap. A barefoot woman, whose single garment is a little skirt, emerges from one of the houses carrying an earthen jar, which she fills from the bayou. Another woman stands before a wooden mortar; the motion of the pestle is accompanied by the chunck of wood against corn. An old woman sits under an oak, before her a pile of cane which she takes piece by piece and splits with her teeth. On the morrow she will make baskets. A few dogs wander from house to house; there is no other domestic animal. A pirogue loaded with clam edges against the bank; an extensive pile of discarded shells and broken pottery indicates that the village is an old one.

In the northern part of the State the scene would differ somewhat in detail. There the houses might be mat-covered or thatched with grass, and in place of the pile of shells would be green buffalo hides stretched and pegged on the ground. But, in most essential respects, one would recognize that the two villages belong to the same general region.

THE TRIBES AND THEIR AREAS

The Indian tribes of 1700 residing within the bounds of present-day Louisiana may be divided into three linguistic families: Caddoan, Muskho-

²As quoted in Swanton, Bull. 43, p. 67.

³Bull. 43, p. 347.

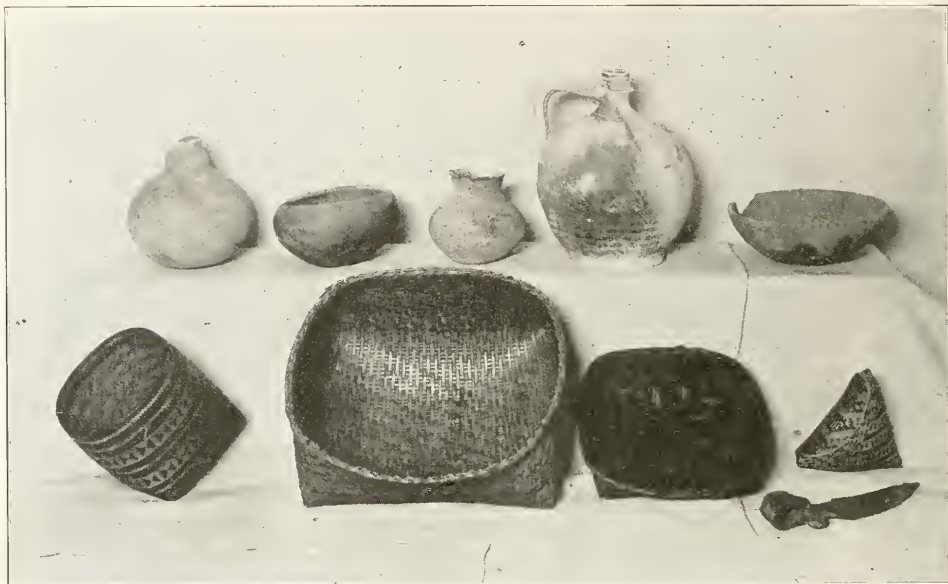


FIG. 2. BASKETRY AND POTTERY

The two baskets at the ends are of modern Chitimacha make while the two in the center were made by the Choctaw of Bayou Lacombe, St. Tammany Parish. The jug in the upper row is of European manufacture, but was found accompanying Indian pottery in a historic burial on the Angola penal farm. At the lower right is an iron implement or weapon of European origin found in an Indian burial on the Angola farm.



FIG. 3. PALMETTO HOUSE

This is the type of house that was in general use in the southern part of the State, and is quite similar to houses still in use. Mr. James Ford, the artist, has in part drawn from an illustration in Bull. 30, B. A. E.

gean, and Tunican.⁴ Differences between linguistic families are so great that there is no indication that they are related in origin. French and German are of the same linguistic family, but of different family from Chinese. Within linguistic families are languages so different as not to be mutually intelligible, although demonstrably of common origin. Such was not the case in Louisiana, where the three linguistic families need division into smaller groups:

<i>Linguistic Families</i>	<i>Divisions</i>
Tunican	Tunican proper Chitamachan Atakapan
Muskhogeian	Muskhogeian proper Natchezan

Caddoan

The term tribe should properly refer to a political group. It is obvious that within a linguistic family or division there may be a number of tribes or political groups who have little in common or may be actually antagonistic. The Louisiana tribes, with their linguistic affiliations, are indicated on the map, Figure 1, and in the following table:

<i>Linguistic Group</i>	<i>Tribes</i>
Atakapan	Atakapa Opelousa
Chitimachan	Chitimacha Washa Chawasha
Caddoan	Kadohadacho Natchitoches Yatasi Adai Doustioni Washita
Tunican	Koroa
Natchezan	Taënsa (Tensas) Avoyel
Muskhogeian	Houma Okelousa Bayougoula Quinipissa Tangipahoa Acolapissa

This list includes only the principal tribes. Numerous other tribal names are encountered in

⁴See Swanton in Bull. 43 and (with Gatschet) Bull. 108.

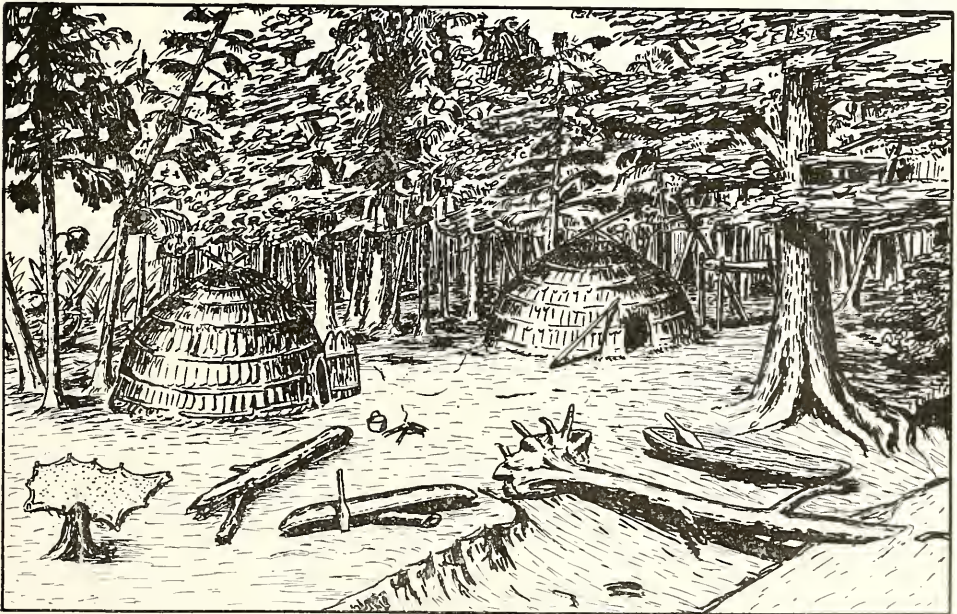


FIG. 4. VILLAGE SCENE IN NORTHWEST LOUISIANA

Grass houses, such as these, were built by the Caddoan tribes. Other details include the dugouts, the skin pegged on the ground, and the raised platform, at the middle right, supporting the remains of a deceased person. James Ford is the artist.

the literature and many local names are not even recorded. Small bands or villages were frequently named by the white people for a prominent chief or a geographic feature, such as a lake or stream. The above-mentioned tribes represent those most clearly and persistently distinguishable in early literature, though it is recognized that a number of them were composed of several distinct groups, as will be brought out later in the paper.

For the purpose of fixing the ancient inhabitants of Louisiana more closely with the areas they inhabited we may profitably examine the geographical situations of the several tribal groups about the year 1700, before the extensive movements, initiated by the white influx, began. It is convenient to divide the State into six linguistic divisions: Atakapa, Chitimacha, Caddo, Tunica, Natchez, and Muskhogean, for, in addition to linguistic unity, these divisions represent geographical unity, and, in a measure, cultural unity.

THE ATAKAPA

A glance at the map shows the Atakapa occupying the prairies of southwestern Louisiana, from Bayou Teche to the Sabine, and from Opelousas to the coastal marshes. The country is well watered, and provided an abundance of game, though the buffalo, strangely enough, is never mentioned for the area. Land fitted for agriculture is plentiful; the region possesses special resources with its prodigal supply of fish, shell fish, and water-fowl.

While it is true that the Atakapa occupied a cultural level lower than that of their neighbors, they are undeserving of their ancient reputation as wandering cannibals. They were at least a semi-settled, partially agricultural people, occupying a number of favorable sites along the waterways of their country.

At least four nuclear sites or groups of sites are recognizable for the Atakapa: along the lower course of the Calcasieu and around the shore of Calcasieu Lake; along the lower Mermentau, from Nezpique Prairie to Grand Lake, and to the east along Bayou Plaquemine Brulé; along the Vermilion, near the present site of Abbeville; and a fourth, possibly divergent group, the Opelousa, near the present site of Opelousas. The probable locations of the villages are shown on the map.

Swanton⁵ estimates a combined Atakapa and Opelousa population of 2,455 for the time under consideration, 1700.

THE CHITIMACHA

The tribes of Chitimachan stock were orientated about lower Bayou Teche and Grand Lake, and at several points along Bayou Lafourche. The Chitimacha proper, who were possibly united by a single chief, occupied two groups of villages, those on the lower Teche and about Grand Lake, and along upper Bayou Lafourche. The Washa and Chawasha, two apparently independent Chitimacha-speaking tribes, originally had their villages on lower Bayou Lafourche, in the vicinity of modern Thibodaux.

The section occupied by the Chitimacha is notable for its complex network of waterways and its abundant provision of fish and shellfish. Extensive accumulations of clam shells indicate an important source of food to supplement maize and other products of agriculture.

Swanton⁶ estimates an aboriginal population of 2,625 for the Chitimacha proper, and 465 may be allowed for the combined Washa and Chawasha, that is, a total of 3,090 for all the Chitimachan tribes.

MUSKHOGEAN TRIBES

Those tribes speaking Muskhogean languages, six in number, lived in the southeastern section of Louisiana. The Houma were found on the east bank of the Mississippi, in the vicinity of the Louisiana-Mississippi line. The village of the Okelousa is indefinitely located to the west of Point Coupeé. In the vicinity of Pearl River were the six villages of the Acolapissa, while on both sides of Lake Pontchartrain were the Tangipahoa. The main village of the Bayougoula seems to have been in the vicinity of the modern town of the same name, a few miles south of Plaquemine, on the west bank of the Mississippi. Downstream from the Bayougoula on the same side of the Mississippi was the sixth tribe, the Quinipissa.

It is notable that in no case were these villages far from a major stream or lake. If our information is correct the pine hills of the Florida Parishes were inhospitable to the primitive population. Hunting, fishing, and agriculture were all better in the lowlands adjacent to the major water bodies.

For these six tribes Swanton⁷ estimates a pop-

⁵In Mooney, *Aboriginal Population of America North of Mexico*, page 10.

⁶Mooney, page 10.

⁷Mooney, page 10.

ulation of 3,385, without specifying the Tangipahoa, evidently including them with the Acolapisa.

NATCHEZAN TRIBES

In Louisiana there were two representatives of this linguistic group, the Avoyel and the Taënsa (Tensas). The main Avoyel village was near the rapids of the Red, a short distance above modern Alexandria. Swanton locates an Avoyel village near modern Marksville. The Taënsa were situated in seven or eight villages near Lake St. Joseph, on the west bank of the Mississippi.

Should the above-enumerated be the sum of villages in the area assigned to Natchezan peoples in Louisiana, a large section between the Red and the Mississippi was virtually uninhabited. Archaeologic evidence indicates that such was not always the case, though it is entirely possible that for the period around 1700 the situation was as here indicated. Even in modern times the area abounds in fish and game, and there is abundant alluvial soil for agriculture.

For these two peoples Swanton allows a population of 1,155.

TUNICAN TRIBES

The only certain representative of this linguistic group in Louisiana in 1700 seems to be the Koroa, whose village lay at some indefinite distance to the west of the Taënsa villages. There are suggestions that the Tunica proper had settlements on the west side of the Mississippi, while Swanton locates another Koroa group on the west bank of the Mississippi, in the vicinity of modern Fort Adams.⁸

Again, for this section, archaeologic evidence would indicate a once abundant population. We must always recognize that shifts of groups were likely to take place, and did take place frequently, for various reasons. Though the country assigned to the Tunican stock would appear to be a favorable one, the situation described was probably correct.

Swanton makes no estimate for the Louisiana Tunican population, as distinguished from its more numerous representatives in Mississippi. A figure of 500 is ventured, and certainly it should be conservative.

THE CADDOAN TRIBES

Apparently somewhat distinct culturally, as well as linguistically, were the Caddoan tribes of Louisiana. Their contacts seem to have pointed away from, rather than toward, the other Louisiana tribes.

Though the Louisiana Caddo were at least a semi-agricultural people, their country offered buffalo in significant numbers. Very quickly the



FIG. 5. WOODEN MORTAR AND WINNOWING BASKET
Though this mortar and pestle were made by a white man they are almost identical with those used by the Indians. The same is true of the winnowing basket leaning against the mortar.

Caddo took over the horse and other cultural traits that went with it, so they are generally counted a marginal Plains people rather than being classed with members of the Southeastern woodland group.

With one exception the Louisiana Caddoan tribes were situated along the course of Red River, from Alexandria northward. The exception is the Washita, a Caddo people linguistically, who seem to have been located at some point on the Ouachita River.

The Red River tribes were members of the Caddo Confederacy, an organization including member tribes in Louisiana, Texas, and Arkansas. The Louisiana tribes that were members of the confederation were: Kakohadacho, Natchitoches, Yatasi, Adai, Doustionis, and Nanatsoho.⁹

In his population estimate Mooney¹⁰ does not separate the Louisiana Caddoan peoples from those resident in other states. An estimate of 2,500 seems not exorbitant.

⁸Bull. 43, p. 327.

⁹The first four are listed by Mooney in the 14th Rep. B. A. E., 1896, while Miss Fletcher adds the latter two, B. A. E., Bull. 30, pt. 1, 181.

¹⁰Aboriginal Population, p. 13.

SUMMARY

This is a very brief picture of the aboriginal scene in Louisiana as it must have been about 1700. In its essential outlines it must be correct; it fails in detail. If we accept the general framework as correct, there are possible a number of generalizations. Along the waterways were the villages, and *there* were conditions most favorable for a people engaged in agriculture, hunting, and fishing. The streams were the main lines of travel, though foot travel was not uncommon, particularly when necessary to cut across drainage lines. Streams did not form boundaries between different tribes, but rather they were the roads between the settlements.

The pine hills that today are among the less favored portions of the State were sparsely inhabited in 1700. The swampy lands between the Red and the Mississippi appear likewise to have been largely uninhabited, though evidence indicates that such was not always the case.

With a total population of 13,000, aboriginal Louisiana had an average density of considerably less than one person to a square mile, as compared with the more than 40 of today. True, the difference is very great, but it becomes less impressive when we consider that the difference is one of degree rather than of kind. A detailed density map for 1700 would show a marked parallelism to the one for 1935. The greater density along the streams, the sparse population of pine hills, swamp, and marsh would appear on both maps. It is a clear example of the persistence of site value through two widely divergent cultures.

THE REMNANTS

From the 13,000 aboriginal inhabitants of the Louisiana of 1700 but a handful of descendants remain in the State today. The census of 1930 gives Louisiana an Indian population of 1,536, certainly of very much mixed blood, and including the descendants of tribes whose homes were originally in other states.

The most considerable group is the 936 listed for Terrebonne Parish, and who may be seen in their little settlements along the bayous south of Houma. These people represent the mixed descendants of the Houma and refugees of other tribes. The six Indians given for Calcasieu Parish represent most of the Atakapa remaining in the State, while the 59 enumerated for St. Mary Parish include the bulk of the Chitimacha. These represent all the groups of the State thought to be descended from the Louisiana Indians of 1700.

The 130 Coushattas (Koasati) living in Allen Parish came originally from Alabama, while there are groups of migrant Choctaw in St. Tammany and LaSalle parishes.

CONCLUSION

The picture presented here is very sketchy. It is not intended to be complete, nor could it be for want of detailed knowledge. It is hoped that it has served to convey a brief picture of the aboriginal inhabitants of Louisiana at the time when they were making their first European contacts—a fleeting glimpse of a scene long extinguished. It may serve as a base or key to the understanding of future studies, restricted in scope and detailed in treatment, that will follow intensive field work, now underway.

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Report on the Black Widow Spider

By

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INTRODUCTION

NUMEROUS inquiries relating to the Black Widow received by the Department of Conservation, together with the occurrence of instances of bite by this spider led James P. Guillot, Secretary of the Department of Conservation and Acting Director of the Bureau of Research to recommend the conduct of certain field studies and experiments which are herein reported. These studies were greatly aided by the excellent cooperation of various commercial houses manufacturing and distributing insecticides, both local and national companies. The aid contributed by each of these cannot be individually enumerated.

There is no reason for hysterical alarm because of the presence of this spider, nor is there any reason for curtailing in any way the recreational use of areas wherein these spiders occur. It is simply desirable that the public recognize this spider, learn the possible serious results of its bite, and take necessary individual precautions to avoid undue exposure. In much frequented public areas simple available measures would be valuable in reducing the hazards of this species. Such logical action has already been suggested by the newspapers of New Orleans.

The presence of poisonous snakes in Louisiana is generally known and appropriate precautions are observed. The presence of this poisonous spider should also be generally known, but knowledge of its existence, far from causing needless alarm to any sensible person, should simply encourage reasonable care to avoid unnecessary injury. Dr. Emil Bogen, eminent medical authority on Black Widow bite, aptly remarks: "Poisonous spider bites could be, to a great extent, avoided if the general population were taught that these small and innocuous looking creatures are really dangerous and should not be tolerated in the vicinity of human beings."

BLACK WIDOW

The Black Widow is a poisonous spider, capable of causing by its bite serious injury and even death to adult human beings. There is no longer

any controversy about the medical importance of this species. It is without doubt the most poisonous North American spider. Bogen has summarized in two monographic papers the medical aspects of this and related species, and it is significant of the medical interest aroused by the Black Widow that in his first paper Bogen lists no less than 462 bibliographic references, and in his second paper, 170 additional bibliographic citations. (Arachnidism, Spider Poisoning—Emil Bogen, M. D., Archives of Internal Medicine, 1926, Vol. 38, pp. 623-632. Poisonous Spider Bites—Newer developments in our knowledge of Arachnidism—Emil Bogen, M. D., Annals of Internal Medicine, 1932, Vol. 6, pp. 375-388). Two further brief instructive papers are: The Black Widow, Shoebutton or Hourglass Spider, by W. A. Hayward, M. D., circular R-659, Bureau of Public Health Service, Washington, D. C., and the Black Widow Spider, circular E-345, the Bureau of Entomology and Plant Quarantine, Washington, D. C. The latter contains excellent illustrations which are herewith reproduced. Both may be secured by application to the Bureaus publishing them.

Dr. A. W. Blair, in two papers recently published, contributes a comprehensive summary of our knowledge of the Black Widow. Blair contributes much valuable original data. These papers are: Spider Poisoning, Experimental Study of the Effects of the Bite of the Female *Latrodectus Mactans* in Man. Archives of Internal Medicine, A. W. Blair, M. D., December, 1934, Vol. 54, pp. 831-843, 4 figures, and Life History of *Latrodectus Mactans*, A. W. Blair, M. D., Archives of Internal Medicine, December, 1934, Vol. 54, pp. 844-850, 2 colored plates.

The medical importance of the Black Widow was formerly far from clear since, as will be indicated below, the diagnosis of serious symptoms following the bite of this species was often faulty.

DISTRIBUTION

The Black Widow although previously believed to be confined to the South is now known to occur

throughout most of the United States. In Louisiana it is of general occurrence in suitable habitats, and the writers have received and identified specimens from many parts of the State extending from the northern to the southern boundaries of Louisiana. The species is common in many parts of New Orleans including certain residential districts. There is every reason to believe that the Black Widow has occurred in New Orleans throughout historic times. Indeed, the first record of poisonous spider bite in the United States, as stated by Bogen, was published two hundred and nine years ago in the Philosophical Transactions of the Royal Society of London, by T. Robie (London, 1726, vol. 6). Many lines of evidence indicate that in parts of the country, at least, the species has increased in numbers during the past two years. Proper evaluation of such increase is difficult since only recently has the medical importance of the species become generally known with, as a result, increased observation and record of its occurrence. The species, however, is evidently more plentiful in the South. The hypothesis has been advanced by some investigators that the numbers of this species have increased due to general changes in water table. Dangerous illness and even death from the bite of a closely related species (*Latrodectus tredecimguttatus*) have been repeatedly described from Spain, France, Italy and Corsica.

DESCRIPTION.

The Black Widow (*Latrodectus mactans*) is a member of the so-called Cobweb Spiders, the Theridiidae. The Black Widow is closely related to the completely harmless common House Spider (*Theridion tepidariorum*), and also to the harmless False Black Widow, (*Steatoda borealis*).

The Black Widow gains its name from the female's habit of killing and eating the male after mating. This peculiar behavior is shared by many other spider species. Other popular names are Shoe Button Spider, Hourglass Spider, Po-ko-moo (an Indian name) and Poison Spider.

Black Widow females are the dangerous individuals, since the males, possibly because of smaller size and weaker mouth parts, have not been known to harm man.

The adult female Black Widow is unmistakable in appearance. Shiny black, with a highly globular and relatively large abdomen, she has rather long, slender black legs. The color pattern, although somewhat variable, is highly diagnostic. Typically there is present on the under surface of the abdomen a conspicuous bright scarlet hourglass, together with one or more circular scarlet spots in the neighborhood of the spinnerets. A

variation frequently observed by the writers is the presence of a longitudinal row of three or four circular scarlet dots along the dorsal mid-line of the abdomen. Baerg reports the occurrence of completely black adult females lacking any trace of scarlet marking. The adult female Black Widow measures about half an inch from the tip of mouth parts to the tip of abdomen, but may, in normal standing posture, show a spread from front feet to hind feet of two to three inches.

The male Black Widow is about half the size of the female, and displays a much different coloration. Considerable variation occurs. A typical pattern shows three pairs of lateral, oblique yellow to golden bands on the upper surface of the abdomen, together with additional straw colored markings. The ventral scarlet hourglass is present. The legs are marked with alternate yellow and black.

The young female undergoes a series of transitional changes from a pattern resembling that of the male to the characteristic adult female design.

Unlike certain spiders, the Black Widow does not jump, but has relatively long legs and can run quite rapidly.

Preliminary field work has suggested that this animal is much more active at night than in the day. This conclusion has been borne out by the medical record which shows that the majority of bites have occurred at night or in early morning. This is of particular significance to those frequenting infested bathing beaches or picnic grounds in the late evening or night.

Blair believes the usual life span of the female to be one year; of the male, less.

WEB.

The web of the Black Widow is distinctive and useful as an index of the presence of the species. Loose woven and irregular so that scarcely two of the coarse strands lie in the same plane, the web is unusually strong. A simple test to distinguish between the web of the House Spider and that of the Black Widow is to stroke a straw through the structure. The web, in the case of the House Spider, will break without bending the straw, but in the case of the Black Widow the straw will bend or break before the web gives way. While usually rather small and in a sheltered place, their webs may often extend as much as six to seven feet, and may be entirely in the open.

The Black Widow captures in its tough web the wide variety of insects and other animal life upon which it feeds.

EGG COCOON.

The Black Widow deposits three to six hundred eggs, each about one twenty-fifth of an inch

in diameter in a spherical or pyriform paper-like egg cocoon, whose external opaque silk surface may vary from white to buff in color. The egg cocoons of most related spiders have no such opaque covering, and can be distinguished at a glance because the eggs themselves can be seen. The young emerge from this egg cocoon through a small aperture after an incubation period that has been given as three to four weeks. This period varies with temperatures. Pale in color at first, these young are highly active, their strongest response being to climb against the influence of gravity. They also to some extent may avoid light. These factors lead to their dispersion. The young are recorded as highly cannibalistic and their numbers, because of this habit, are correspondingly reduced. Investigators have found that these eggs are exceedingly toxic, and care should be exercised in handling the egg sacs, since if one were mashed against an abraded portion of the skin, possible serious results may ensue. Another source of danger is that the spiders inside of the egg sac may already be hatched. At this stage they are exceedingly active, and it may be quite difficult to catch and kill all of them if they get loose while tearing the sac.

HABITAT.

The Black Widow haunts relatively dry situations. She is characteristically solitary, that is, one occupying each web. Webs may, however, be closely adjacent. If two adult female Black Widows are introduced into the same container, one will almost invariably kill and eat the other. The writers, however, found many instances in which the Black Widow was living closely adjacent to other spider species.

Typical occurrence around New Orleans is in cypress stumps, accumulations of trash, piles of stones and paving blocks, under steps, fence corners, culverts, and in the burrows of animals. The Black Widow will also enter out-buildings, garages, the housings of service meters, sleeping porches, and even occupied homes. Numerous specimens from all such situations have been received by the writers.

BITING MECHANISM.

The poison apparatus of the Black Widow consists of a pair of poison glands which, in contrast with those of other spider species, are relatively large, although compared with the poison glands of snakes, they are surprisingly small. These glands which are located in the spider's head lead into small curved, hollow structures which move in a lateral horizontal plane and serve as an efficient double hypodermic needle.

As Blair has pointed out: "Strictly speaking this spider does not 'bite' at any time. It pierces the integument of its victim by means of a pair of extremely sharp, chitinous claws articulating on the basal segments of the chelicerae. The chelicerae are considered as modified antennae and constitute the first pair of appendages. They lie in front of and are attached above the mouth parts. Near the tip of each claw is a small orifice through which the venom from the poison gland is discharged in the wound. The mouth parts are used only in pressing and sucking the fluid contents of the victim."

BEHAVIOR.

The Black Widow is described as avoiding strong light, although the writers have observed specimens apparently at ease although fully exposed to noonday sunlight. The Black Widow fortunately is not aggressive, although under certain circumstances if something vibrates her web she may rush excitedly to the object and bite violently at it. Experimentally controlled Black Widows are sometimes only with difficulty induced to bite material offered to them. Most instances of human bite are due to the spider being caught in clothing and irritated by pressure, to the presence of these spiders in beds, or to the disturbance of these spiders in out-door toilets. The last category has been the cause of most reported cases of human injury.

BLACK WIDOW BITE.

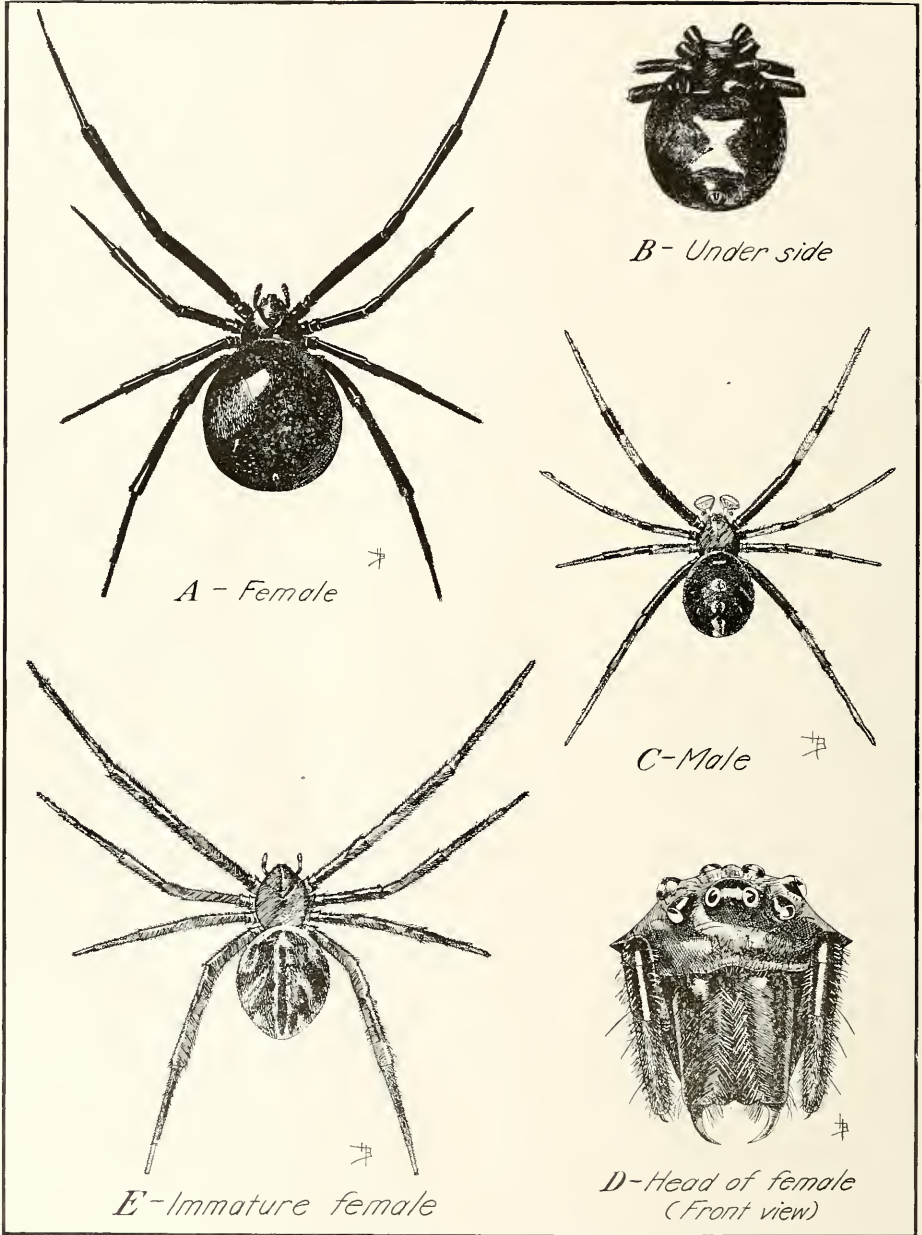
The pain caused by the initial bite may be so slight that it may pass unnoticed. Usually, it is but the equivalent of two slight pin pricks. The colorless venom, which is a powerful neurotoxin, is extremely poisonous since in spite of its small quantity it may cause such serious results. It is evidently disseminated with considerable speed. The clinical evidence indicates a slower elimination of the venom than in the case of snake venom. The symptoms may develop within from ten minutes to several hours following the bite, and vary profoundly. The actual site of the bite usually reveals a small wheal, which is red or sometimes white and hard. Some itching and burning may be noted at the time. A frequent general symptom

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THE BLACK WIDOW, *Latrodectus mactans* Fabr.

Figures A and B. Adult female dorsal and ventral views, the latter displaying the typical scarlet hour-glass marking. This hour-glass is variable in shape depending upon the condition of the abdomen, and may consist of a transverse rectangular bar (placed posteriorly) from the center of which rises an inverted triangle.

Figure C. Adult male. Note the pair of genital bulks in front of the head.

Figure D. Front view of head of adult female. Note the sharp claws articulating on the basal segments of the chelicerae. Through these the venom is injected into the wound. Note the appearance of the eight eyes.

Figure E. Immature female. The pattern differs strikingly from the adult female since a scarlet stripe occurs along the mid-line of the back together with three pairs of lateral golden bars. As the female grows, this mid-line scarlet stripe breaks up into a row of circular scarlet spots.

(After Circular E 345, U. S. Bureau of Entomology and Plant Quarantine)

is the development of sharp pain sometimes radiating from the site of the wound and often spreading over the entire body. The pain may be so severe that the body of the patient becomes contorted because of its excruciating character. Such pain may be accompanied or followed by nausea, vomiting, difficult breathing, unsteady speech, profuse perspiration, with often a marked retarding of the heart action. Severe abdominal pain, accompanied by a board-like rigidity of the abdominal wall (with or without tenderness) may strongly suggest some acute condition such as appendicitis. This abdominal condition develops even though patient is bitten in an extremity. The development of a rash covering the body, accom-



—Photographs by Benjamin F. Lecper.

Two photographs of the same adult female Black Widow guarding her egg sac. Left—viewed from below. Right—viewed from the side. The slender legs and typically high standing posture are clearly shown. (Approximately life size.)

panied by intense itching, increased blood pressure and rise in white blood cell count to over twenty thousand are often symptoms.

Contrasting the effects of a Black Widow bite with that of other spider species, Bogen in his later paper states: "Moreover, the astounding symptoms which develop after the bite of this spider are so striking and unique that there seems to be little danger of confusing it with any other form." Mysterious cases which have come under the writers' observation and which have been ascribed to the bites of unknown flies are undoubtedly Black Widow injuries, since such cases accord in their syndrome with the Black Widow clinical picture, and since further no species of insect capable of producing such violent symptoms is known to occur in Louisiana.

Fever is usually low, seldom reaching 102. The average cases of Black Widow bite exhibit an

abatement of these symptoms within a few hours, and the patient can usually be discharged within two or three days. Certain cases of Black Widow bite which have come directly to the attention of the writers have had a more delayed recovery. One, the case of a physician, involved hospitalization for almost two months, and severe effects were still present after a lapse of five months. Bogen in an analysis of 380 cases of poisonous spider bite scattered through eighteen different states records a total of seventeen deaths.

BLAIR'S DESCRIPTION OF SYMPTOMS

The three stages which progressively developed following a Black Widow bite are thus described by Blair, who, like Baerg, deliberately permitted himself to be bitten:

"A study of the clinical picture in this case indicates three well defined stages in its development. Lymphatic absorption of the injected venom, as evidenced by the proximal progress of pain along the lines of lymphatic drainage, constitutes the first stage. It is characterized by pains in the bitten finger and in the arm and by the absence of general systemic effects.

"Passing through the axillary lymph glands, the venom reaches the blood stream via the efferent axillary lymph channels, the subclavian lymphatic trunk and the subclavian vein. This ushers in, secondly, the stage of vascular dissemination which is characterized, clinically, by the explosive onset of widespread agonizing muscular pains and a condition of profound shock. This was, in this case, the most painful and critical stage, and yet no mention of a period of shock in this condition has so far been encountered in the literature. Two possibilities may account for this discrepancy. 1. All persons bitten may not

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receive a quantity of venom sufficient to induce the degree of shock obtained in this case. 2. The patient may have recovered from the condition of shock before coming under medical observation.

"The third stage, that of elimination of the venom or its toxic products, commences with the rapid recovery from shock. It is characterized, clinically, by hypertension, diaphoresis, gradually diminished muscular pain, a slight rise of temperature, polymorphonuclear leukocytosis and urinary evidence of renal damage. This clinical picture, coupled with the slight headache and edema of the face and ankles, is very suggestive of the development at this stage of an acute (toxic) nephritis. The damage to the kidneys probably results from the attempted elimination of the venom or its toxic products by that route.

"The development in man during convalescence of any degree of immunity to the venom of this spider remains unproved. I was presented with the opportunity of deciding this point, but lacked the courage to submit myself to a possible repetition of the first experience. Degrees of immunity to the bite of this spider can be developed in animals and, on the assumption that man reacts likewise, convalescent serum has been used therapeutically. The results so far obtained are, however, inconclusive.

"Lacking the history of a spider bite, or an acquaintance with the clinical picture which it may produce, one might well be excused for mistaking the symptoms for one of several acute conditions. Thus a perforated peptic ulcer, acute pancreatitis, ruptured ectopic pregnancy, tabetic crisis, ruptured appendix with generalized peritonitis and renal or biliary colic may be considered in arriving at a diagnosis. Similarity between the clinical picture presented in poisoning by this spider and perforated peptic ulcer, particularly, has subjected the patient, on more than one occasion, to the added risk of surgical intervention."

EMERGENCY TREATMENT

Emergency treatment of Black Widow bite differs considerably from that of snake bite. Cut-

ting and suction of the wound appear to be of little value since the venom spreads speedily, and, furthermore, cutting often results in serious secondary infections. Sterilization of the site of the wound with iodine solution is recommended by medical authorities. Applications of cloths soaked in a hot fifty percent aqueous solution of ordinary epsom salts afford local relief. The patient should be kept quiet, and as in the case of snake bite nothing whatever alcoholic should be given. Sedatives to relieve the pain may be administered, although they are often surprisingly ineffective.

MEDICAL TREATMENT.

Baerg in his valuable study of the effects of the venom, a study accomplished by deliberately permitting the spider to bite him, found that hot baths considerably prolonged and repeated several times a day gave decided relief from the pain. The hot water not only stopped the pain for the duration of the bath, but appreciably lessened the pain that returned later. Application of dry heat alone failed to aid. (Some Poisonous Arthropods of North and Central America, W. J. Baerg. Fourth International Congress of Entomology. 1928. Vol. 11 (1929), pp. 418-438.)

Hayward states that the abdominal pain can often be relieved if the patient is placed in a prone position and pressure applied over the lumbosacral region.

Since the time of Bogen's monograph, Drs. Becker and D'Amour of the University of Denver, have worked out a specific antivenin for the bite of the Black Widow, which is reported to have been recently used with success for the first time in human cases during the last several months. (Francis Becker and Fred D'Amour. Society

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for Experimental Biology and Medicine, 1934, Vol. 32, pp. 166-167.)

It is clear in any event that where serious symptoms follow the Black Widow bite, the treatment should be at the hands of a physician.

Blair, in his excellent paper, presents a compact summary of treatment:

"Rational therapeutic measures in combating the effects of the venom injected by the bite of *Latrodectus mactans* should recognize the following points: 1. The reaction is due to the instantaneous injection, through a very minute skin puncture, of small quantities of venom, followed by rapid lymphatic absorption. 2. The subsequent vascular dissemination of the venom throughout the body may result in the development of a condition of shock. 3. Recovery involves the neutralization or elimination of the injected venom. 4. The development of an acute nephritis in the later stages is indicated.

"The minute skin punctures, the rapid absorption and the small amount of venom capable of producing such a severe reaction in man make it unlikely that local applications can exert any appreciable neutralizing effect on the injected venom. A sharp 'X' incision through the site of the bite, if made in the first few minutes after the accident, probably offers the best possibility for an early elimination of the venom.

"Treatment of the shock as seen in the second stage of this condition involves the use of the accepted means for counteraction. Thus, the adoption of measures tending to a restoration of capillary tone and blood volume are indicated, while the use of cardiac stimulants is contraindicated. The use of large doses of alcohol for the relief of pain is to be condemned, in view of its tendency to accentuate and prolong the much

more serious condition of shock. For the same reason, morphine, in the notoriously high dosages found necessary for relief of the associated agonizing muscular pains, should, at this stage, be used with caution. In my case immersion in a hot bath gave immediate and marked relief from pain. It may be merely a happy coincidence that it also marked the termination of the period of shock and the initiation of a progressive general improvement. Baerg also remarked on the relief given by frequent hot baths, and it is said that in Russia baths are used extensively in the treatment of the bite of the closely allied species, the 'Karakurt,' found in that country.

"In view of the clinical indications of the development of an acute nephritis, treatment during the third stage should be directed to giving rest to the kidneys. On the assumption that the damage to the kidney arises during the elimination of the venom or its toxic products, the adoption of measures tending to aid in their possible elimination by other routes is indicated. The patient should be placed in a warm, well ventilated room, between woolen blankets and surrounded by hot water bottles. Frequent hot baths should be given. An intake of fluid sufficient to satisfy the patient's thirst should be encouraged, but in view of the damage to the kidneys fluids should not be forced. For the relief of pain and to secure rest, morphine may, at this stage, be used even in fairly high dosage. Spinal puncture is said to give considerable relief in many cases.

"The use of specific antivenins and convalescent serum in this condition must await the collection of further clinical and experimental data before the therapeutic value of these agents can be safely estimated."

CONTROL MEASURES.

The writers have examined many areas in and around New Orleans for the occurrence of Black Widows during the past three weeks, and both in the laboratory and in the field have conducted an extensive series of experiments concerning the effects of various types of sprays on this spider.

It is desirable to point out again that New Or-

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leans has long been a notable center for research and progress in pest control, and that many commercial manufacturers of insecticides, have worked out, after much investigation, sprays effective in killing the Black Widow. In fact, of the forty or more such substances tested out by the writers, only some three or four proved ineffective. The writers, however, wish to warn against the handling of Black Widows following spraying, since a frequent result of the application of a spray is that the spider, after appearing dead for a period, recovers, and becomes temporarily capable of inflicting a serious bite.

Spiders are not insects and have a different breathing mechanism from insects. Probably for this reason few insecticides work rapidly but rather require minutes or even hours to kill when used under normal, exposed conditions. Often during the interval between the time the spider is sprayed and its death the animal will, due to the irritation, become agitated, leave its web and bite viciously at anything with which it comes in contact. Consequently, in spraying, one should be on the look-out and crush them as soon as they emerge from hiding.

The writers also found that in nearly all instances direct application of the spray on the spider is necessary.

Control measures for the Black Widow are simple, available, and highly desirable. It is the opinion of the writers that they should consist of periodic inspection of premises to determine the presence of this spider. Three means of noting its presence are available: first, the distinctive color and appearance of the adult female; second, the distinct irregularity and unusual strength of the web; third, the paper-like opaque ovoid egg cocoon. When the presence of the spider is established, it should be searched for and destroyed, its egg sac located and burned.

Control measures, as far as private property is concerned, must reduce themselves to the simple practice of "each man looking after his own backyard." The destruction of the spider itself inside houses must be accomplished by the use of commercial insecticides, of which, as already stated, very many are both available and efficient. Periodic cleaning out of accumulated trash

and rubbish, whitewashing with kerosene and lime in sheds and out-buildings will serve to reduce them. For use in yards, garages, out-buildings and out-door toilets, a spray of pure creosote has been recommended by the Bureau of Public Health Service in Washington, D. C. This substance, the writers found, did not possess the expected rapidity in killing the adult spiders, but it did prove to be highly repellent. Creosote kills vegetation, damages paint and is irritating to human skin.

For use about old stumps, fences, concrete walls and similar situations where destruction of paint or plant life is not involved, the writers found a suspension of powdered unslaked lime and kerosene oil to be extremely effective. In use the lime should be kept agitated and the mixture can be applied with an ordinary hand spray gun. A mixture of roughly fifteen percent lime proved easy to use, and was found to kill adult spiders in less than thirty seconds. The substance must strike the spiders, since no effective fumes are produced by it. The use of lime-kerosene was made by the writers at the suggestion of Dr. W. L. Tower, who was familiar with its use in spider control in Tropical America.

It is the opinion of the writers that it would be desirable for the appropriate agencies to take some measures to reduce the numbers of Black Widows in much frequented public places. Certain public agencies have already volunteered assistance in carrying out such work. It is not the province of the Department of Conservation to supervise such activities, but it is the opinion of the writers that the proper authorities could accomplish effective results by conducting some such work at proper intervals. Such work need neither be expensive in labor nor time, and would accomplish the desirable end of reducing the haz-

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ards from this spider in places where the public, during recreation, might otherwise possibly be exposed.

Children should be taught the appearance of the Black Spider so that they will avoid this species whose attractive color might arouse their curiosity.

In any region a considerable untouched area of possible natural habitat will exist, and will continue to serve as a reservoir for the species. Correspondingly, clearing up operations such as destumping and cutting of undergrowth must take into account the possible migration and dissemination of the individuals of this species.

SUMMARY.

In conclusion, the writers wish to suggest the desirability of the following four points:

1. The periodic examination of private premises and the exercise of control measures therein.
2. Some measures to reduce to a minimum the numbers of these spiders in much frequented public places.
3. The extreme desirability that children be taught to know and avoid this spider. Teachers can secure on application to the Bureau of Entomology and Plant Quarantine, Washington, D. C., a circular, the illustrations of which (also reproduced herewith) will serve as an adequate chart.
4. It seems possibly desirable that some appropriate agency list the persons who have been bitten by the Black Widow so that the convalescent serum found useful in treatment might be available.

The writers wish again to emphasize that there is no need to become hysterically alarmed about the presence of this spider, but that there is every need to exercise reasonable precautions in reducing to a minimum the dangers of being bitten.

The newspapers of New Orleans have accomplished an excellent service in bringing to general public attention the character and occurrence of this spider.

There is nothing controversial about the Black Widow, its presence here is clear, the possible

serious effects of its bite are firmly established by careful studies available in medical literature, and the sole purpose of the Department of Conservation's interest has been to bring the attention of the public to this matter with which the concern of the Department of Conservation now terminates in this report.

Death Takes No Holiday

(Continued from Page 1)

"The most dangerous hour is from 5 to 6 in the afternoon, judging from the percentage of accidents which occurred during that hour. However, the fatality rate was higher for other hours. It is significant that from 6 a. m. to 6 p. m., the normal daylight hours, there were 459,510 automobile accidents, in which 15,050 persons were killed; from 6 p. m. to 6 a. m., the normal hours of darkness, when the volume of traffic is one-fifth as great as in the daytime, 422,490 accidents occurred, in which 30,950 persons were killed. The rate of death per accident was 51.4 percent worse during the hours of darkness than during the hours of daylight. This means that the hours of darkness are several hundred percent more dangerous than the hours of daylight, although it is customary to drive just as fast at night as in the daytime. . . ."

Representative Lundeen, in his outline of a program to reduce this grim price that the United States pays for the privilege of automobile transportation, states that: "Education, generally considered the keystone of the arch, is the most needed of all activities to reduce accidents." He commends the accomplishment of school safety patrols sponsored largely by the American Automobile Association who are now also sponsoring a course in high schools to teach and train youngsters to become a generation of better automobile drivers.

Adult education, which is the most needed, is the most difficult.

Legislation, good highways and other contributions of traffic engineering, together with enforcement of traffic regulations, though they contribute so immensely to safe transportation, are nevertheless powerless to eliminate this tragic toll of travel without the intelligent individual cooperation of the man behind the wheel.

THE GULLS, TERNS AND SKIMMERS OF LOUISIANA

Part Two of the discussion of the Gulls, Terns and Skimmers of Louisiana will appear in the next number of the Louisiana Conservation Review.

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Some Wild Flowers of Louisiana

Part III

Flora of the Alluvial Soils

By

CLAIR A. BROWN

Assistant Professor of Botany, Louisiana State University

THE alluvial soils consist of sediments deposited by streams and bayous over a long period of time. The Louisiana alluvium lies roughly between the Mississippi and the Atchafalaya River systems. To the east of the Mississippi River it extends from below the bluffs at Baton Rouge southeastward to Lake Pontchartrain. West of the Atchafalaya River it extends to the bluffs in the vicinity of Lafayette and to the prairies of southwest Louisiana. Southward it extends to the Gulf of Mexico. Near the Gulf, the timbered swamps are replaced by extensive fresh water marshes which are fringed on the southern edge by the salt water marshes. Each has a characteristic vegetation consisting chiefly of grasses, sedges, and rushes; plants which do not produce conspicuous or attractive flowers.

Although Cypress swamps once covered large areas and hardwood swamps are still extensive, better than half of this region is arable land. Much of the cultivated land lies along the waterways where, as the result of natural levees, the land is the highest. The ground slopes away from the streams into the permanent swamps.

The alluvial areas of lower Louisiana are spotted with an ever changing succession of floral colors from March until frost.

The Spider Lily (*Hymenocallis occidentalis*) on account of the delicate, intricate structure of its fragile flower is worthy of considerable attention. Its fragrance wafted about by the gentle breezes is pleasing, but its allure is lost to many when the heavy odor is confined. It is extremely abundant in swampy places and seeing hundreds of these beautiful, white flowers in full bloom leaves an impression similar to that of a greenhouse full of stately Easter Lilies.

The Swamp Lily (*Crinum americanum*) is a close relative of the Spider Lily, differing from it mainly by the presence of reflexed perianth segments and the absence of a membranaceous crown. It is particularly abundant around the shores of Lake Pontchartrain.

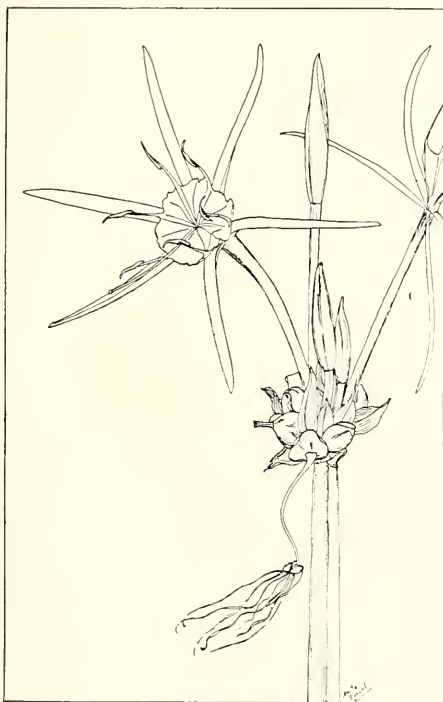
The Water Hyacinth (*Piaropus crassipes*) on account of its abundance and very striking appearance is perhaps more widely known than any

other plant in the bayou regions. It covers acres and acres of bayou surface with its beautiful bluish to lavender blossoms, set above a carpet of glossy green. One cannot but marvel at the peculiar structure of the plant which enables it to float on the surface of the water. The petiole of the leaf is swollen and contains large cells and large intercellular air spaces. The entire plant is more or less spongy and the texture is rather coarse. It is remarkable how such a soft, spongy plant can clog the propellers of boats, as well as retard the passage of the lone pirogue.

Violets are common in Louisiana and many of them grow in the alluvial section. Just how many species occur in the state is not definitely known, but more than twenty species have been reported. A place, blue violet (*Viola Langloisii*), which is common around Baton Rouge and elsewhere in the state, was named for Father A. B. Langlois, who published a catalogue of plants of lower Louisiana in 1887, after spending many years of his life in the neighborhood of Point-a-la-Hache and St. Martinville. A white violet, the Primrose-leaved Violet (*Viola primulifolia*) which occurs along the streams and in moist places has pale green, glabrous leaves, elliptic to ovate in shape, and long, white stolons which extend underground from plant to plant. The flowers are white, and bloom normally from February to April, although a few often open as early as in January. The Bird's-foot Violet (*Viola pedata*) which has the largest and most conspicuous flower of our native violets is so-named because of the leaves being deeply cleft. It occurs most frequently in the Longleaf pine hills, especially in the parishes of Tangipahoa, Washington, Rapides, Beauregard, Natchitoches, and Winn. *Viola rosacea* has beautiful rose-purple blossoms and is apparently the most common species in south Louisiana. The Lance-leaved Violet, (*Viola vittata*), a white flowered species, is at home in the moist flat woods between Hammond and Abita Springs. Walter's Violet (*Viola Walteri*) is a creeping violet of the pine woods which has bluish flowers and differs from the others by its creeping stem, and by its small, heart-shaped leaves. Lovell's

Violet (*Viola Lovelliana*), named for Mrs. Phoebe Lovell of Crowley, Louisiana, has leaves which may be entire or variously cut on the same plant. Its flowers are blue.

The wild Verbenas grow in Louisiana in great abundance. There are many species, some of which occur almost everywhere. It is probable that several of these could be used for ornamental purposes. As a matter of fact, certain species are now being used in California. One of our species best adapted to cultivation is the perennial *Verbena rigida* which occurs in dense patches.



SPIDER-LILY

Hymenocallis occidentalis (LeConte) Kunth.

Amaryllis Family

Amaryllidaceae

The spider-lily is a fragile flower and cannot stand the buffeting of the wind or the beating of rain. It is quite desirable as a cut flower because the buds continue to open for two weeks after it has been cut. It has a fragrance which, if confined in a room, is too heavy for many people. It is readily transplanted and thrives if given a sunny spot with plenty of moisture.

The long, fleshy, green leaves come from an underground bulb several weeks before the flower stalk is produced. The flower stalk towers above the leaves and bears a cluster of white flowers. The long, narrow, white perianth segments spread outward as the flower opens and inside is a white membranaceous crown to which the stamens are attached. The seeds resemble green plums, being large, fleshy, and green, and start to grow soon after they drop from the flower stalk.

It blooms from March to April.

Wide-spread in southern Louisiana in swampy places, and frequent in the northern part of the state, along streams and swampy places.

Explanation of plate. Figure one-half natural size.

The brilliant crimson to lavender blossoms are very attractive to the eye. It is very abundant along the roadsides. *V. littoralis*, *V. Bonariensis*, *V. zutha*, *V. bracteosa*, *V. urticaefolia*, and *V. Halei* are some of the common species. Many of them besides being decorative are important nectar-producing plants. In fact, *V. littoralis* is commonly called the New Orleans Vervain by beekeepers who regard it as an important honey plant. It was so named because of its abundance in the beekeeping section in the vicinity of New Orleans. It is, however, widely distributed in south Louisiana and is prevalent on most alluvial soils.

The Jack-in-the-pulpit recalls to mind the delightful nature poem by Clara Smith. The structure of this plant is quite different from what most people suppose. The flowers are placed on the lower half of the spadix. This in turn is enclosed by the striped spathe which terminates in a canopy over the spadix. What one commonly considers the flower is in reality an attractive accessory, for the tiny flowers are hidden on the inside. By summer, a bright red cluster of berries on a semi-decaying stem is all that is left above ground to mark the splendor of the Jack-in-the-pulpit. The name, Indian Turnip, which has been given to the underground stem of this plant has led many an unsuspecting victim to sample the fiery corm, urged on by those previously initiated. Certain crystals called raphides which are found in the cells of the corm have the power of penetrating the tissues of the mouth and feel like thousands of red hot needles. It is said that the Indians dried or cooked these corms to render them edible. In Louisiana we have two species, *Arisaema triphyllum* and *A. quinatum*. The former has two trifoliate leaves which shade the flower cluster whereas the latter has two leaves with five divisions to each leaf. The Green Dragon (*Muricanda Dracontium*) is a close relative of the Jack-in-the-pulpit from which it differs by the long, narrow, twisted spadix closely covered by the green, curled spathe, and by the much divided, solitary leaf.

The Evening Primrose (*Oenothera speciosa*) is better known in lower Louisiana as "Buttercup". Nature blends the pink and the white blossoms of this plant into delightful combinations with other species along the roadsides, levees, and canal banks. It is widely distributed in lower Louisiana and one can find literally miles of it along the Old Spanish Trail. It is especially abundant from Morgan City to New Iberia.

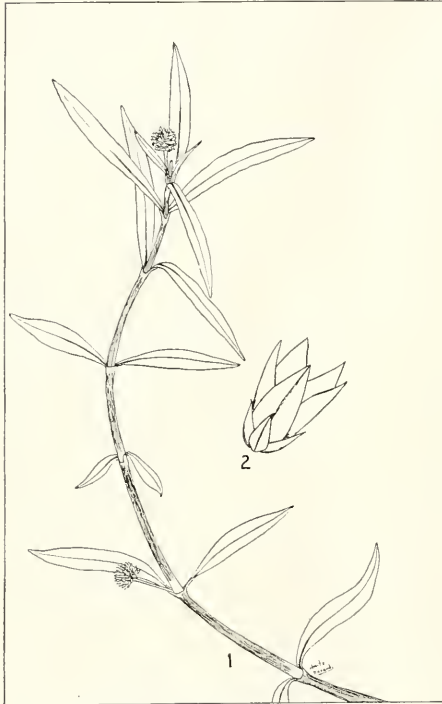
Butter Weed or Yellow Top (*Senecio glabellus*) brightens many an acre with its golden blossoms. It adds color to the fallow fields from the middle

of February into April. The flowers of the Blue Toadflax (*Linaria canadensis*) which dance and flutter in the March winds lend a pastel blue to the fields in early spring.

The Large-seeded Forget-me-not (*Myosotis macrosperma*) is not as attractive as some of its close relatives which are so commonly seen along the streams in the northern states or are cultivated in our gardens. The small, white flowers

which barely peep out of the enlarged calyces are scattered on the stiff branches. It is called "macroserma" because its seeds are larger than those in most other species.

Blue Stars or Blue Dogbanes (*Amsonia salicifolia* and *A. rigida*) are common in lower Louisiana whereas the "Creole Phlox" (*A. ludoviciana*) is apparently quite rare. All of these plants produce from one to several erect, leafy



ALLIGATOR WEED, ALLIGATOR GRASS

Alternanthera philoxeroides (Mart.) Griesb.

Amaranth Family

Amaranthaceae

This plant with its smooth, shiny, green, succulent leaves and stems with button-like clusters of white flowers makes an attractive border for the margins of ditches, bayous, and lakes. It has a tendency to spread, until it completely covers the surface of the water. Its long tangled stems, and the rapidity with which it grows, makes it a strong rival of the water hyacinth for the clogging of the waterways. It also grows in drier habitats such as lawns, and cultivated fields. It is a serious pest in the strawberry fields of the Florida parishes. The soft juicy stems are relished by cattle for food.

The shiny, green, succulent stems with opposite leaves, and button-like clusters of white flowers which arise in the axils of the leaves readily distinguish this plant.

It blooms from spring until frost.

There are several closely related species in Louisiana; *A. repens* (L.) Kuntze, *A. Polygonoides*, L. are procumbent plants with sessile clusters of white flowers; *A. ramosissima* Mart. is a plant similar to *A. philoxeroides*, but differs in that the leaves are obovate, and the flowers are borne on peduncles longer than the leaves.

It is widely distributed in southern Louisiana, along streams, ditches, waste places and cultivated fields.

Explanation of Plate.

Figure 1. One-half natural size.

Figure 2. Four and one-half times natural size.



IRIS, FLAG, LILY, COPPER-COLORED IRIS

Iris Fulva Ker.

Iris Family

Iridaceae.

Louisiana can justly be called the "Iris State" because more native species are known to occur in Louisiana than in any other state. Irises are of various colors, and the combinations that occur or can be secured by hybridization are almost unlimited. These include reds, purples, blues, and whites with a multitude of intermediate hues. The variety of colors found in native species surpasses those of the cultivated forms and consequently the wild iris is highly prized by gardeners.

These plants are easy to transplant and they will grow under a wide range of moisture conditions, in both swampy and well drained soils.

The Copper-colored Iris was first discovered in 1811 in the vicinity of New Orleans. It is a perennial plant with stout root-stalks, basal leaves, and a reedy, erect flower stalk with leaf-like bracts. The flowers vary from red to copper-red, orange-red, salmon colored and occasionally yellow. The arched, spreading sepals (Falls) are larger than the drooping petals (Standards). The style branches arch over the sepals and under each style is a stamen. The fruit is a six-angled capsule with usually two rows of seeds in each cavity. This species is readily distinguished from all other species by the lack of a distinct crest to the sepals and by the reddish color of the perianth.

It is widely distributed in southern Louisiana in moist places, blooming usually in April.

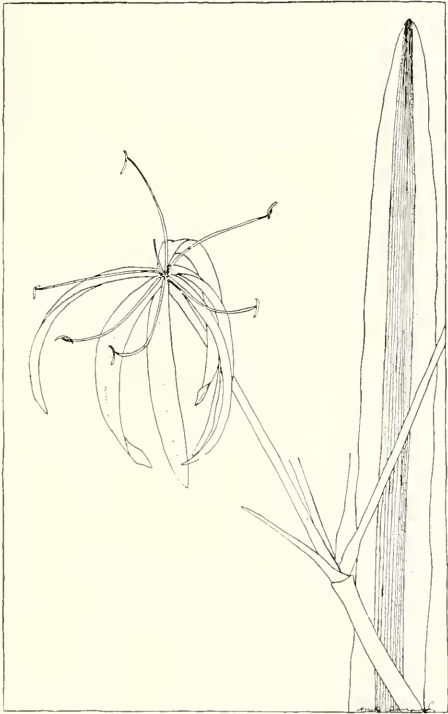
stems, one to four feet tall from a perennial root-stalk. The top third of the stem is crowned with a pyramidal cluster of bluish flowers. *A. salicifolia* is abundant in the moist woods of Iberia Parish and scattered elsewhere. *A. salicifolia* and *A. ludoviciana* are pubescent on the outside of the corolla, whereas *A. rigida* is glabrous. *A. ludoviciana* can be distinguished from *A. salicifolia* by the white, tomentose undersurface to its leaves. Texas Star (*A. Tabernaemontana*) has been collected near Hammond, Louisiana. These

plants have distinct ornamental possibilities, and a few people are now growing them in their wild-flower gardens. They are often difficult to transplant because of their deep root systems.

Our Spiny Thistle (*Cirsium spinosissimum*) is one of the largest of thistles. Early in February its rosettes of leaves on the rich bottom soils are often three feet in diameter, and by March it sometimes attains the unbelievable height of 8 to 12 feet, although normally it is from two to five feet tall. It is aptly named "*spinosissimum*" because it is covered with an abundance of needle-sharp spines. While this plant is sometimes troublesome in pastures, it will never become a serious pest like one of its close relatives, the Canada Thistle, as it can be eradicated rather easily.

True Buttercups or Crowfoots, members of the genus *Ranunculus*, are common in Louisiana. *Ranunculus pusillus*, which inhabits ditches and other moist places, is a low herb with small, inconspicuous flowers. *R. muricatus* produces a large cluster of fruits from each flower, each of which is spiny. The Celery-leaved Crowfoot (*R. sceleratus*) is at home in pools, along moist ditches, or on the drier bluff soils. In the pools the lower leaves terminate in long, flexuous petioles and float upon the surface of the water but in drier sites, the petioles are shorter, stiff, and hold the blade erect. The Early Crowfoot (*R. fascicularis*) is common on both the bluff and the alluvial soils and is by far the most conspicuous species in Louisiana. It has flowers three-fourths of an inch across, and the petals are a bright golden yellow.

April is the Iris month and Louisiana should be proud of the multitude of species and varieties of Iris that inhabit the swamps and fields of the lower coast section of the state. Our common Copper-colored Iris or Red Iris (*Iris fulva*) was first collected on the banks of the Mississippi River in the vicinity of New Orleans in 1811. Our native species of Iris, however, received but little attention until 1925. About that time the dean of our southern plant explorers, Dr. J. K. Small of the New York Botanical Garden, became interested in them as the colors were different from any of the wild species of his acquaintance. He has spent many hours in the field collecting plants for study and has described in all 86 new species of Iris for Louisiana. His enthusiasm for these rainbow-hued plants was contagious and in south Louisiana soon aroused the nature lovers to an appreciation of the beautiful plants which had been so long neglected. He called attention to the destruction of the habitats of several species by the march of progress, that is, by the filling of parts of Bayou Sauvage and the clearing and



SWAMP-LILY
Grinum americanum L.

Amaryllis Family

Amaryllidaceae

A traveler through the swampy sections of Louisiana cannot help but see the conspicuous blossoms of the Swamp-lily peeping out of the dense jungles along the roadsides. This inhabitant of the swamps should be cultivated in our gardens; its showy blossoms rival many of the cultivated lilies as to shape of flower and in length of the blooming season. The bulb is buried from ten to eighteen inches in the rich, black muck. It will survive transplanting to dried soils.

It can be readily recognized by its broad, strap-shaped, glossy, green leaves which are one and a half to two feet long, and broader and thicker than those of the spider-lily. At the top of the flower stalk four to twelve slightly fragrant flowers are produced, which, because of the drooping white and pink petals, appear like big rounded poms. The fruit is a nearly spherical capsule, irregularly lobed and about two inches in diameter. The seeds germinate readily, but two or three years are necessary to produce flowers from them.

It blooms in mid-summer for two to four weeks.

Widely distributed but not abundant in the swampy sections of southern Louisiana.

Explanation of Plate. Figure one-half natural size.

draining of other Iris fields. As a result, the New Orleans Iris Preservation Society was formed. This organization established a memorial garden in Audubon Park where these beautiful plants can be preserved. Not only are all of the standard colors represented in the native Iris species but dozens of variations in hue are so common that one needs a color guide book to describe the brilliant array of colors.

An early botanist left a painting of what was unmistakably *Iris fulva* but the illustration was

colored canary yellow. Inasmuch as no Iris with such a color was known it was generally believed that the artist had erred in his selection of colors. However, a yellow variety of this species does occur. The late Mr. George Thomas of the New Orleans Parkway Commission had a yellow colored form of *Iris fulva* in his garden. This form is so rare that when Dr. Small discovered the third collection in 1928, he remarked to the writer, "This pays the expenses of the trip." This yellow form is considered an albino of *Iris fulva*.



BUTTERCUP, SHOWY PRIMROSE, MEXICAN PRIMROSE
Oenothera speciosa Nutt.

[*Hartmannia speciosa* (Nutt.) Small]

Evening Primrose Family

Onagraceae

The name "Buttercup", as used in south Louisiana, is applied to this pink and white, conspicuously flowered plant, although it does not belong to the true Buttercup family.

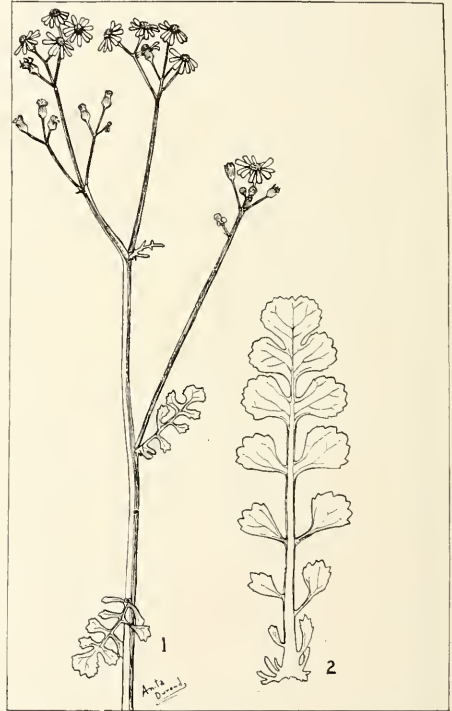
The ensemble of pink and white blossoms produced by this plant is so attractive that it is surprising that so few people have used it for its decorative effect. It can be used very effectively as a border plant to blend the taller plants with the lawn.

It is a leafy herb from 8 to 20 inches high. The leaves are quite variable in shape. The nodding buds open into flowers that are pure white, pink, or white with pink veins. The blossom varies in size from 2 to 4 inches in diameter. This variation is apparently associated with the water supply. As the soil moisture is reduced, the new blossoms become smaller in size.

It blooms from April until July with occasional blooms late in the fall.

Widely distributed in lower Louisiana along roadsides, ditch banks, and waste places.

Explanation of Plate. Figure one-half natural size.



BUTTER-WEED, YELLOW TOP
Senecio glabellus Poir

Composite family

Compositae

Yellow Top is a very conspicuous member of our spring flowering plants. Here and there we may see occasional plants, but it reaches its glory when we see acres of it in bloom.

Most people pass it by with little comment since it is considered a weed. It is important to the beekeeper because in early spring it furnishes large quantities of pollen and some nectar to the bees before most other plants are in bloom.

It is a soft, succulent annual which grows from one to three feet high. A single, leafy stem may arise from the rosette of leaves or several stems may be produced. The compound leaves are deeply cut and each leaflet is coarsely toothed. Dense clusters of flower heads are produced at the top of the stem and often from the axils of the lower leaves. Each flower cluster has many yellow ray flowers which surround in a single marginal row, the yellow disk flowers.

It blooms from January to April.

Very abundant in the swampy sections of Louisiana and especially common in alluvial soils and in cultivated fields.

Explanation of Plate:

Figure 1. Inflorescence, one-half natural size.

Figure 2. Compound leaf, one-half natural size.

Varieties with white flowers also occur in many of the blue species of Iris.

Iris giganteaerulea is well named as it produces a very large blossom and the plant is large in stature. It is particularly abundant in the region from New Orleans to Morgan City, and along the road to Lafitte. Dr. Small identified *Iris vinicolor* (wine-colored), *Iris atrocyanea* (dark violet-blue), *Iris violipurpurea* (violet-purple), *Iris chrysophoenicia* (purple with a gold stripe) for the writer along the Gentilly road and elsewhere in the vicinity of New Orleans. Some of



BLUE TOAD-FLAX

Linaria canadensis (L.) Durm.

Figwort Family Scrophulariaceae

The flowers of the Blue Toad-flax are responsible for the shimmering pale-blue haze which is often visible over fields in the spring. This plant, with its spike of attractive flowers, deserves a place in our gardens. It is a close relative of the cultivated Snapdragon.

It is an annual herb with one to several slender stems arising from a rosette of small procumbent leafy branches. The stems often attain a height of two to three feet. The linear leaves are about an inch long and scattered on the flowering stem. The top of each stem is tipped with a cluster of pale-bluish flowers. The flower is irregular in shape, and strongly two-lipped, with a distinct spur on the lower part of the corolla.

The flowers are abundant in March and the early part of April.

It is widely distributed in Louisiana on the bluff and alluvial soils, especially abundant in cultivated fields and waste places.

Explanation of Plate:

Figure one-half natural size.

these locations have since been destroyed. *Iris virginica*, lavender-colored with conspicuous veining, is very abundant around Lake Pontchartrain, from Frenier Beach to Ponchatoula, and scattered clumps occur northward in the pine flats area. *Iris mississippiensis* (ordinarily blue, but including a pure white form) differs from these in that its flowers are produced on a zigzag stem below the level of the leaves. These are just a few of the rainbow-hued flowers and one must see the Memorial Garden collection at Audubon Park, in New Orleans to appreciate the diversity of color and the similarity of species.

Wild Iris plants are easy to grow and for the most part, have few serious diseases. Although their native habitat may be in marshes, in wet woods, margins of swamps or roadside ditches, they will thrive if planted in drier soils. For the best results the main rhizome should not be planted over the depth of the rhizome itself. These plants seem to adapt themselves to a wide variety of soil types. They apparently do not make satisfactory growth when fertilized with stable manure. The best time to transplant them is after the blooming season. If this is done, they will have a chance to become thoroughly established and will bloom the following season. Many have also had success in moving the plants during or before the blooming season. Iris should be lifted and divided every two or three years. This also helps to keep down the weeds among them. A word of caution should be added in regard to introducing the Alligator Weed (*Alternanthera philoxeroides*). This plant has proved to be a severe pest in lawns and is quite troublesome in strawberry fields in the southern part of Tangipahoa Parish. It grows in association with Iris and is frequently introduced when dirt is brought in with the rhizomes. After it has become firmly established, it is very difficult to eradicate as its perennial stems often grow to a depth of four feet.

Mrs. Dan DeBaillion of Lafayette, a nature lover whose garden contains many native plants, has discovered a far easier method of securing a large number of different species of Iris than by digging the big rhizomes. Small plants appear on the side of the main rhizome. These can be detached easily and, when planted in a mulch of peatmoss and loam, with a proper moisture supply, will develop into good sized plants and frequently bloom the same year. This method is much easier than attempting to move large quantities of the rhizomes.

Iris can be grown from seed. These germinate sporadically but the germination can be accelerated if the corky, waterproof coat is removed be-

fore planting. Many of the beautiful cultivated varieties have been produced by crossing different species and planting the seed. For instance, the Dorothea K. Williamson Iris is a cross between our common copper-colored Iris (*I. fulva*) and a cultivated species. Pollination of Iris is fairly simple. The stamens should be removed when the flower first opens. The emasculated flower should then be bagged with a cellophane bag to prevent accidental pollination. The stamens can be removed and placed in a properly labeled paper envelope or small glass vial until needed. The pollen will usually remain viable for a week, and the length of the blooming period for individual flowers is from three to six days. The pollen is applied to the stigmas with a camel hair brush when the upper part of the petal-like style drops down, and exposes the stigmatic surface. After pollination the flowers should be rebagged and tagged. Accurate records are necessary if one expects to create new forms for commercial growing and are especially necessary from a scientific point of view. Very often several attempts to cross pollinate Iris will have to be made before one learns just the proper time to apply the pollen in order to secure seed.

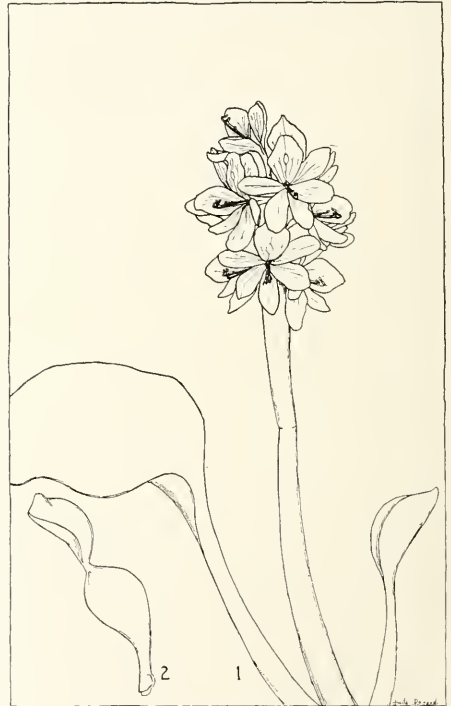
In South Louisiana, there are a number of species of Hibiscus, close relatives to the cotton plant. Hairy-fruited Rose-mallow (*Hibiscus lasiocarpus*) has a large bell-shaped white flower with a dark purple eyespot in the base of the corolla. The ovate leaves are coated with a dense velvety pubescence. It is common along the streams and in the bottom lands. Swamp Rose-mallow (*Hibiscus Moscheutos* L.) with its pink blossoms is common along the marshes from Slidell to Lake Charles. It blooms in the latter part of August into September. The Halbred-leaved Mallow (*H. militaris*) is readily distinguished by its glabrous, hastately 3-5 lobed leaves. *H. aculeatus*, an inhabitant of the pine flatwoods, is easily recognized by its angular 3-5 lobed leaves, covered with a rough pubescence.

Lion's Ear (*Leonotis nepetaefolia*) an immigrant from South Africa, is now widely distributed in southern Louisiana. It can be recognized by the large, globular flower clusters scattered along the tall square stems. The flower has a two-lipped corolla and is a bright orange in color. The calyx teeth are tipped with rigid bristles.

The Sensitive Plant or Shame Plant (*Mimosa strigillosa*) produces a globose cluster of minute pink flowers. The leaves close up and droop when disturbed and this behavior accounts for its common name. It is widely distributed on the alluvial soils and also on the sandy soils of the pine hills in northern Louisiana.

The Black-eyed Susan (*Rudbeckia hirta*) which is so common in the pine flatwoods, has its counterpart in the alluvial soils in the Niggerhead (*Rudbeckia amplexicaulis*) [*Dracopis amplexicaulis*]. The Niggerhead grows from one to three feet tall, has pale green, ovate to ovate-lanceolate leaves clasping the stem. The flower cluster is larger than in the Black-eyed Susan. The ray flowers are yellow, sometimes with a dark purple

(Continued on Page 29)



WATER LILY, WATER HYACINTH, "LILLIE"

Piaropus crassipes (Mart.) Britton

[*Eichhornia crassipes* Solms]

Pickereel-weed Family

Pontederiaceae

This plant is better known in Louisiana as "Water Lily", or "Lillie" of the Louisiana-French dialect, than by the book name Water Hyacinth.

To see acres of this plant in bloom with the clusters of bluish-purple to lavender flowers above the deep green foliage is a sight never to be forgotten. It is a pity that this plant is such a pest. It carpets the bayous and streams, and often forms floating mats which drift about in the winds. This dense growth in navigable streams is a menace to navigation and to the lone hunter in his pirogue it forms an almost impenetrable barrier.

The water hyacinth is a desirable plant for garden pools where its spread can be controlled. The blossoms are too fragile to carry any distance, but budded plants will bloom in the house.

It is an aquatic herb, free floating or occasionally rooting in the mud and quite variable in size. The petioles of the leaves are inflated, and on smaller plants, more conspicuous than the blades. The flowers are bluish-purple to lavender with a yellow eye spot on the top petal.

It blooms from spring until frost.

Widely distributed in Louisiana in shallow lakes, streams, and bayous and more abundant in the southern part of the state where the temperature is higher.

Explanation of Plate:

Figure one-half natural size.

GEOLOGICAL SURVEY

DR. H. V. HOWE, *Director,*
School of Geology of Louisiana State University
and Director, Research Division, Louisiana
Geological Survey

C. K. MORESI, *State Geologist,*
Louisiana Geological Survey,
Department of Conservation

FIELD INVESTIGATIONS OF ST. BERNARD AND PLAQUEMINES PARISHES

Fieldwork will be undertaken this summer for a geological bulletin on St. Bernard and Plaquemines parishes. A party composed of Dr. R. J. Russell, Dr. F. B. Kniffen, and Mr. C. F. Dohm will leave New Orleans by boat, in the early part of June to study the rapidly submerging island tract of eastern St. Bernard Parish. In addition to geological findings it is expected that Indian mounds and camp sites will be discovered and that they will shed light on the problem of dating various stages in the growth of the Mississippi Delta. It is also hoped that collections of pottery and other evidences of Indian habitations will prove a connecting link between the newly developed Mississippi Valley chronology and the history of the coastal shell-mound builders.

From the geological standpoint the St. Bernard-Plaquemines bulletin will not only form an interesting study in the contrasts between yesterday's and today's Mississippi Delta but should be significant from the standpoint of fundamental conditions making possible the vast petroleum accumulation of the Louisiana Gulf Coast.

SOME WILD FLOWERS OF LOUISIANA

(Continued from Page 28)

blotch at the base. The dark colored disk flowers are borne on a conical receptacle which is much longer than the receptacle of the Black-eyed Susan.

Water Lilies are common in the shallow lakes and sluggish bayous. The Yellow Spatterdock or Mulefoot Lily (*Nymphaea advena*) has large ovate to oval leaves which either float on the water or are thrust above the surface. The flowers are a clear yellow and do not unfold like the White Water Lily, and hence are not as attractive. The White Water Lily (*Castalia odorata*) produces a beautiful fragrant flower and is much sought after. It, with many cultigens, is being used in the aquatic gardens so popular today.

CHENIERS OF SOUTHWESTERN LOUISIANA

A paper on the Chinese of Southwestern Louisiana by R. J. Russell and H. V. Howe will appear in an early issue of the Geographical Review, the official publication of the American Geographical Society.

TERTIARY OSTRACODS

Dr. H. V. Howe, Director of the Research Division of the Louisiana Geological Survey, will spend the latter part of June in Washington, D. C., studying the collections of Tertiary ostracods in the collections of the United States National Museum. The rapid development of oil fields in South Louisiana whose production is coming from Miocene sands has made it imperative that the Miocene ostracods of the Gulf Coast be described as an aid in the recognition of these producing horizons in wells. Dr. Howe expects to have a paper describing the Upper Miocene ostracods ready for publication by early fall.

GEOLOGY OF CAMERON AND VERMILION PARISHES

During July and August Dr. H. V. Howe and James McGuirt, Assistant State Geologist, plan to complete the field work for Geological Bulletin No. 5, which will be entitled, "Geology of Cameron and Vermilion Parishes."

The American Lotus (*Nelumbo lutea*) is known in Louisiana as Yonkapin, Water Chinquapin and "Graines à Volée." This plant sends leaves to the surface of the water from a large, tuberous rootstalk which is securely anchored to the bottom. The tissue in the flexious petioles of these leaves hardens and the peltate leaves are held above the surface of the water. The flower stalks are rigid and produce solitary large yellow flowers overtopping the leaves. The seeds and the rootstalks formed a part of the diet of the Indians. This plant spreads rapidly and will quickly take over small pools and ponds. It is common in the ponds and bayous of lower Louisiana and present in isolated localities elsewhere. It ranges northward into Minnesota, Michigan, and New York.

Louisiana Nature Guardians

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HOW YOU CAN BECOME A NATURE GUARDIAN YOUR PART

Consult your teacher.

Ask that the purpose and plans of the Nature Guardian Club be explained to you and the class.

Ask for an application card.

Get a responsible person to indorse it, after proving that you fully understand the duties of a Nature Guardian.

Sign the application and mail the card postpaid, or give to your teacher, to send with cards from all the class.

OUR PART

We send the application card.

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This is all free, and is carried on with the purpose of instilling in the children's minds a knowledge of Louisiana's wild life and a thorough understanding of its economic value to the State.

It also aims to develop individual humanitarianism. Even within this short time an amazing improvement has been made in the mental attitude of our young folks toward the conservation and protection of Louisiana's natural resources.

EDITORIAL

DEAR GUARDIANS:

Recently we had the pleasure of listening to a splendid lecture by Dr. H. C. Oberholser, Senior Biologist of Biological Survey, of the U. S. Dept. of Agriculture, who in no uncertain terms predicted the extinction of many species of water fowl within the next few years if something drastic is not done immediately to prevent such a calamity.

Many factors have combined to bring about this state of affairs in regard to our game birds and other wild life creatures.

Animals, fish, forests and wild flowers have all suffered within the last decade.

Song and insectivorous birds have had their nesting ranges greatly restricted by the destruction of brush and natural cover due to land cultivation.

Our game animals and our fur-bearers have been enormously reduced in numbers by drainage and deforestation. Fish life has been exterminated in certain sections by the pollution of streams by poisonous waste matter from factories and industrial plants.

Normal precipitation has been interfered with by the cutting of our forests and the drainage of reclaimed lands. Our wild flowers have suffered depredations by thoughtless and ignorant persons who tear, rend and uproot. Our forests have suffered from fires and destructive logging methods.

Now, what can YOU do about these mistaken practices, Guardians? Here are a few things that you CAN and SHOULD do:

Use your influence to spread the gospel of Conservation among your friends and families.

Encourage them to take an active part in any project affecting the conservation of game and song birds, forests and wild flowers.

Replace dead trees or shrubs in parks, school grounds or in the home yard with live ones.

Give a Five-Minute talk at school during the morning exercise period on such subjects as reforestation, erosion control, stream pollution, and the care and protection of song birds.

In the regular monthly Nature Guardian meetings have a program devoted to any of the following subjects:

Wild Flowers of Louisiana and their Protection.

Reasons underlying the Formulation of Louisiana's Trapping Laws.

Forest Fires and their Prevention.

Forest Fires As Destroyers of Wild Life.

The Recreational Value of Louisiana's Wild Life and Forests.

The Economic Value of Louisiana's Wild Life.

The Aesthetic Value of Louisiana's Wild Life.

It might prove of conservational value to post a list of magazines, bulletins, and leaflets pertaining to the care and conservation of wild life. This might become the nucleus of a nature library.

The conservation of Louisiana's natural resources is the civic duty of every citizen of the

State, but it is a SACRED duty of each Louisiana Nature Guardian.

With my love to all of the Guardians,
THE EDITOR.

Here is an interesting letter from the fourth and fifth grades Nature Guardian Clubs of the Broussard High School. They have started a fine museum and have every reason to be proud of their work. They say:

Broussard High School,
Broussard, Louisiana.
March 18, 1934.

DEAR EDITOR:

I want to tell you about our fourth and fifth grade Nature Guardian Club.

We have 42 members. We have a nice museum with a collection of snakes, spiders, frogs, frog eggs, feathers, lizards, insects, opossum pelts, leaves, turtles and butterflies.

We placed the small specimens in clean paste bottles and put alcohol on them. The color of our museum is brownish red. It is very large and is on the south side of our room.

We have programs and invite our mothers so they will know what we learn about Nature.

Your friends,

The Fourth and Fifth Grades,
Per MARGARET S. LANDRY,
Secretary.

We are very glad to have so many new members this month. This increased enrollment shows that more people than ever before are interested in Louisiana's natural resources and are anxious to help in their protection.

We hope that our members will send us more

poetry and more letters for our next issue. How are the Pen-Friends getting along?

A RARE BIRD WITH RARE CHARACTERISTICS

BY AMBROSE DAIGRE,

Department Taxidermist

During a recent sojourn in Grand Isle, for the purpose of gathering a collection of migratory birds, I collected a specimen of considerable rarity and interest, the Groove-billed Ani, technically termed *Crotophaga sulcirostris sulcirostris* Swainson.

The range of the particular species, according to the A. O. U. Checklist, Fourth Edition, is that it breeds from the lower Rio Grande Valley, Texas, south to Peru and British Guiana. Casual in Arizona, Kansas, Louisiana, and Florida. The above being the fifth official record taken in Louisiana makes it considerably interesting.

The Ani is a member of the Cuckoo family, but in general appearance resembles the Boat-tailed Grackle of the coastal marsh regions; although one trained in the observation of birds afield will readily detect the parrotlike beak.

The plumage is jet black with the exception that iridescent purples or greens stands out on the back and wings in certain lights.

In flight the Ani gives the appearance of being loosely jointed, flopping about in the air seemingly to have no accurate control of its aerial progress.

The Cuckoo family is peculiar in its domestic habits. The American Cuckoos build their own nests and rear their own young, but the English Cuckoo is parasitic, depositing its eggs in the nests of other birds and thus its young are reared

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by foster parents. In this way the English Cuckoo resembles our own cowbird.

The Anis are still more peculiar, since they nest in colonies and join together to build a single large nest in which all of the females of the colony lay their eggs. As many as twenty eggs have been observed in one such nest, these eggs being laid in layers separated by dry leaves.

The calls of the Ani are said to resemble the wailing of a young kitten.

There is another species of Ani, *Crotophaga ani* Linnaeus, rarely occurring in Louisiana, having a smooth beak. This statement is hoped to assist in the avoidance of any misclassification of the species.

The particular specimen taken at Grand Isle interested me greatly. I learned from persons native to the Island that the Ani had resided in those parts for approximately the past two years. During the course of this time the bird met with a catastrophe which, no doubt, had serious bearing upon its pride. Some mischievous boy pulled its tail out.

After such a close call, you can be sure that Mr. Ani was very wary. It would sneak around to Madam Besson's yard, each day, to snatch a morsel of food and flip flop back to its secluded haunts. Upon collecting the specimen I observed that the tail contained a number of pin-feathers, giving symptoms of the bird's disaster.

I had often read of Anis feeding among cattle and horses and sometimes on the backs of these animals in quest of the animal flies thereon, but not until this time was I rewarded with having observed it myself.

I had an occasion to observe the Ani boldly feeding on the back of a horse belonging to a Mr. Verdon of Grand Isle. Upon killing the specimen, I was confronted with Mr. Verdon relative

to the fact that the bird was his. After explaining the rarity of the bird, and, Mr. Verdon being a man of kind nature, he chose to let matters stand as were, with no obligation on my part.

An analysis of the stomach proved that the principal diet of the bird is various species of animal flies. This makes the bird worthy and beneficial among cattle and horses.

The specimen now carefully preserved is on exhibition at our Royal Street Museum.

LIGHT TACKLE IN SALT WATER

(Continued from Page 4)


the rod in the direction of the line, pull some tension in the rubber band by hand and release it suddenly. Often the recoil will dislodge the sinker, and if it does not, the rubber band will break before the line and only the sinker will be lost, while the leader and hook are saved.

The next time you go out take along a fresh water casting outfit and give it a fair try, keeping in mind that you must use a certain amount of skill and some patience in handling the fish, then determine for yourself whether the increased thrill and pleasure of landing both large and small fish does not more than make up for the few that you may lose. After you have successfully handled a large trout or redbfish, I feel certain that you will become a confirmed member of the light tackle tribe for life.

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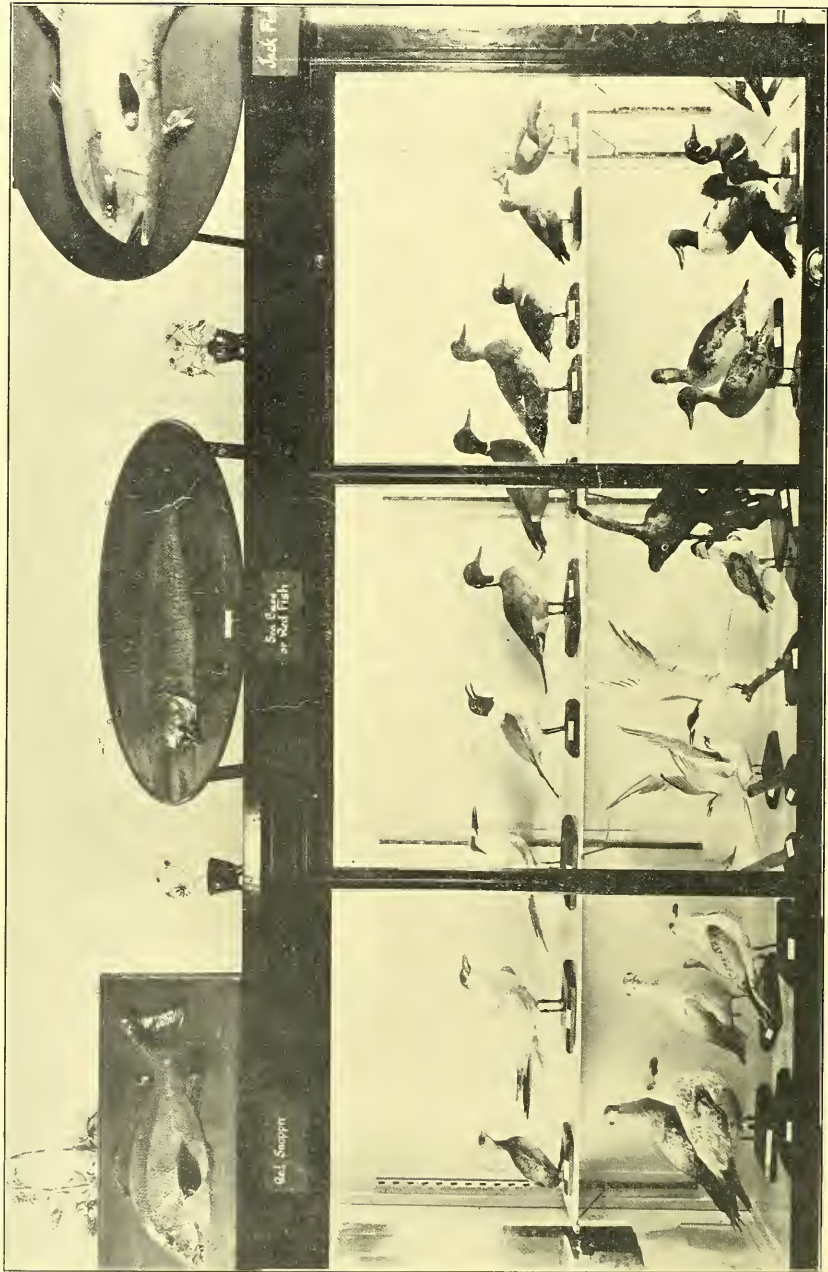
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