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# Strange Animals I have known

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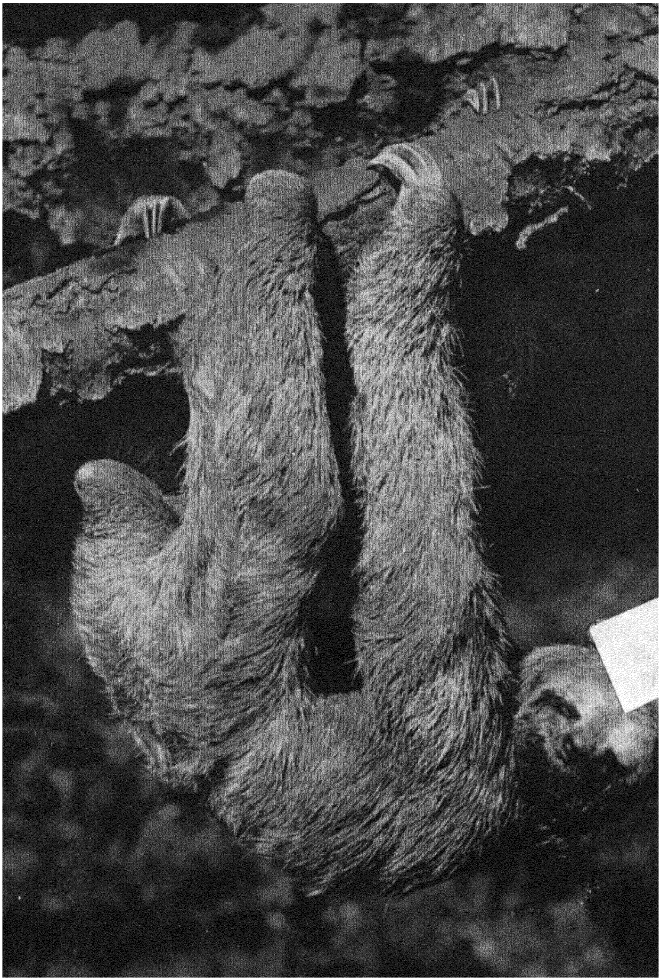
# Strange Animals I Have Known



THREE-TOED SLOTH.

A resident of the American tropics, climbs, eats and sleeps in an upside-down po
and is the laziest and most deliberate of all four-footed animals.

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## Chapter I

# Snakes Did It!

FOR over a quarter of a century, it has been my task to capture, transport, feed, nurse, soothe, fight, guard and cajole various specimens of the animal kingdom. I have been on intimate terms with snakes, bears, apes, monkeys, elephants, jaguars, tigers, buffaloes, giraffes, deer, kudus, hippos, wild horses, kiangs, rhinos, lions, cougars, leopards, kangaroos, beasts of almost every sort and many other species.

The average wild animal has character, personality and conscience, pretty much like the average human being. He is temperamental, perverse, vicious, phlegmatic, diffident and deceitful as the case may be. Entertainment lies in discerning these traits and adroitly checkmating them. Only in this way can one gain the upper hand.

It's a sort of game. Where some men play golf, those of us at the New York Zoological Park play *animals*. Usually we win. Once in a while we lose.

## Snakes Did It!

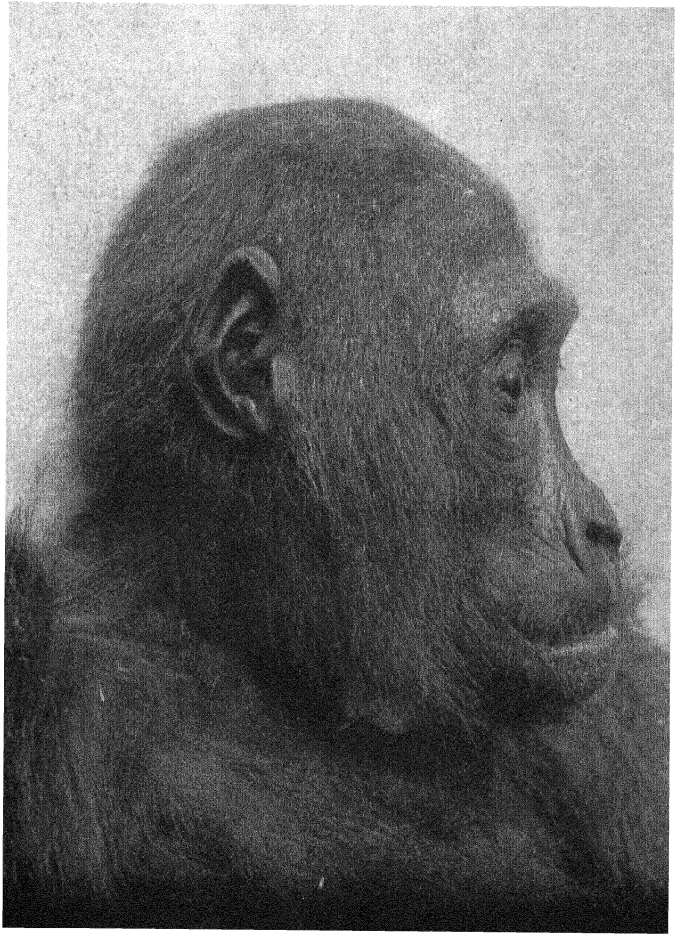
One morning the head elephant keeper was carried away with excitement when he found that his favorite charge had gained weight. Not waiting to return the elephant to its cage, he started for my office to tell me the glad tidings.

The elephant, a pygmy species, patiently followed his keeper not only across the yard from the scales, but also down the passageway which led to my office.

"Congo's doing fine, sir!" gaily cried the keeper as he entered. The next moment he gave a loud grunt and advanced rapidly toward me. Congo had come up behind and butted him out of the way. Never having been a stenographer, he probably was curious to find out what the inside of an office looked like.

Before he could stop him, Congo tried to enter. His big, black head got through the door all right, but his bulging body stuck. He tried to back off for a push. To his consternation—and ours—he couldn't move. Instantly he raised his long black trunk and emitted a blast of sound that nearly deafened us.

As Congo struggled to free himself, trumpeting wildly, the whole wall threatened to cave in.



PROFILE OF THE YOUNG GORILLA "DINAH"

which was successfully exhibited in the New York Zoological Park. About three years old at the time.

HAND-PRINT OF A FOUR-YEAR-OLD ORANG-UTAN.

The skin textures, or parallel lines are finer than upon the human hand except upon the finger tips. A roll thumb print of this animal, compared with one of a human, puzzled experts at the New York Police Department in distinguishing which was human or ape.

That was bad enough. What concerned us more painfully was that we knew he would attack us the minute he was free. The elephant mind is childishly literal. He had come to visit me. He had been pinched in a trap. Therefore, I was to blame!

Through the window I could see other keepers, always on the alert for trouble, running to our assistance. I knew they would be on the job in a moment or two. Our immediate problem was therefore to calm Congo, first, to save the wall, and, second, to protect ourselves.

There was no dramatic climax to the incident, illuminating as it is of our problems. The keeper and I simply engaged in a loud fake dispute, pretending not to notice Congo. Almost at once he quieted down, distracted by what must have seemed a more important trouble than his own. The other keepers quickly removed the door from its hinges, extracted Congo and led him back to his own quarters, somewhat subdued by his first and last experience with "big business."

It took me a good many years to learn how to meet such an emergency with any one of the many kinds of animals that are now under my care,

direct or indirect. At the age of twenty-one I was the discontented, callow, vacillating youth characteristic of immaturity. I could vote and I had a sort of minor job in a big scientific institution. But my work was painfully monotonous and my salary microscopic. My family were anxious for me to go into business. This was understandable because my father was commercially successful and my uncles were nationally known experts associated with big enterprises. Any of them could have put me on the road to financial eminence. Naturally, when I refused to be drawn into the struggle for the Almighty Dollar they all concluded that I was somehow lacking and would end up in some sort of disgrace.

Then the serpent entered my life and determinded my career!

Poisonous snakes had always fascinated me. Just how and when this fascination started I can't remember, but an early episode indicates just how serious it had become when I was still a boy. I had heard of a den of rattlesnakes in the mountains near Waterbury, Connecticut. An old woodsman who knew its location passed the news to me. When I found the den the snakes looked

like velvet cushions coiled here and there on the pale rock of the ledge. On my return home, I told my family about the den and suggested bringing some of the rattlers down to keep in a barrel. Naturally there was a storm of protest and I didn't press the plan. But my parents would have been horrified had they known how I revisited the den and pinned this and that rattler's head down with a stick, grasping the reptile by its neck with awe and cautious respect until I could examine the hypodermic fangs. What a thought for a mother! A youth of sixteen, alone on a ledge handling deadly rattlesnakes, with help far distant, separated by miles of rocks and scrub oak!

My interest in snakes grew apace. Soon I became an amateur collector of reptiles. In the end, seeing my case was hopeless, my family actually capitulated and gave me the upper floor of our large stone house in which to keep my collection of poisonous serpents.

There were other developments. I went to Dr. Henry Leipziger, supervisor of evening lectures in the New York City public schools, and proposed I give a talk on snakes. He was ex-

tremely sceptical about the subject, and the youth of the prospective lecturer was not reassuring, but he gave me a chance and also came to hear my lecture. It was illustrated with living specimens each carried in a separate cloth bag, carefully tagged. The bags had been brought to the lecture hall in a hand-satchel. If Dr. Leipziger had anticipated such a procedure I might not have had a trial. Nevertheless the lecture was a success. The serpent's charm was potent.

My monotonous work in the scientific institution did not relate to reptiles. To make a break for more active work and something that would give me more time for my hobby was imperative. I surprised my parents by announcing that I was going into the newspaper profession. They received the news with joy and asked when I was going to get rid of the snakes! But their relief was short lived. I proudly showed them letters from Dr. S. Weir Mitchell, internationally known toxicologist, expressing interest in my collection and even intimating that he might come on from Philadelphia to see the specimens; and from the well-known Dr. Gustav Langmann, stating his wish to cooperate in studies of serpent poison. No

doubt both eminent men thought I was a mature investigator near their own ages. Although my parents knew these names they were not pleasurably impressed. To make matters worse other letters, from India, from the West Indies and Brazil, had often been followed by gifts, in the shape of boxes with sinister contents, which meant additional coiled forms with bizarre patterns, in glass-fronted cases. My parents protested, but I could not give up the snakes. Destiny had the whip-hand!

Almost the first place I tried to enter journalism was the famous *New York Sun*. With trepidation I ascended the wooden staircase to the second floor of the building occupied by this great daily. My heart was pounding, for I was bound for the office of Chester M. Lord, the widely-known managing editor. The little table at the door, where the stern guardian normally presided, was vacant. Without opposition I entered the big news room and wandered around among desks and plain wooden chairs, my feet scuffling through sheets of crumpled paper that littered the floor. It was early afternoon and most of the reporters were out on assignments.

Over in a corner, a lanky young man was writing on sheets of yellow paper. Arms almost in a circle, head lopped on his left shoulder he drove a soft pencil rapidly across the paper, scrawling bold lines of barely ten to a page. As he finished a page his left hand swept it out of the immediate field of action into an accumulating nest. I asked for Mr. Lord. The journalist's left hand waved a thumb over a shoulder, indicating an office door. The pencil travel stopped not an instant.

Through the open door I saw a thick-set man at a desk. I tapped on the door frame.

"Well?" came a harsh voice.

"Mr. Lord?" I humbly inquired.

He nodded, but didn't look around.

"Mr. Lord, I am here to ask for a position."

"Who brought you in?"

"There was nobody at the door. I walked through."

"There are no positions open, young man." He swung around and looked at me in a manner that belied his fierce greeting. "You would like to be a reporter?"

Involuntarily, my story burst forth, including a detailed account of my snakes, which was

listened to with friendly amusement. Meanwhile, a stocky, good-looking fellow of about thirty had entered the office. Mr. Lord said to him:

'There's a good story for you, Goodwin. This young man wants to be a reporter. I've told him there is nothing open." He turned to me. "Send me some stories about your snake studies; and try the other papers for a job."

The younger man followed me out. He put a hand on my shoulder. Possibly I was a bit pale. He was Joe Goodwin; later I discovered he was one of *The Sun's* star reporters.

"Keep at it until you get a job," he said, "and if you stick any place, come around and tell the boss about it. I know there isn't room for another cub here now. He's always interested in kids like you getting started and likes to hear about it."

That was the beginning of a lasting friendship with Joe Goodwin.

Next day I got a letter of introduction to the managing editor of *The Times* and was given a position—on trial. This was terrifying as I hated the idea of being out of a permanent job. I naively mentioned this to the editor, who re-

marked that I had selected the one best place in the world for such a shock! This was my first meeting with Henry Loewenthal, managing editor of *The Times*—a man who later became my revered counsellor and friend. His stern and efficient management of the paper was a brilliant and well-known chapter of its internationally famous history, but of his personal kindliness and interest in cub reporters few have heard.

I hung on as a cub reporter, skating along thin ice, falling down on many stories, making good on a few and writing specials for Sunday in order to stave off that fateful suggestion of the city editor to get my hat and say good-bye.

Soon after this I was given a permanent assignment to cover the criminal courts. By coming in on Sundays to do "around-town-stuff" I was allowed an occasional evening off to give a lecture. As a convenience I brought my lecture satchel of snakes to the editorial rooms. The first time I did this I asked the night City Editor to caution the boys not to knock my satchel over as it was full of snakes. Then I rushed out to dinner. The snake news spread while I was away. When I returned to get my satchel and start up to the

lecture hall I was met by an excited delegation wanting to know if the editor's story were true or only a joke. My answer was to produce a snake. The demonstration almost resulted in a panic.

After that I tried to hide the lecture satchel, but Hughes, the assistant night City Editor, hated snakes so vigorously that he began to jump every time he saw a satchel anywhere. Finally he insisted that I keep mine somewhere under lock and key.

One day Bacon, of the City Hall staff, thought he heard a satchel squeaking as if it was about to burst open. At once he carried it gingerly to a steel cabinet where we stored the biographical records and locked it up. An hour later there was a tremendous uproar. One of the reporters had lost his satchel and had missed his train for an out-of-town engagement. I came in during the excitement and was taken over to the cabinet to reclaim the incarcerated bag supposed to contain snakes. It belonged to the infuriated reporter!

We had a sort of family row and I indignantly told the gang that they wouldn't see my satchel again. Whereupon someone posted a bulletin, deploring the fact that the editorial rooms would

be snakeless thereafter, but wishing everyone a happy return to normal nerves and sympathizing with the reporter about missing his train. To live up to my promise I sought a berth for the satchel in the Criminal Courts Building. Recorder Goff said I could leave it in his chambers. He always carried a genuine Irish blackthorn cane and therefore felt pretty safe. District Attorney Gardiner also said I could stow it in his office as he was accustomed to interviewing tough customers and didn't mind a few snakes. I accepted the generous offer of Coroner Zucca, however, because his office was open day and night and I could get the satchel any time I wished.

When I went back to our editorial rooms and, without thinking of the effect, burst forth with the information to the crowd that they needn't worry as I had found a berth for my satchel at the *coroner's office*, a yell went up that could have been heard on Park Row! Even the stern City Editor joined in the laugh and they never got over it.

When quiet was restored came the voice of the City Editor, who was hunched forward examining some memoranda.

"Ditmars!" he called.

Going over to his desk I waited for instructions. He gave them: "I want you to interview a certain scientist and write a funny story."

"Where shall I find him, sir?"

"At your desk! Write a story about yourself, for Sunday. And put in plenty of snakes!"

## Chapter II

# What Is a Skink?

AS one of my later assignments *The Times* sent me to interview Dr. William T. Hornaday, the Director of a new-born enterprise with the formidable title of The New York Zoological Park.

The journey to the then remote Bronx ended at a cabin, where I was told about future elephant, lion, monkey and reptile houses, deer and buffalo ranges. What I saw were rows of surveying stakes and men digging for a foundation. It all seemed a long way off, but made a good story. The conversation ended with me telling about my snakes. Probably as a result of the "snake talk" I was several weeks later offered a position on the staff of the Park. I accepted with alacrity.

I found the new collection to consist only of a bear cub and a wolf pup. There was also one snapping turtle in a tin bathtub. These were gifts in advance of the buildings. As the Zoological Society had decided to build the reptile house first a fine building went up in a hurry. At once I

proudly presented my entire collection of snakes —to the great relief of my parents.

I now faced a fascinating situation. The Society had plenty of money. Its Director told me to order all the interesting reptiles I could think of. Imagine a boy of twenty-two turned loose on a job like that! I had weighed every dollar in buying specimens for my own collection; but here was the world to write to and a generous fund to cover the costs. Eagerly I dispatched letters to the New and Old World tropics and to scores of animal dealers. There were letters to government agents, explorers, missionaries and captains of steamers touching at remote points.

Meanwhile I went down to the great river swamps of the Savannah and came back with over five hundred pounds of reptiles, with weights of crates deducted; also I brought a fine case of malaria, all my own. Among this series of several hundred reptiles there were twenty distinct kinds. They ranged in size from diamond rattlers to ring snakes no larger than a worm.

Exotic material literally flowed into the Park. One day, after unpacking several cargoes, I proudly telephoned Dr. Hornaday's office and

suggested that he come to the reptile house and look things over. He did, but he was rather appalled at the array of poisonous serpents. Great glass cases along a whole side of the building were given over to them. In a single row was a representative series of the reptilian deviltry of the world. There were cobras, kraits, coral snakes, Australian death adders, bushmasters, buzzing groups of rattlers and specimens of the fer-de-lance. Dr. Hornaday congratulated me, but implored that in the name of heaven I watch those sinuous terrors like a lynx, so that none got away. But I had thought of that awful possibility and from the first schooled my keepers into solemn feeling of their responsibility. In the thirty years of the Park no dangerous serpent has ever escaped.

Today the New York Zoological Park consists of 524 acres of magnificently laid out and wooded land. Our thousands of living specimens are housed in the finest homes and live in the greatest luxury that money and science can devise. Our zoo is one of the finest things of the sort the world has ever seen. Millions of dollars have been expended on its growth and upkeep. More than 2,000,000 people visit it every year. It is de-

signed for a city with a population of 25,000,000!

The institution is founded on what is called the "New York Plan" of developing great public educational institutions on a basis which utilizes to the utmost private philanthropy and the taxpayers' cooperation. And because it promulgates interest and sympathy in the rapidly vanishing wild life of our globe it is one of the sound social activities of modern life.

Naturally, one supposes that the scientific staff of such an institution would follow a routine of strict and scholarly dignity. A good deal of the time we do. But "the sky is the limit" when we don't. For instance, one morning my secretary put her hand over the telephone so that the party at the other end could not hear what she said.

"It's a lady and she insists on speaking to you personally."

I glanced up wearily from the scientific report I was working on which was already overdue. "Is it important?" I asked.

"Must be, judging from the tone."

I took the receiver. Yes, the lady's voice was worried. Mental pictures of a pet monkey in hysterics, a dog with rabies, even a tame bear gone

mad and terrifying a whole neighbourhood, flashed across my mind.

"Please help me, Dr. Ditmars," entreated the voice in my ear. "I hate to bother you. But there is no one else in town."

I thought rapidly. Must be snake bite. This happens to be one of my specialties. I glanced up at the shelf where the serums were kept. My eye swung to the clock. It was nearly noon. The traffic would be bad. I couldn't make a rush without a motor-cycle escort.

"There is absolutely no one else I know," the unhappy voice went on, "who can tell me the name of an animal in five letters that is a reptile and is spelled something like *skunk*, but can't be because a skunk isn't a reptile, and——"

"Hello," I interrupted. "*Hello.* You mean a 'skink'!"

With an involuntary growl of anger I hung up. But my secretary's smile of sympathy took the edge off my indignation. She knew as well as I that it was all in the day's work for the staff of the New York Zoological Park to be the court of last resort for baffled cross-word puzzle workers!

Inquiry about a "skink" is only the mildest sort

of irregularity that may turn up in one of our days. When I come to my office in the morning I face a pile of mail that resembles outwardly the mail of an average business man. There is some work on an expedition or two going into the field for new specimens. Perhaps a dull problem of upkeep has to be handled for one or more of our big collection of wild animals. Then, if not before, the real day begins.

The keeper of the giraffes comes in wearing a worried look and fumbles nervously with his cap. In hurried words he informs me that our finest specimen is going to die if we don't do something in a hurry. The keeper has done what he could.

Somewhat puzzled at just what is the matter I permit myself to be led out to the giraffe enclosures. Sure enough old Long-Neck does look a little pale and droopy.

"It's that column," says the keeper, pointing to a piece of decorative iron-work far above our heads in the wall of the cage. "He keeps on licking the paint off it and he's getting poisoned."

Not being sure of the dietetic effect of paint on the stomach of a giraffe I agree that we must put

an end to the practice at once. We send for the carpenter. After a council of war we design a special net that will gently but firmly prevent Mr. Giraffe from commiting suicide.

Through a branch telephone, I am hurriedly recalled to my office. I find there one of our men whom I have sent out a few hours before to pick up a raccoon which had been donated to us by some public spirited citizen. At least that's what I understood from the cryptic message I had received.

From a fiber packing case on the floor of my office suddenly comes a startling series of snorts and snarls. The case trembles, jumps a few inches into the air, and presently falls on its side as if it were possessed by the devil. In fact it is possessed by a devil of a wild beast which is protesting in no uncertain terms at its imprisonment.

"Well, I did what you said to do," the man tells me, glaring balefully first at the packing case and then at me.

I feel guilty. But quick reflection convinces me that whatever has happened isn't my fault. It is our duty to respond to authentic public calls. After all, the taxpayer is our patron.

"You went to the address they gave us," I begin tentatively.

"I sure did," exploded the man. "And what do you think it was?"

"A private house?" I murmur, remembering that a substantial proportion of our worst troubles came from the most innocent sources.

"Private nothing! It was an undertaker's shop!"

A fresh outburst of jumps and growls come from the packing case. Making sure that the unruly prisoner can not break out, we push him through the door so that we can talk.

"And where do you think this wildcat was? I mean this 'coon with a wildcat's disposition." Before I can make any guesses my informant answers his own question. "He was in a coffin! A coffin, mind you. A *coffin*!"

It is a startling and unique case. My impulse is to take my pencil and make notes, heading the situation with a caption something like: "Raccoon found with dead body." But as the facts come out I begin to see light. What had really happened was that when my man got to the undertaking parlours he was directed into the cellar.

He entered in some trepidation. By a dim light he saw a lot of big boxes that were not coffins, but coffin "containers." Out of one of these was peeping the sly face of a terrified raccoon.

I infer that the boxes had been cut and assembled at the sawmill. A nomadic 'coon chanced by just before shipping time and took up his residence in the box. Before he knew what happened he was nailed up and on his way to New York. My man took quick measure of the situation and borrowed a pair of leather mittens from a hearse driver who was in the small audience back of him. He then went up and courageously grabbed the 'coon by the scruff of the neck and finally got him as far as my office.

Scarcely have I got rid of the raccoon and his ruffled chaperone when I am visited by a delegation from the Elephant House. Ever since the days of our Indian elephant I have felt a chill of apprehension whenever this particular group of keepers brings trouble to my door. This visit is no exception. As many New Yorkers may remember, Gunda was our first Indian elephant. We got him direct from Assam in 1904. For some years he was a model pachyderm, cheerful and

obedient and seemed to enjoy his surroundings. Suddenly he was seized with a homicidal mania, whether it was purely a mental state, or whether some obscure elephant disease was torturing him within, we never found out. But there was no secret about his insane desire to kill men. After several dramatic encounters we decided that it wasn't safe to keep this elephant any longer. So we sent for Carl Akeley, the great African explorer, and he so skilfully sent a steel-jacketed bullet into the brain that the unfortunate beast died instantly.

However, on the morning of which I write the case proves less pressing. It appears that the elephants have made up their minds not to eat. Knowing the delicate sensibilities of these curious animals I at once decide that the trouble is as likely to be mental as physical. Accompanied by the plaints of the keepers I inspect the Elephant House to see if there is anything that could be depressing its inmates to the degree of making them lose their appetites. But I find the huge structure clean and well-lighted as usual, and the general atmosphere serene enough to please the most temperamental animal.

"Let me see the hay," I ask. Hay is the staple diet for all our elephants.

"A new batch just came in," is the grumbling reply. The speaker's tone means: "These blamed elephants are just too danged particular. They must have been spoiled before I came here!"

The fact that it is a new batch gives me my clue. I check and find that the brand is exactly the same as the last brand; and that to the eye the quality of the shipment is the same.

"We went to all the trouble of unloading it," continues the keeper, "and piling it up in the feed room. A whole half day's work."

"But it isn't the unloading and piling that gives food its flavour," I interject, as pleasantly as I can.

The keeper looks at me as if to say that a big lummox like an elephant shouldn't care what his food tastes like.

As a matter of fact, I know that an elephant is very finicky; and that if the hay hasn't exactly the right shade of taste to the elephant's palate he won't touch it. Moreover, since one elephant represents a big bank item in our zoological assets we cannot afford to take any chances. I smell

the new hay. By experience I know it is sweet and wholesome. But I at once detect a foreign odour in it which means that there has been harvested at the same time some weed the taste of which our elephants don't like. Many such weeds or grasses may grow along with the timothy or clover in a meadow. Some things grow faster one season than another. Again, winds may blow from different directions in different years in the period just preceding planting season. As a result, the same meadow may be seeded with different "aliens" from year to year without the farmer knowing anything about it.

Naturally the feed company who supply us are indignant when they hear the elephants won't eat their hay. They are inclined to blame us for being weak and imposed upon by our dumb charges. But if they could only see the wicked glares we receive from the hippos as well as the elephants they would have had a change of heart. The upshot of the incident is that I personally get a truck and have all the hay taken to another part of the Park and fed to animals with less discriminating tastes. Another rush load is ordered for the elephants. By suppertime they are con-

tentedly munching away, but they exchange knowing looks when I appear.

I have often thought that I should organize a riot squad among the keepers. Not for the public, for our human visitors are admirably well-behaved; but for some of our more pugnacious inmates. Curiously enough, those animals which are intrinsically most dangerous, such as the lion and tiger, usually give us the least amount of trouble. There are two prime reasons for this. First, such beasts are particularly well caged and cannot ordinarily do any damage; second, I think they have sense enough not to stir up trouble on slight pretext since they realize it won't get them anywhere.

Take the elk as an example of the opposite kind of temperament. Elk are beautiful animals and seem gentle and kindly in captivity. Yet it was not out of the ordinary last year when our best male specimen began to treat his wife with vicious cruelty. He beat her and insulted her in every way at his command. With his splendid set of antlers there was always danger that he do her permanent damage. The Keeper had to watch the pair closely and several times we made up

our minds to bring divorce proceedings in favour of Mrs. Elk. However, we hesitated because we wanted the family line to continue and because we knew that the male would soon shed his antlers, as all deer do periodically.

Sure enough, when nature removed the armament that gave Mr. Elk such an advantage over his spouse, he calmed down considerably. He still eyed his lady with uncooled rancour, but he made no attempt to bully her. Probably he knew that she was near enough his own weight and strength to give him a good tussle if he started anything. A few days later one of the Keepers rushed into my office with his face working and his arms waving. As this was a usual sight for me, and meant anything from a new baby in the hippopotamus family to a riot in the bear cage, I grabbed my hat and prepared to follow to the scene of trouble.

"She's killin' him! She's killin' him!" were the only words that I could distinguish among the Keeper's excited explanation.

Who "she" was I didn't know; but the fact that it was a "she" did lift my curiosity beyond my apprehension.

"She" turned out to be no other than the much-abused Mrs. Elk. When I reached the elk enclosure it was smoky with the dust that the pair were kicking up. The lady was getting her revenge at last. Mr. Elk was beating an ignominious retreat around and around his small front yard. Whenever Mrs. Elk overtook her mate she reared on her hind legs and beat him unmercifully. Gene Tunney himself couldn't have shown a finer boxing form than she had. And so effective were her blows that we had quickly to rescue the humiliated Mr. Elk and put him in another enclosure to save his life!

We had just settled this domestic contretemps when we heard from the direction of the Monkey House, a clattering rumpus which at once suggested that several of our largest baboons had escaped from their cages and were settling old scores by throwing ash-cans at one another. It was incredible that such a racket could be made by anything less than several animals armed with something approaching a tin-roof apiece.

Those of us who had been both divorce judge and jury for the Elk family scurried away in the direction from which the clattering came. As we

arrived all was peaceful. The little fellows were chasing each other up over the swings and braces and others were sunning themselves or were busy "picking" one another. The clatter had absolutely ceased. We examined the enclosures carefully. Nothing seemed to be wrong. I went personally to look at Koko, our big orang-outan who is something of a clown. But he only blinked at me stupidly as he sat with his hands behind and under him. As I turned away from Koko the clatter suddenly rang in my ears with a loud fury that made me jump at least a foot in the air. It wouldn't have surprised me if the whole skylight had suddenly tumbled in and landed with a crash at my feet.

I whirled on Koko. "Did you do that—you *devil*?" I yelled at him. He still sat there staring and blinking. But I thought I detected a wicked gleam in his little black eyes. I stepped closer to the cage. Koko did not move. I peered first to one side of him and then to the other. As he was still sitting on his hands I suspected that he might be hiding something from me.

"*What is it?*" I shouted so suddenly that I startled him into jumping up and whisking on

three limbs across the cage. Something clattered familiarly as he ran. It was a long strip of sheet metal which he grasped.

I then saw what had happened. Koko had managed to yank out of its holder the big metal label, fourteen by eighteen inches, which was fitted in the front of his cage. On it was written his description for the benefit of visitors. Perhaps this description displeased Koko, for he had banged the label back and forth across the steel bars until the words were literally hammered off. When I had rescued the label I sent it to the repair shop while I returned to my office to catch up with my morning mail.

The first letter I picked up was from a New Yorker whose grandmother had immigrated here from Russia. The gist of it was:

Dear Dr. Ditmars:

I have been suffering of late from rheumatism. The physician does not do me any good with his medicine. Now I want you to help me. My grandmother cured her rheumatism with a medicine she made by boiling the hair from the neck of a Russian stag which her brother killed at home. If you have such an animal will you please help a suffering man by sending me some of its hair?

Well, it wasn't a question of sympathy or of having a Russian stag in our collection. My correspondent was safe on both points. But since our regulations prevent putting specimens in any way physically at the disposal of the public, I had to say no.

Such requests are not at all rare and several like it are in my mail this morning. There are plenty of superstitious people left in this so-called material age and a goodly lot of their beliefs are tied up with animals. Such beliefs are inherited from our savage ancestors or have been originated through the white man's contact with Indians and other aborigines.

As an example of this, the East African natives attach considerable importance to the hair in the tails of elephants and of giraffes. So it is not extraordinary for me to find requests in my mail for such hairs for the purpose of making "good luck rings." The elephant's tail-hair is often used because it is very strong and is nearly an eighth of an inch thick.

Many queries come to me for advice about unusual pets. It is really surprising how many people who have seafaring or much-travelled

friends acquire a small menagerie of their own. A monkey and a parrot are a widespread combination. Even baby bears, wolves, wild-cats and other undomestic creatures find their way into private families.

"What shall I do about my poor little monkey which is paralyzed?" is a very common plaint.

In such a case I am sorrier for the pet than I am for the owner. For it shows a pitifully ignorant love for the animal, a love that has overrun into improper diet and living conditions. Lack of sunshine and bone-nourishing food is usually the cause of the trouble.

"My bear is disturbing the whole neighbourhood every night," complains another owner. "What shall I do with it?"

Investigation shows that the animal came into the family as a cub. While it was a little fellow it was brought into the house every night and fondled like a child. But when, to the dismay of the family, the pet grew out of all proportions to a civilized living-room it had to be kept in the back-yard. Naturally, when the bear missed its cuddling it began to complain, querulously at first, and then with deep-throated bawling that

was finally brought to the attention of the police.

Our duty is to intervene as far as we can, both with advice and with help. We point out that what at first may be just a nuisance may easily become a peril. A monkey reared to maturity, which is rare by the way, becomes jealous and dangerous, considering a neighbour's handshake a signal to attack. A leopard that was a cute ball of soft fur at the age of a few months, grows both powerful and treacherous in the passage of a year.

There are letters seeking information about fur farming. Some want nothing more than assurance about breeding such rare animals as chinchillas, for instance, in mere rabbit coops. Queries about the heights and weights of animals like elephants and giraffes, may come from writers of fiction who want to work such a creature into a tale and play safe from criticism. But a similar query may be from a railroad office wanting to know whether to provide a standard or a furniture car for transporting an oversize passenger.

I remember an elderly lady writing me to this effect: "I have a beautiful estate, and am trying to keep it old-fashioned. In my girlhood one of the things that appealed to me was the singing of

the katydids. Wouldn't it be possible to establish these little insects on my place so that I could have their good old-fashioned music?"

Alligators and chameleons seem to worry their owners almost more than any other animals. The former get thoroughly numb by the dropping of house temperature at night. Also they won't eat at all in winter.

The only thing I can do is to suggest maintaining a temperature of about 70 degrees in the vicinity of the alligator tank or pan. But in so doing I have a guilty feeling that I may be altering the laudable habit in many families of sleeping with bedroom windows open at night.

Feeding the chameleon is a more difficult problem to advise about. The most practical insect food obtainable for them, though I won't say the best, is what are called "mealworms." These are kept in stock by many of the larger bird and pet shops.

"But I can't buy any in my town," comes in the next mail in reply to my advice about mealworms. "Isn't there something else I can use?"

Yes, madam, there is: and I forthwith write her to give the starving chameleon some cock-

roaches which, I know, it will devour with gusto. Madam is shocked. Indeed, to think that she is the kind who has cockroaches in her house! And more—implying that just because I may have cockroaches in my home I needn't think other people tolerate such things.

"Dear madam:" I reply, "I am sorry you construed my letter the way you did. What I would suggest is that you take a cockroach trap to a small all-night restaurant and ask the proprietor to let you set it. If you explain that your pet is starving I feel sure that he will not be offended. And I feel equally sure that, if you hurry, your chameleon will not die of hunger."

All this may seem very trivial in contrast to the expense and dignity of our institution. But I have been answering such letters for thirty years and could not bring myself to be annoyed by them. After all, we are at the park to elucidate the ways of beasts and birds by properly exhibiting them and answering questions about their lives and habits.

There are always plenty of questions in our open hours. Old Jake Cook, the veteran keeper of the monkey house in the Central Park

Menagerie, got desperate some years ago over the way people pestered him for information. This led him to take his lunch and enjoy his holidays in a near-by cemetery, "where nary a person can ask me any fool questions," he explained.

Part of my routine work is extracting the poison from snakes. One day I work with rattlers, on another with copperheads. The idea is to provide venom for assistance in the preparation of snake-bite serum, now being made available all over the country.

All you have to do, to succeed in this ticklish job, is to press the snake's head down with a notched stick, and then grasp him firmly by the neck. The head keeper prepares a glass tumbler with a parchment tied over its top. You apply the serpent's jaws to the parchment; he bites, sending his fangs through, and several drops of amber poison fall into the glass. A scientific friend with whom I am working needs cobra poison, which is even more dangerous to get than the others.

Right in the middle of the poison job the telephone rings and word comes that a new bear has arrived. This may sound simple and indicate

nothing more than turning the newcomer into one of the dens. But the transfer of a bear is fraught with serious consequences unless the greatest care is taken. It has been my privilege to invent a special apparatus for safely doing the job.

When I get back to my office I find a rising young scientist with a flashlight and extra batteries.

"There are interesting data," he begins, clearing his throat impressively, "to be found by testing the eye reflex of wild animals. It is my wish, Dr. Ditmars, to hold my light up to the eyes of different animals and time the contraction of their pupils."

He hands me a list, which contains specimens like the leopard, chimpanzee, buffalo, gnu and crocodile. It is useless to go into the details of the danger, but I feel it my duty to lay the facts before him. I am tired by now and, for the moment, have no great zest for investigation. What I really need is a rest.

At this moment comes suddenly the familiar jangle of the telephone and my secretary presently turns to me with the old story that only I can satisfy the person at the other end.

"Another cross-word puzzle?" I ask with a wry smile.

The secretary shakes her head. "No, I wish it were," she says. "It's a family over in Washington Heights who opened a bunch of bananas in the house and a big tarantula jumped out. They've pretty nearly torn the apartment to pieces trying to find it. They want you to come right over and tell them what to do next!"

## Chapter III

# Live Baggage

PROBABLY because of my boyhood snake adventures the Reptile House interested me most in the early days of developing the Zoo. In a relatively short space of time I had this department well stocked. There was left for me to secure only some big pythons.

We expected a shipment of these on one of the Castle Liners, making regular runs between East Indian ports and New York. They were fine big freighters, of eight or ten thousand gross tons and with bridges looming to the fourth story of the warehouses. Such a ship was the captain's home and his quarters were as commodious as any suburban living room. Indeed, some of the captain's furnishings approached the luxurious, the tables and chairs being of teak inlaid with pearl, picked up at China ports.

It was a ship of this type that brought one of our largest pythons—twenty-four feet long. The captain had invested in a batch of animals and, on arrival, lost no time telling me about his vari-

ous troubles, including losses. A tapir and young elephant had died at sea. He declared he would barely break even if everything were sold.

When I went below it was necessary to watch sharp. There were cages of leopards and black panthers, the latter a black variety of the leopard; golden cats, binturongs, civets and monkeys. Going down the aisle of cages one was greeted with growls, snorts and hisses. Sinuous paws flashed and reached. If one instinctively recoiled from a snarling face with glowing green eyes, one was liable to back up into something equally bad.

The great python I was after was coiled in a teakwood box four feet square. While the serpent hadn't eaten for months, a drop-light showed its skin glowing with healthy iridescence and while I looked it expectantly raised a head as big as that of a terrier dog. There were several others almost as big.

We made a deal for the whole outfit and, over a dinner of curry, heard the captain's story of his long trip. He had had a number of Lascars in the crew and this swarthy contingent had been pretty nervous about the animals—particularly the snakes. One day a young Englishman had

forgotten to replace a pin in the hasp of the smaller python's box and on a morning's inspection the box was found to be empty! The specimen was ten feet long. News travels aboard a long-voyage ship and soon every hand from the firerooms to the captain's steward knew about the snake's escape. The Lascars were alert and jumpy. They dodged dark corners and huddled when they could, for they were high-strung enough to jump overboard if they saw the snake.

The ship had been running for two days through oil-smooth waters of the Mediterranean and one of the officers thought he could relieve the tension by telling a white lie. He passed the word that he had heard a big splash over the side the night before. This rumour quickly swept the steamer and helped a little, but not much. There was suspicion about certain officers prowling and peeking.

A day or so later the captain was on the bridge. Two officers stood by him. Beneath them was a group of Lascars painting the deck, and some stokers who had come up to cool off. Forward and ahead of the winches was a cave-like projection sheltering an iron stairway, its doors fastened

back. *Slowly issuing from this cave to the sunny deck were about six feet of python!*

Orders came smartly, but softly: "Mr. Armstrong," snapped the captain, "go to the deck and talk to those men. Keep their backs to that snake. Mr. Gray, go below and work forward. Get that damned thing by the tail and yank it out of sight—and hold on to it! I'll join you."

Flashing a glance over a clear sea, the captain left the grinning quartermaster at the wheel. Endeavouring to appear casual he made his way below and caught up to Gray who was not galloping to the job. They arrived in time to find a couple of feet of tail still within the stairway. Gray gritted his teeth, took hold and yanked with the strength of his two hunded pounds. Gray and the python poured downward upon the captain and the avalanche continued to the bottom of the stairs! Flying arms, legs and serpent produced the effect of an octopus gone mad. But in the melée the captain managed to slip off his white coat, throw it over the snake's head and grasp its neck. It was a tussle to carry the heavy creature back to its box.

The largest python from that ship wouldn't eat

when we got her to the Zoo. We had named her Fatima, and in length and bulk she was probably the largest serpent ever exhibited in the United States. Figuring that she had been a couple of months in the Chinese animal dealer's shop in Singapore and about three months on shipboard, the month at the Park made a total of *half a year's fast!* I was worried and decided to give her a meal by force.

The meal was composed of four, large freshly killed rabbits, all skinned and tied in a continuous string. A twelve-foot bamboo pole was inserted in the skull of the leading rabbit. My plan was for ten husky men to hold the serpent in a fairly straight line. It wasn't so easy to get volunteers, but the head-keeper got an assortment of mechanics, plumbers and a few mammal keepers who were willing to help. Instructions were simple. The head-keeper was to throw a blanket over the creature's head and grasp her by the neck. He could then yank her towards him, and, as she was raised from the ground, each man was to jump in and grasp every two feet of python.

The head-keeper made his plunge and the men jumped in as directed. She made them stagger,

but they kept her straight while I tapped her on the nose. Her mouth flew open and I started the rabbits down her throat like loading a muzzle-loading cannon. When nothing but the end of the pole protruded I concluded that the rabbits must be somewhere in the neighbourhood of the stomach. So I told the last man who had felt the meal slide past him to hug his section of the snake. This enabled me to pull the pole out and leave the rabbits in approximately the proper place.

We kept this up for six months at intervals of two weeks. The python thrived. She took on girth and a fine bloom shone on her mottled skin; but she still stubbornly refused to eat of her own accord.

There was a pig raising establishment not far from the Park and defective specimens were killed and sent to me. If no python was hungry the meal was carved up and fed to the big alligators. Just after one of these pigs had been offered Fatima and she turned up her nose at it, an idea flashed through my mind.

Going down to the corrals, I picked up a piece of cotton-waste and went in with a pet peccary,

a Mexican wild pig. This animal has an oil gland on its back. On squeezing the gland there squirts out a jet of fluid with a gamey odour.

I saturated the small piece of waste with the fluid, rubbed the dead pig with it and tried Fatima again. It woke her up. She swallowed the pig and strangely enough fed at regular intervals thereafter without special inducement!

My own first trip to bring home a varied collection of animals was a fairly extensive one, although I didn't capture anything. It was just a purchasing trip in Europe and I had selected one of the leisurely moving Atlantic-Transport ships for my return. At the time this line had accommodations one deck down for horses so I was able to secure a generous allowance of this area for my forty cages.

I had a mixed shipment of particularly interesting mammals, birds and reptiles. I broke in two of the ship's hostlers to assist me in cleaning the cages which was the regular morning's job. The hostlers brought me the food from the refrigerators in the afternoon and I attended to the feeding myself. It took us three hours for cleaning and two hours to feed. Between changing clothes

and taking baths I had a little time on deck with the passengers, which included about two dozen theatrical people, a wealthy lady who liked a slow ship, and a few others. The captain sternly told me he didn't like the looks of some of my specimens and was emphatic in saying I must use the greatest care to have nothing escape.

Some of the cages had come down from London at the last moment on a motor lorry. At the time I had noticed that the cage hasps were closed by an abomination used among some animal dealers —a split ring. You never know when these things are right. Most of them have been strained open and you can't detect whether they are turned to a safety position or not. I had spoken to one of the hostlers who had promised to get me a batch of snap hooks from his junk box.

The shore had faded and it was breezing up. The ship had started to roll. It looked as if we were running into a storm and since the cages were in general disorder from being hastily lowered through the hatches, we not only had the job of placing them in neat rows for the voyage, but of lashing everything to prevent shifting and upsetting.

One of my hostlers would have made an excellent keeper. He took to the job as a duck does to water, and knew just how to keep out of reach of the snarling and clawing things. Things soon looked shipshape. We made two parallel alleys of the larger cages, the central portion composed of crates placed back to back. This enabled us to take long boards and nail the cages together in large units, a good protection against shifting. We fastened these units against the metal uprights.

Suddenly, amid the bang of hammers, I heard an exclamation. Two big mangabey monkeys were sitting on the top of their cage. The rogues had reached out and had turned the split ring on their door. These particular monkeys have gray bodies, fiery red heads and white eyelids. They look like clowns—and act like them.

"Get hold of a tail," I shouted to George North, the veteran hostler. We both made a break and reached for the tails. But just then both monkeys made leaps over our heads and galloped up a long passage dimly lit by heavily basketed lamps. We dashed after them and they ascended a stairway to the passenger deck. A few

passengers fled while some laughed. We tried to chase the monkeys into a cabin. But they were too crafty. Before we could overtake them the imps had ascended to the boat deck and had dashed towards the bridge.

"Holy smokes!" groaned George.

There was reason for his wail. There on the bridge was the captain, gleaming in formal gold braid. I can still remember his stern demeanour, with firmly planted feet and the stiff wind flapping his trousers against his legs. But the monkeys were not impressed. While we stopped, they didn't. They galloped straight on past the captain, in one side of the steering room and out the other, past us again, down the stairway and forward on the passenger deck!

We followed in hot pursuit and North ducked through a passage across the deck to head them off at the forward crossover. But they weren't to be caught in that way. They went down a narrow stair to the main deck, with North and I literally sliding after them. We chased them between capstans and winches. A tail slipped through my hand when a rubber heel slid on the wet deck and my knee banged against a winch.

Meanwhile the ship was booming through a cross swell, with spray coming over the bow and the wind so strong one could almost lean on it. The monkey whose tail I grasped gave a screech and ran for the mast. There was an iron ladder leading to the crow's-nest and up he went, the other following. And they continued up, stopping only at the giddy level of the wireless crossarm where their tails stood straight out in the gale. The mast was sweeping an arc across the sky as the vessel rolled. Looking up to the bridge I again noticed the blue and gold of the captain's uniform.

"What are you going to do?" gasped George North.

"Leave them there to think it over." I retorted breathlessly. "They were shipped last night from London and haven't had anything to eat all day. Just before dark we'll show them a fine bunch of bananas."

Here was trouble enough and to add to it I had a horribly serious grease spot on the only trousers I had ever had made by a genuine English tailor! The splotch had come from contact with that smeariest of all mechanisms, the gears of a ship's winch.

I hunted up a steward at once and told him to convey my compliments to the captain and say I had decided to leave the monkeys where they were for the present, but hoped to have them in their cage before dark.

"The Old Man may come down here and raise a riot," said George, as we finished the lashings and found enough snap hooks to replace the rings. But he didn't.

We fed and watered the outfit and the afternoon wore away. One of the crew reported that the monkeys were staying near the wireless pulley. We went up to take a look at them. It was a bleak roost. The mast swung against a curtain of dirty, racing clouds. An incipient geyser rose frequently from the windward side of the bow wash and streamed over the deck. This seemed to be a good time for coaxing. George suggested that he make the trial as he didn't mind the flying water while he had his dungarees on.

I opened a door leading to a passageway from the steel deck. Midway down this was a stairway leading to the horse-deck level and not far from my cages. There was also a room nearby. I put the monkey cage in this room and tied a long cord

to the door handle. George was to try to lure them down the passage, then throw his bananas into the room. I hid behind a crate, holding the cord.

A most attractive bunch of bananas had been selected from the abundant food I had sent aboard. This had been sent up to George. It was to be very grandly handed to him in order to make a show of the fruit. Then he was to eat one, possibly a second, and walk off with the bananas into the passage, down the stair and past the room.

While I waited, thinking most frequently of the captain, George carried out the pantomime.

A few minutes later I saw a sight that gladdened me. Coming down the dim passage was the silhouette of George North, and immediately behind him the silhouettes of two monkeys! And, wonder of wonders, they were almost hanging on George's coat-tails! He walked into the room with each of them reaching to him in entreaty for the golden fruit. I was so astonished I didn't even pull the string on the door. George shoved two bananas into the cage and the monkeys crowded in. More bananas were shoved in and

the clownish faces became distorted by enormously swelling cheek pouches. We put a snap hook on the hasp.

The next morning at breakfast the captain came over to my table. This was the dreaded moment. I endeavoured to appear calm in receiving the scolding.

"I have been down to see your cages and like the way you have placed and braced them," he began.

A smile glinted in his eye. Then he chuckled, slapped a hand on the table and broke into a laugh. The laugh developed until he shed several tears.

"If that was a rehearsed maneuver to capture those monkeys," he exclaimed, "it certainly made a hit with me! I saw it all from the bridge. Your man received the bananas from one of the crew as if going through a ceremony. He laid them on a capstan and ate about ten of them. He ate them so fast I thought he was swallowing the skins. No hungry monkey in the world could endure such a spectacle. They nearly fell off the mast to join him!"

This friendly greeting made me feel very happy

for about two minutes, when I returned to the sad realization that the rolling of the vessel was too much for anyone but a seasoned sailor. My breakfast had consisted largely of coffee. It made me ponder in sad envy to watch the captain's genial face and fine colour as he swung out of the dining room.

We rolled all morning. Amid the strong odour of my charges I miserably directed George and his helper as they cleaned the cages. By occasionally running over to a port and unscrewing it and getting the blast of wind in my face I would feel better for a few minutes, although George cautioned me that if a swell ran up to the port level I would be knocked flat.

Afternoon feeding time arrived. The rolling was worse than the morning, but feeding was a personal job and had to be performed to the bitter end. People have asked me if animals ever get seasick. I can answer that there wasn't one in that outfit that didn't eat with relish. I had almost hoped to see a few animals with which I could sympathize, but there was none! It was a case of full rations along every line of cages.

In the midst of things, while I was feeling

worst, the wealthy elderly lady who liked a slow ship came down to see the collection!

She was as much at home on the heaving decks as a viking. She fairly bristled with questions. Why weren't the animals seasick? What was I giving them as a special diet? What did the penguins cost? Did they always stand and could they sit down? Why did the Tasmanian devil look like a dog? I did my best to make my replies interesting but didn't succeed very well.

Next day broke with a clearing breeze from the opposite quarter and a flattening sea. It was lovely weather and I got permission from the captain to have the main hatch lifted and slid back a good ten feet. The sun streamed to the cages. Under such conditions animals do exceptionally well at sea. From then on the voyage was uneventful. A few hours outside Ambrose Light the Associated Press sent me a wireless: "Are you bringing many animals?"

I was right in the midst of boarding up cage-fronts, fastening protective mesh over openings where a dangerous paw might be flashed through; in fact, getting the cages ready for the excitement of the dock and prying curiosity seekers who often

find trouble if one leaves a loophole. I wrote the answer hurriedly and sent it to the wireless room: "Fine series of rare mammals, birds, reptiles."

The boy had barely left with the message when I realized that it was a rather tepid answer to an interested query and contained little inducement for anybody to meet the ship and write up something of this really fine series for the Park. My old newspaper instinct asserted itself. There was no news in that message. Telling George I would be back in a few minutes I ran upstairs. The wireless operator was busy, but he swung around in a minute.

"Did my message go?" I asked him.

"Not yet, Sir. Couple more to go. I'll have it off in ten minutes. Any addition?"

He gave me the slip and I amended it: "Fine series of rare mammals, birds, reptiles—and a Tasmanian devil."

The Tasmanian devil doesn't look like much. It is a dog-like marsupial, not larger than a toy Boston terrier, but its head is incongruously large and its jaws prodigiously strong. I said that it doesn't look like much, but it has the kind of a name a newspaper man likes to liven up a story.

In consequence the press gang met me with a tug at quarantine. Cameras clicked all the way to the dock and there followed good stories about Tasmanian devils in papers all over the country.

## Chapter IV

# Some Fish Climb Trees

TASMANIAN devils weren't the only strange creatures that crossed my horizon as I got deeper and deeper into the animal business. Trips for specimens, the lure of watching wild things and the study of smaller types in a laboratory at home, piled up a number of notes showing that truth may be stranger than the many fallacies about animal life. For instance, I found out that there is a fish that actually climbs trees; a frog so big that it can swallow a rat; a snake that soars like a bird; an ant that runs a dairy; an animal that always walks upside down!

Some of these creatures are on hand in any well-equipped zoo. Others can be found in the form of mounted specimens in many museums. Others are in the laboratories of investigators. Then there are photographs, moving and still, to confirm their startling performances.

There are several species of fish capable of climbing out of the water. One of these, the gurnard, is found in the fresh waters of the East

Indies and is about the size and shape of a small sculpin. It has three finger-like projections in the front of its breast fins by which it is able to drag its body along. The movement of the fins is alternate, giving the fish a firm steady gait like that of an old man determined not to let age conquer him. These climbing fish don't hesitate to come right out of the water and prowl around the branches of dead trees which dip down from the banks. In this fashion they can cross from one pond or river to another.

A related species that has always amused me in the observation tank is the so-called "archer fish." It hunts its prey in the same fashion a school-boy pesters his playmate in the old swimming hole: taking a large mouthful of water the fish swims along and squirts it with deadly aim. Its marksmanship may be judged from the fact that by this method it brings down small flies and other insects sunning themselves on green leaves overhead. The archer fish has been known to knock a spider out of its web several feet above the water.

Most people picture a small fish as a rather stupid, helpless creature completely at the fisherman's mercy. But I think the 18-inch pirahna

of the Amazon and Orinoco would make a ferocious wild-cat seem tame by comparison. There are many tragic cases of cattle wading into the river during hot weather only to be disemboweled by the bloodthirsty pirahna. I know of a lady who thoughtlessly trailed her hand in the cool water while being paddled by a native who should have warned her of the danger. Suddenly she felt what she thought was the blow of a club. Jerking her hand upwards she was horrified to see a pirahna dangling from it. The next instant the fish dropped off carrying with it two joints of the lady's middle finger.

More canny than the archer fish and subtler than the pirahna is a common species found in European waters known as the "fishing frog." Unlike most fish it is far too slow in movement to overtake the prey its diet demands. It survives by one of the strangest performances of any sea animal. In the first place, its body blends perfectly with the ocean bottom, being decorated with thin filaments that look exactly like seaweed. Then it has an enormous mouth that can be closed as quick as a flash. Over this mouth the fish hangs a long stalk-like arm on the end of which

grows a small irregular piece of cartilage. This arm is nothing more or less than a *fishing-pole* and the cartilage does as *bait*. What happens is that when the fishing frog is hungry it sits on the bottom of the sea with its mouth wide open. It swings its bait in front. A small fish swims by, sees a gaping hole in the sand with what appears to be a morsel of food floating near the entrance. The small fish makes a dash for the food, the hole closes with a snap and the fishing frog swallows its meal!

The frog I referred to earlier as being large enough to swallow a rat is a real frog found in the Cameroons along the equatorial belt of West Africa. Some specimens attain a weight of over five pounds and, when stewed native style, make a meal for a whole family.

Flying snakes are found on some islands of Malaysia. Let me give you a hovering humming bird's eye view of the creature. The snake is about two feet long. It is resting quietly, far out on the horizontal branch of a huge tree. A hundred feet below lies the tangled mass of tropical jungle, alive with buzzing insect life. Fragrance of exotic flowers is wafted upward in the torpid air.

The snake is awaiting its meal of raw lizard. The little lizards on which it lives are forever restless. They, in turn, live on insects which they chase about interminably. The snake, lying motionless and nearly identical in colour and form with the supporting branch, is invisible to the lizards. One comes near him. He makes a quick dart, wiggles his jaws in the curious engulfing process of a snake, and the unfortunate lizard has disappeared.

When the insect life on one tree diminishes the lizards scamper on to another—followed by the flying snake. Partly due to laziness, and partly because the trunk may be alive with fearless "fire ants," he prefers to avoid the long journey down to the ground and up another tree. Nature has taught him a short cut. First he flattens his cylindrical body against the branch. He does this by rolling forward his hundred-odd slender crescentic ribs. In a few seconds he looks as if he had been run over by a steam roller! Then he gently slides off.

In effect, he doesn't fly but glides. He sails through the air like a toy airplane. To an observer from the ground it looks as if an extremely

elongated, swordlike, dead leaf had broken off and slithered down almost parallel to the ground. His aim is good. He does not collide with useless branches. Many yards away he checks his speed by curving upward the front end of his body, much the same way as an air pilot would use his elevators. With a soft thud he lands on the solid branch of a distant tree and by a short climb can attain his original elevation.

Ants have long been known as among the most highly organized animals so far as their communal life is concerned. Their military and foraging operations, their buried cities, their efficiency in ant labour, all set them apart from larger animal forms which tend to live in more limited croups.

Most people look on ants with disgust because the little insects appear parasitic. And the common belief is that the ant world is only a blind mechanism motivated by instinct. But in some ways ants show an order and system that suggest something closely akin to human intelligence.

For instance, there are types of delicate plant lice known as *aphids*. These lice secrete a fluid that is as healthful and appetizing to an ant as sweet cow's milk is to you or me. Now if ants

were only savage creatures blindly seeking food they would certainly kill all aphids that crossed their path and, having drunk their fill, pass on. But not so. Ants herd aphids just as men herd cows: collect them in groups on green branches where the aphids can "chew their cud," so to speak, in shady repose. When these branchy pastures become poor feeding grounds the ants transfer their charges or dairy stock to other branches with softer stems!

The animal that always walks upside down is the sloth, a small hairy denizen of tropical America that looks like a cross between a monkey and a bear. Poor fellow, he hasn't strength enough in his legs to support his weight. So all his locomotion has to be in a hanging position—*head down!* But since he is almost the stupidest animal the Creator ever made he doesn't seem to care.

A sloth's courtship has its difficulties. For not only is he compelled to woo his lady friend upside-down, but nature has made it impossible for him to move with any agility. A sloth's caress looks like the slow motion picture of a man reaching for a glass of water. While his round, dull, star-

ing eyes gaze off into space, his three-clawed paw drifts slowly out in the direction of his love.

The trouble is that the lady in the case is just as dumb as her beau. Thought of his romantic aspirations may finally penetrate her flabby brain, but thought of food is likely to come first. Just as the affectionate paw starts toward her she concludes she'd better shift outward along the limb from which they hang. She, too, makes slow movies of her humble aspirations. A whole minute passes as she takes a single step by shifting grips, hand-over-hand.

The slow caress now reaches its goal—or at least where its goal was a little while before. In a wide sweep the hairy arm carries on through space. Its owner's eyes now lower until they rest on the empty claws. For a long while he stares, unblinking and unsurprised despite his failure. Perhaps his opaque slothy brain wonders what he meant to do in the first place. Then he, too, moves slowly on, hand-over-hand, toward the nearest food.

The sloth's walking upside-down is by no means the only curious form of animal locomotion in nature. The average visitor to a zoological

park or menagerie may not notice the difference between the "walking" of a seal and that of a sea-lion. Yet the seal is handicapped on land by having its hinder pair of flippers permanently pointed backward; while the sea-lion (walrus, too) bends his rear flippers forward, giving him a useful pair of hind feet. As a result the sea-lion and walrus can move in a sort of undulating gallop on the shore, while the poor seal can only drag himself along by his front flippers.

Most of us are familiar with the fact that clawed carnivories, such as cats and dogs and lions, have five toes on their paws just as man has five fingers; and that in horses the five toes are combined in one which is covered by a hard shell, called the hoof. But few city dwellers know that deer and cattle have two toes, or that some animals walk on their toes instead of the soles of their feet the way you and I do. The stiff-legged mouse-deer is an example of an animal that touches only the extreme tips of its toes on the ground.

There are other such freaks: the wart-hog often walks on its fore-knees when grubbing for food. The great ant-eater bends its toes backward when

it walks. The wretched sloth, which I have de-described, has to lie down and pull itself along by stems of bushes and tufts of grass.

Flies are not the only animals that can walk along the ceiling. The feet of tree frogs and some lizards have disk-like suckers by which they cling to a vertical wall.

The old tradition that there is a "hoop snake," a snake that would take its tail in its mouth and roll down hill, or propel itself along a road, has been pretty well exploded. There is no serpent in the world that in its habits even indicates a basis for such a story. There is, however, a type of insect that moves after a fashion just as grotesque. This is a parasite which lives on the bodies of bats. It has no sort of legs or feet or flippers, and it can't glide or squirm along the way a snake or worm does. Its only means of getting from one spot to another is to *roll* over and over in any direction! "Like a clown in a pantomime," one scientist describes the little fellow. "And yet its speed exceeds that of any known insect."

Snakes walk on their ribs, so to speak, when slowly moving, but they use their scales to gain a

"foot-hold" as they glide along. The gliding is always in a lateral plane, and never vertical, as shown in some illustrations. How important the scales are may be judged from the fact that the average snake is largely helpless when placed on a flat pane of glass. An earthworm moves in quite a different way. By expanding its body it pushes its front end along. Minute hairs then anchor the front end while the back end is drawn forward for another "step."

Perhaps the most modernistic form of locomotion in the animal kingdom is that of the octopus, the nautilus and the squid. These sea creatures propel themselves by shooting water through a tube, the same principle by which a rocket may some day reach the moon. Reaction of the expelled water forces the animal's body along. Their long tentacles are used only for moving on the bottom or for climbing over obstacles.

While Nature has given some creatures strange habits of locomotion, she has occasionally seemed anxious to conciliate her victims by added powers. She has given feet to the caterpillar, a sail to the argonaut, wings to some fish and a jumping tail to the lobster. To the firefly she has given a night

lantern. One species of tropical American beetle also has the power to light its way. It is about an inch and a half long and carries two small globes, one on each side of its throat, that can be voluntarily illuminated like the searchlights of a man-of-war.

The interesting thing is that this flash is not of just a second's duration, as in the case of the lightning bug, but actually lasts five minutes or more when the beetle is aroused. Apparently nature intended the light for night courtship. But any disturbance causes it to be switched on. The natives are familiar with this phenomenon and turn it to practical use. They keep several beetles in small wicker cages hung about their houses. To "turn on the light" one simply picks up the cage, gives it a few taps and the beetles do the rest!

I remember seeing one device in the tropics that closely resembled the modern flashlight. It was a piece of hollowed sugar cane about four inches long, cut in half longitudinally and hinged to form a cylindrical box. One of the halves was covered with a removable strip of netting behind which sat several beetles. A native carried the

contrivance in his pocket or belt. If he wanted to examine the trail at night he pulled out his beetle "flashlight," opened one-half and shook it. On a wet tropical night it was very effective.

A considerable part of my time at the New York Zoological Park is taken up in answering strange queries that come to me from the public.

"How does an elephant sleep?" is a sample.

The best answer I can give is that our big African elephant Khartum, towering nearly eleven feet high and weighing in the neighbourhood of four tons, sleeps mostly standing up. In the twenty years we have had him neither I nor our night watchmen have ever seen him lie down.

Many letters come to me asking about strange hybrid types of animals that may have resulted in nature from cross-breeding. In rural districts, particularly, there persists the belief that there is an animal with a head and body like a cat, but the short front legs and long hind legs of a rabbit.

I do not think that such extreme cross-breeding is possible. Lions and tigers have been crossed; so have the zebra and the domestic horse. But in both cases these are closely related types. Extremes, like the combination of rodent (rabbit)

and carnivore (cat) seems quite beyond the realm of possibility.

No doubt there are cases of occasional deformity in the cat family, wherein the fore legs have been born short in an otherwise perfectly normal hundred per cent cat. I was shocked one day when, having written a non-committal letter to a showman, I was confronted with such a specimen. The extraordinary cat—for such it undoubtedly was—hopped around my office like a Belgian hare. Its forefeet were quite all right, but its hind leg development was grotesquely large. Moreover, the creature was quite tailless.

"You see," said the showman with unconcealed pride, "it's got the hind legs of a rabbit—and no tail, too!"

But my faith in his story was shaken when I found that the tail had been neatly clipped off, no doubt to make the story of a half-rabbit-half-cat freak as airtight as possible.

Another belief on which queries come in is that a prairie "dog," rattlesnake and prairie owl occasionally inhabit the same burrow. The truth of the matter is that these three prairie types are natural neighbours. The rattler wanders into the

village of prairie dog mounds to seek young "dogs" for food. He then crawls into an abandoned burrow to digest his meal in peace. As for the prairie owl, it is often so hard-put to find a shelter in the open that it seizes on a deserted burrow for its nest.

"As slow as a tortoise" is quite an unfair affront to this unfortunate beast, heavily handicapped as he is. Don't forget that the tortoise is at home in the high temperatures of the tropics and deserts. When observed in the chill air of temperate zones he slows up like molasses. On a good hot day when the tortoise is at his best I have seen one make a dash for his burrow six feet away and make it before I could cover the scant fifteen yards that separated him from me.

Nearly all sorts of reptiles and amphibians have been credited with grotesque powers and habits that certainly would mortify them if they knew what most of us think. No tadpole, for instance, ever dropped its tail, as it is popularly supposed to, while slowly changing into a frog. The tail is slowly absorbed into the body while the mouth parts are changing from an aquatic to an air-breathing animal. Indeed, the tail serves

as absorbed nourishment during the period when the creature cannot eat.

Even Theodore Roosevelt, Sr., who abhorred any sort of nature faking, was misled into believing there was such an animal as a stinging snake. During and after his South American journeys he wrote me several letters about such snakes that he had seen but had not had occasion to examine closely. He finally sent a specimen that had tried to sting him with a spine on the end of its tail.

"I picked it up," he wrote, "and was holding it by the neck. Just in the nick of time the natives yelled at me to drop it." Just then he felt a needle-like prick. As a matter of fact he was holding a rainbow mud snake which almost never bites, but when picked up pokes its hard tail, with a very sharp, spiney scale at the tip, against the captor's hand or arm in an effort to stick him with the needle-like point, although the minute wound is less serious than contact with a small rose thorn.

There is a small limbless lizard found in our southern states that closely lives up to the belief that it is made of glass. For if it is grabbed by its tail the tail is voluntarily twisted from its body by the owner. If struck a blow with a stick the

tail is likely to break into several pieces, each of which does a dizzy dance of its own as the lizard glides away. The loss is not serious as a new tail at once begins to sprout.

I often have had pointed out to me cases in which toads are alleged to live for months or even years sealed up in an air-tight cavity. I do not believe this is possible unless some crevice leads to it from the open air. Toads are known to burrow deeply into the earth during a drought in search of damp ground. They return to the surface when infiltration tells them of returning rains. At such times they exist for months in a state bordering on suspended animation.

The Texas horned "toad" that was alleged to have been liberated from a cornerstone after thirty years of enforced imprisonment without food or water was not a toad at all, but a lizard. I had no means of checking up on the fact, but I do know by personal observation in my laboratory that these creatures are very delicate and unable to fast as long as amphibians (actual toads), to which they are not related. Without plenty of sunlight and warmth they soon die.

A surprising number of people are positive they

have heard mice *sing!* Many claim they have heard singing mice in their homes, set a trap and actually caught them—and the mice sang in the trap! But it is a scientific fact that a mouse cannot sing. The explanation of the phenomenon is that some species of mice become afflicted with a curious bronchial trouble that appears to be chronic, yet not serious enough to weaken the animal. The trouble may be likened to asthma and when the mouse wheezes and whistles, and even squeaks shrilly it may accidentally sound quite musical.

There has not been a year during the thirty-year life of the New York Zoological Park that newspaper writers haven't dropped in during the autumn or at the end of the winter to glean information from our animals about the forthcoming season. There seems to be a deep-seated belief that animals are long-range weather prophets and anticipate extreme heat or cold by varying the thickness of their fur, care in digging burrows, storage of food, lining of nests and other activities.

Year after year I have patiently watched for evidence that would indicate some creature's sen-

sitiveness to coming change of season. Today I am convinced there is nothing to such a belief.

True, the coats of fur-bearing and hairy animals do vary in thickness from year to year; and the activities of others in gathering winter food or in preparation of their cold-weather domiciles may also vary. But both the protective coats and the defensive toil seem to be influenced far more by the season through which the animal is passing than by anything that is to come.

I have gone so far as to keep records. In one autumn I recall, there were distinct indications of unusual preparation for winter. Hoofed stock grew heavier hair, beavers stored more food branches close to their house; prairie "dog" mounds were higher; squirrels and chipmunks were busy all day carrying acorns. Yet the winter that followed was comparatively mild—certainly milder than average.

The explanation of this apparent paradox seemed to lie in the type of summer we had been having that year. There was no prolonged discomfort for any of our animals from heat, insect pests or poor food. When autumn arrived our hoofed animals were less worn from the flies than

usual, the beavers more enterprising and the squirrels and chipmunks so full of pep they simply had to keep busy. The latter were especially favoured because the acorns were bigger and fatter than usual. So naturally all gave signs of preparing for a hard winter—which didn't come.

I have been among old woodsmen who would consider it sacrilegious to debate their faith in wild animals as weather prophets. One widespread tradition is that if the woodchuck or groundhog sees his shadow on February 2nd he retires for another six weeks of winter, indicating a belated spring for the countryside. The groundhog is the husky eastern relative of the prairie "dog." In the fall he eats until he is bursting fat. Then he descends into his burrow, rolls up in a ball and falls into a deep sleep. If he is dug out in the wintertime he may be rolled around like a ball and cannot be awakened unless warmed up.

By the same token, if a warm sun comes along in late winter he may actually rouse out and wander around a bit. The same fickle sunshine may cause a few frogs to float up from the mud and feebly croak or lure the blacksnake from its hiber-

nating crevice. But the groundhog would not stir unless he felt it; and he certainly returns the moment the winter chill penetrates his thinning coat of fat.

Despite the facts in the case, every spring our groundhogs at the Park are overworked by "still" and movie photographers who must have the animal's likeness for public consumption. I always explain in advance that our groundhogs are awake all winter because they live in sheltered quarters; but it seems to make no difference. The hero of Groundhog Day appears in the press and on the screen year after year, nevertheless. The most sought after pose is squat and erect with a wise look on his smug little face.

I could go on indefinitely with facts and fancies that make animal life so much more interesting than most people give it credit for being. And I should like to put in a word for "pets"—that is, the proper kinds of pets which means *no* monkeys, no wolf pups, cub bears or infant leopards, pumas and the like. No mechanical toy will ever bring out a child's character the way a small rabbit, cat, dog, turtle, duck, chicken or other pet will—provided, especially, that the parent take a little

pains in cementing the friendship between the child and the pet.

Recently a well-known criminologist made the statement that, so far as he had been able to discover, no child that had been fond of pets had ever turned out to be a professional criminal. This may be a strong statement of the case, but certainly association with animals is good for the spiritual welfare of the child.

And then there is always a chance that a child so influenced may directly or indirectly contribute something to the beauty of life and the welfare of the race. Remember that the goldfish is only a carp which the Chinese, by Burbankian methods, turned into a household decoration.

## Chapter V

# Making Friends with Monkeys

AS time went on more men and money were put at the disposal of the Zoological Park. New buildings were going up all the time, but most of them were not ready for the animals that came trooping into us from the far corners of the earth. Nevertheless, visitors flocked in to see such curious animals as the Prjevalsky wild horse, the kiang, kudu, pygmy hippopotamus, dwarf elephant and echidna. The press closely followed the Park's development and did its part in keeping public curiosity aroused about our work and our charges.

I had now been put in charge of the mammals as well as of the reptiles. I felt at home with the jumble of young elephants, lions, tigers and kangaroos. But the real fun began when the monkeys came trooping in.

Many of the animals were still in temporary quarters. But since the monkey house wasn't far from ready we started to bring our big family of them together. As they overflowed the small

mammal house I borrowed some big bird cages from William Beebe, who was our curator of birds. These were about five feet square and I set them on joists outside. They had wooden tops for shelter, but I provided each of them with a snug sleeping box and straw bedding. In a neat row they stretched for a hundred feet. When ready I bustled into them rhesus, macaque, pig-tailed, Japanese, spider, woolly and ring-tailed monkeys and some baboons. The arrangement was neat and interesting.

Imagine my surprise when, on inspecting that row of cages next morning, it looked as if a cyclone had struck them! They were turned this way and that and several had slid from their foundations. I soon guessed what had happened. Some monkeys have a habit of grasping the mesh or bars of a cage and violently shaking the front. The aggregation hadn't become acquainted and every animal that had the power to shake had done its best. The whole outfit had to be aligned up again and spiked into place. I now thought the installation was trouble-proof. And so it proved to be, with one notable exception.

I had gone downtown to the custom house to

clear some animals and while away the wind had started to blow from the northeast. It quickly developed into a severe cold storm, with rain driving at a sharp angle. My first thought was of my monkeys with the open side of their cages facing the wind. They should be covered with tarpaulins. I hurriedly telephoned to the keeper about it. But he had had the same thought and already had half the cages covered and was hunting for additional tarpaulins. He said the storm was raging out at the Park and that some of the monkeys looked wet and shivery as they kept running in and out of the sleeping boxes. I told him to heat a pot of milk and give them all a warm drink, draw the spikes from all the cage bases and have the whole outfit ready to move in somewhere when I got back.

I found the cages looking snug. I noticed there wasn't a sound—not a chatter. This was strange. I cut the cords binding two of the tarpaulins and drew them back. The monkeys were asleep. The tarpaulins on several other cages were thrown back. Several monkeys sat with their backs to the wall and blinked at me strangely. A baboon lolled in a corner, each hand grasping a foot. He

was a wicked animal and usually barked and rushed at us, but now he only gave me a leer, with half-open eyes, and remained motionless.

"What on earth is the matter with these monkeys?" I exclaimed

The keeper was hesitant, but noting my stern and worried gaze, recited his story. He said he was heating the milk when the chief constructor had come in. They talked for a moment and the reason for the hot milk was explained. It seemed that the chief constructor had put through some big projects in Mexico and had seen wild monkeys. He averred that it was hot where they lived, so hot that he defined the condition in forceful adjectives. He told the keeper there was a tremendous discrepancy in temperature between southern Mexico and the row of monkey cages here in the New York Zoo; that the hot milk was good, but that the monkeys should certainly have some brandy if the whole crowd were to be saved from sneezing their heads off by morning. He pointed out that there was an emergency cabinet nearby containing drugs and a bottle of medicinal brandy. The question was, how much brandy to add to the pot of milk. It was a large pot of milk

and the keeper was not a chemist, nor had he ever made punch. He figured that if he ever did officiate in converting a quantity of fluid like the heated milk to a festive bowl, he would use the whole bottle; and he did! That was the trouble with the monkeys.

The more I saw of the monkeys the more I enjoyed their acquaintance, and the more I came to appreciate their many possibilities.

Among early observations—these at the request of a scientific institution—was the recording of skin texture (no more or less than making fingerprints) of a number of monkeys. I didn't have any tame specimens and some of the subjects looked like tough customers. We turned the first one loose in a room. Before the completion of a minute everything movable was on the floor or knocked over. There was a mixture of malice and panic in the production of this wreckage.

When the monkey saw me smear the ink he seemed to think I was preparing to torture him. He stood with his back to the laboratory wall, his face contorted with hate.

"Ready," I told my assistant.

At the sound of my voice the "criminal's" body

stiffened. And while he did not utter a syllable his whole posture conveyed a threat:

"Lay a hand on me and I'll tear you to pieces! I know I've done wrong. Perhaps if I had a chance I wouldn't do it again. But I've done it. . . . And you think you're going to get even. Well, you're not! So don't you dare touch me!"

It was a tough situation. If I weakened it would undermine my authority. Peril of the moment was nothing to the danger that I might have to face if I let my prisoner defy me.

"Just you start something," he snarled.

It was the courage of desperation. For we outnumbered him three to one and he was quarter the size of any of us. But he apparently didn't mind dying if first he could get his stout canines at my throat.

Every second that passed made my position weaker. I said to my assistant: "All right, I'll handle him. You make the fingerprints."

Ready for a bloody battle I approached my furious prisoner. His fingers curled into claws as he crouched to spring at me. His eyes were black diamonds.

At this moment I heard the laboratory door

open. Out of the corner of my eye I saw that it was my daughter, a pretty school-girl in her 'teens. Like a flash my captive darted by me. Before I could stop him he threw himself upon my daughter, encircling her neck with his hairy arm and began to gibber his heart out upon her breast. I was unnerved, but could only accept this strange turn of affairs. And with my daughter's help we took what I believe may have been the first fingerprints ever taken of a monkey.

We got the prints all right, and, to my delight, they showed the same characteristic concentric circle markings or whorls which all human hands possess. But, to my equal astonishment, the whorls were not on the monkey's fingers, *but on his palms!*

I don't describe this incident merely to cite an interesting biological phenomenon. There are hundreds of other queer traits to list about monkeys. But none, I think, illustrate so pointedly as their fingerprints how near and yet how far monkeys are from being related to human beings.

After Darwin suggested the descent of man from monkeys scientists kept on discovering more and more monkey traits and tricks to support the

theory of man's evolution from tree-dwelling ancestors. But today there is a strong swing away from this belief. We are told now that prehistoric man inhabited the earth more than 1,000,000 years ago. And many great scholars have concluded that from the very beginning of an immeasurably distant throw-off from some antediluvian quadruped man has been a separate and distinct species, and not just the highest form of ape or monkey.

Abstract theorizing is not in my line. I deal with the animals themselves—thousands of them—at our zoological park. But I can't resist observing that much of the man-monkey relationship is based on feeble arguments. For instance, you might say a dog is descended from a cat, or vice versa. Both have four legs; both make good pets and enjoy meat. The dog may be said to be the descendant because he is more affectionate and more easily trained. But I don't think many people would take such reasoning seriously. Or, carrying the idea a little further, we might say a rifle is a higher form of baseball bat. The two are of generally similar shape and size; and both, under proper circumstances, can cast a ball. In a

sense both have the cave man's war club as a common ancestor. But to say that one is descended biologically from the other is nonsense.

I don't pretend to take sides in the man-from-monkey hypothesis. But for a quarter of a century I have been alternately surprised and dismayed at the capricious mentalities of the monkeys that have been under my charge. As in the case of the fingerprints, they often show one moment an arresting quality of humanness, only, the next moment, to shatter the similarity by a difference that may put them down the scale even further than beasts we consider altogether inferior. The apes, for instance, have a thumb. Yet with the orang-utan, a member of that quartette of anthropoid types that stand at the very head of classification, this thumb grows so far up the animal's wrist that it is but weakly useful—a mere clumsy appendage as compared to the deftly opposable thumbs of brutish baboons way down the scale or the grasping "hands" of opossums, which are at the tail end of animal classification.

It is in the monkey's mind that we find both fascinating and elusive clues to man's most precious treasure: *reason.* One day I received a

small ring-tailed money from South America. To my surprise he had been shipped in the same cage with a young Brazilian wild dog and a *coatî mundi*, which is a long-snouted tropical cousin of the raccoon. All three animals were amicable friends until they struck the fancy of an old lady who used to visit the collections daily.

The lady began to bring lumps of sugar to the cage and feed the amusing trio which she had discovered. Then the wild dog and coati for the first time were able to outdo their nimbler friend, the monkey. With their strong teeth they could eat the lump sugar three times as fast as the ring-tail. In this way they always got by far the largest share of the sugar ration. So much ill-feeling began to develop that I thought we might have to separate the unfortunate monkey. But by his own quick wits he solved his problem before I did. The keeper sent for me one morning to show me how it had been done.

"Watch and you'll see something funny," he said.

He had brought some sugar just as the lady visitor did and began to hand out the lumps, one to the wild dog, one to the coati and one to the

monkey. The first two instantly seized their lumps and began crunching them to pieces with their strong teeth. Not so the monkey. In one spring he reached the watering trough, dipped his sugar lump in the water until it was soft and then swallowed it with a few sharp smacks of his tongue. He was back at the wire asking for more long before his two rivals had been able to down their dry morsels.

"He began doing it the fourth time the lady fed 'em," declared the keeper.

How the monkey discovered the trick of wetting his sugar if he didn't reason it out is hard to guess. It is possible that he may have dropped it into the water by accident and, on recovering it, found it soft. At any rate, no young human three times his age could have done any better.

Because so many people doubt a story of this sort I made a motion picture of it as a permanent visual record of the monkey's ingenuity and resourcefulness. On the other hand, this sort of reasoning is to a degree often present among our domestic animals. I once had a horse that was as smart as any monkey I have ever seen, though of course he didn't have fingers to help him.

When I petted him he always tried to get his nose into my right-hand coat pocket where I carried lump sugar for him. With the reins slack he could be driven right or left, fast or slow merely by word or light slap of line. He understood my few gently spoken words—and had received no course of "training." When we came home from a drive and I had unharnessed him he would go to the door of his box stall, push up the latch with his nose and walk in.

The "trained monkeys" one sees on the stage are not usually monkeys at all, but chimpanzees which belong to what are known as the anthropoid or man-like apes.

A chimpanzee is usually imported at the age of about one year or a bit over. By association with trained "chimps" the newcomer soon gives way to his curiosity and tries to imitate them. Because of his docile and amiable disposition he is only too glad to obey his trainer's wishes as fast as he understands them.

The young chimp takes to acrobatics like a duck to water. With a year's training he will walk on a ball, balance nimbly on a tight-rope, catch like a big leaguer, and later ride bicycles, roller skate,

dress and undress; even lacing and unlacing his shoes. Because of his occasional awkwardness as well as the fact that he looks like a grotesque cartoon of a man, audiences never tire of watching him.

But for all his seeming brilliance the chimp is theatrically successful only through a certain period of his mental development. For a time he may be controlled by simpler cues and punishments than any other species of equal intelligence, but he grows stubborn with early maturity (say at seven or eight years) soon becomes dangerous in developing fits of maniacal rage and has to be locked up as nothing more than an exhibition specimen. This is the reason that chimpanzees make treacherous pets as they grow older; one can never tell when they will fly off the handle and attack their owners.

An old chimpanzee is a lot like an incorrigible convict in a penitentiary. Nothing a keeper can do will generally mollify him. Some examples are friendly enough with their keepers—through the cage front—although they would murder anybody else. I remember one old chimp, however, reared through a gentle immaturity, who used to

glower in the back of his cage with a look of murderous fury in his eyes every time the keeper came near even to feed him. When the keeper turned his back to leave the chimp would rush to the front of his cage and do his best to spit on the only real friend he had in the world!

I hope that some day our zoos will agree to ship their adult chimpanzees back to Africa and turn them loose in some sanctuary like that now established for the gorilla. This would limit us to the exhibition of only young specimens, which are highly interesting to adults and always a joy to children.

In my own experience I have enjoyed and admired orang-utans more than any of the others. At one time I staged a series of tests for a group of scientists who were interested in the mind of an ape. I prepared a room with only a few pieces of simple furniture in it. Besides a table, two chairs, hammer, wrench and mop, there were a window and a faucet. The faucet ran into an ordinary kitchen sink.

I brought in the two orangs which I called Jim and Mimi, and which were gretty good friends of mine. First I made them sit in the two chairs.

"Don't move," I told them sharply, shaking my finger at them for emphasis.

Jim looked a little sulky because he wanted to romp; but Mimi seemed to smile at me and wonder what exciting thing I was going to show her. They had already learned quite a bit through observation—not training.

Meanwhile the scientists peered in through the window.

I walked around the room slowly, doing first one thing and then another that neither orang had ever seen me do before nor that they themselves had ever tried before. I turned the faucet on, let it run a few moments and then turned it off. I splashed some water on the floor and mopped it up with a cloth.

All the while Jim sulked and pretended not to watch. Mimi was all attention. I picked up a broom and took a few strokes with it. I lifted the hammer and drove a nail into the floor. With the wrench I loosened a nut and took it off with my fingers.

After having done each thing several times I told the orangs they could go ahead and enjoy themselves.

"Get up, Jim. All right, Mimi. Look around and see if there's anything here you like."

Mimi hopped up and made a bee-line for the faucet. She wasn't thirsty it developed, but she liked the excitement of running water. She wasn't able to turn it on at once, though she remembered that I had done something with my hands on the pipe. While she fussed with the faucet she hopped up and down impatiently because nothing happened. When the water suddenly gushed out she gave a little squeal of joy.

Meanwhile Jim pointedly ignored everything I had touched as much as to say: "You needn't think I'm going to perform for you after you made me sit all that time in the chair!"

Such perverseness was characteristic of orang-utan temperament! Knowing this I simply ignored the fellow and spoke approvingly to Mimi which I knew would soon make him jealous.

Jim spotted my hat on the window sill, grabbed it and jammed it down over his ears. He looked exactly like an old tramp begging for a handout. He was so comical that we all laughed. This applause promptly put him in a better humour. Still wearing the hat he began to emulate Mimi

in seeing what he could do that I had done. He picked up the wrench. Disregarding the details of nail or nut he began banging loudly on the floor. As an orang loves a banging noise Jim no doubt thought that I had merely been amusing myself when I drove the nail.

Mimi was still fascinated by the water, turning the faucet on and off. She was enraptured when she discovered that if she left it on it would fill the basin quicker than it would run out. When the water reached the top she suddenly struck it a hard smack with their hand. A shower fell over Jim who had his back turned while he still beat a loud tattoo with the wrench. With a muffled squeal he dropped the wrench and sprang up beside his lady friend. The ensuing water fight was so violent that it put an end to the experiment for the day.

The simple lessons were extended through several weeks at the scientists' request. And while I knew that the pair were intelligent, even I was surprised at the quickness with which they learned. Soon Mimi could turn the water on and off whenever she chose. She usually stopped it in time not to overrun the basin. Also, like any well-

trained girl, she would sweep up bits of paper I had strewn on the floor, or mop up water with a cloth. Her thoughts were a bit short-circuited in the mopping process as she would squeeze out the rag in a dry spot and try it again.

Jim, with true masculine instinct, was finally able to drive a small nail. He didn't always succeed because the first blow or two often bent the nail over. But when he did succeed he gave a few extra hard blows of satisfaction after the head of the nail had been levelled with the floor. He would unloose a nut with the wrench, and, after it was loose, he would unscrew it the rest of the way with his fingers. If an orang had a better thumb its actions would be weirdly like a human.

Strange to say, the thing that surprised my scientific friends most of all came when the performance was over. Soon as I told Jim he was to go back to his cage he took my hand, led me to the door, unlatched and opened it for me to pass through.

The reader may be wondering by now why it is that orangs do not make much better performers than chimpanzees. Orangs can perform tricks just as clever; and their older years are not

marred by the raging savagery that so often characterizes the adult chimps. The reason is both simple and overwhelming. The orang is gifted with a superb perverseness that usually appears at the most inopportune moment.

For instance, I tried to exhibit Jim one day when I had a very distinguished visitor.

"I will believe everything but the fact that he drives a nail," declared the visitor.

I smiled contentedly. "I'm really glad you don't believe it, because you will be that much more impressed when he does."

As usual Jim was glad to see me when I took him out of his cage. He was even friendly to my visitor; and he displayed a promising eagerness as we moved toward the room I used for such exhibitions.

"Will he mind my being here?" asked the visitor.

"Oh, no," I innocently replied. "He performs better with an audience and he seems to like you."

To make the affair impressive I sat Jim in his chair and then started three nails in the floor.

"Now, Jim, old man," said I, "drive the nails for the gentleman."

Jim didn't move. His eyes shifted dreamily to the ceiling and stayed there.

"All ready, old fellow," I told him and gave the hammer a push with my toe.

Jim meditatively scratched his head.

"Get up out of that chair!" I commanded sharply, beginning to lose my patience.

Jim rose like a rheumatic old man. He did not lower his eyes. He moved forward as in a dream. He stumbled over the hammer but didn't look at it. Like a naughty child he wandered vaguely toward the wall. On reaching it he felt it tentatively with the palm of his hand as if to see if it were vertical.

I was furious. But I knew that if I lost my temper Jim would only sulk. Nothing I could say or do would jolt him out of his coma. My distinguished visitor made it worse by feeling sorry for me and sympathizing with Jim.

But the whole incident was typical of an orang. I have known one to behave this way about the simplest trick on his list and one that he has performed scores of times. Just when the audience is most enthralled he will wander over and, taking a boy's cap from the crowd, jam it down over his own ears.

The audience breaks into loud laughter. Whereupon the orang gives one a saucy stare that I know means: "There, you see? My own little tricks are far better than the ones you invent!"

A theatrical exhibitor would not dare submit to such behaviour. Yet he couldn't do a thing about it when it occurred. Unexpected punishment would not be understood by the orang and only cause a scene. Worse still, the spectators might easily be terrified by some whim of the performer. I can well imagine from my own experience an orang getting suddenly tired of the routine show. He would leave the stage before any one could stop him, climb swiftly into a box and, with a good-natured grin, decorate himself in the first ladies' wrap that he could reach.

On another occasion Mimi mortified me before a large crowd, though I must add that the crowd hugely enjoyed my discomfiture. The keeper and I had taught four orangs to dine at an outdoor table. They would use cups and plates, knives and forks, and pour milk from a teapot with great skill and gravity. Hundreds of children came to see the show every day. All went well for a good many days. An orang can always be depended

upon to eat and he is quite willing to amplify his meal with one or two man-made tools. If there are a few minor inaccuracies in etiquette the crowd is all the more hilarious in their appreciation.

At the end of the meal the orangs were trained to push back their chairs and leave the table single-file. Mimi was the last in line. One afternoon she was just descending from the platform when her eye caught a low-hanging branch that I had never even noticed. With a jump she was able to seize it and the next moment was swinging her way to the top of a high tree.

While the crowd howled its delight the keeper started after the fugitive. My man was a good climber and soon was in the topmost branches. But Mimi was too good for him. Hand over hand she ran out to the end of a slender fork that bent and creaked with her weight. She hung by one hand and glanced proudly down upon the crowd that were cheering her as she had never been cheered before.

Success went to her head. She played tag with the keeper until I thought he would break his neck. Darkness came and I had a portable search-

light brought out lest she descend suddenly and try to escape.

Finally the crowd dispersed. As there were no more cheers the game lost its savour for Mimi who was also growing tired and bored. With a quick swing and a slide she eluded the keeper and dropped at my feet. She put up one arm and encircled my neck ingratiatingly. As a final touch, when I lifted her up, she took my hat and pulled it well down over her ears as if protecting herself against any remote chance of punishment. You couldn't be cross with a creature like that!

If an orang is never taught any tricks he invents some of his own. Perhaps he feels the need of exercising what ingenuity he possesses. In this way he is distinctly above most other captives who are content to spend their restricted lives in indolence, or to do no more than enough to take care of the families they occasionally acquire.

Strange to say, most orangs know the principle of the lever. If an orang can break his trapeze loose there is fair probability he will use its crosspiece to pry apart the bars of his cage, disfigure the ironwork or possibly escape. He well understands the advantage in obtaining such a tool.

Orangs will slack their trapeze chain, then bang it down full force over and over again to open the links. For this reason I always insist on a very heavy chain with welded links for an orang swing.

If an orang gets hold of a stout screwdriver he will jimmy up the boards from the floor of his cage. He loves, too, to break heavy sticks, exhibiting great strength and agility in doing so. If he has any long coarse straw at his disposal he will sometimes twist it into a rope strong enough to hold him up by throwing it over the bar of his trapeze. But when he finds he can neither make a noise nor damage anything with his rope he soon discards it.

The most unusual case of really malicious destructiveness I've ever seen was that of a big baboon we had. Because he needed air I placed him in an outside enclosure attached to the monkey house. At once he began to loll against the front bars of the cage with his hairy hand shoved out a few inches. The hand was a lure. It looked pitifully restrained. But by shoving out his full arm and shoulder its owner had a reach of close to two feet.

He would sit in that position as if plaintively

begging. But the moment some kind-hearted visitor reached forward the baboon grabbed a hat or anything else that could be reached with his lightning-like thrust. Whatever he retrieved was instantly torn to pieces and then brushed back into dark corners of his cage.

I watched the baboon one day and soon saw him snatch an umbrella from an astonished observer. At once his actions became almost maniacal. He tore every bit of silk from the ribs of the umbrella, disintegrated its skeleton and bent the handle double. He then pushed the wreckage into a corner and began to watch for his next victim.

The afternoon's activities closed when he grabbed a lady's pocketbook. Luckily it didn't contain much beyond some loose change and a handkerchief. But the owner shed tears to see her pretty bag ripped to bits and cast savagely in the corner. A warning sign over the cage did no good. That luring hand with its pitiful implication was too much for the average visitor. The baboon's banditry ended only when we erected a barrier screen on the guard rail.

Perhaps the emotional excitement of destroy-

ing things has something to do with this trait in the monkey tribe. They are like some people I know who must always be on the go. If this be the case then the relationship between us and monkeys must often be very close. A friend of mine had an expensive adventure along this line not long ago. He bought two small and very rare monkeys at a Chinese animal shop. As his long and garrulous bargaining with the natives had made him thirsty he stopped at a bar for a glass of beer on his way back to the hotel. Scarcely had he sat down than he heard a murmur of surprise from those about him. The rare monkeys had moved a panel and had slipped out of their box which he had put down on a nearby table.

He made a lunge for the monkeys just as they leaped. Instinctively they headed for the glittering rows of glassware on shelves behind the bar. The next instant the place was in an uproar. While everyone tried to catch them the monkeys dashed up and down the shelves industriously sweeping every bottle and mug and glass upon the floor until they had destroyed the entire visible supply. The monkeys were finally captured and restored to my friend. But the episode cost him

over $400 and converted him into a strict prohibitionist while carrying monkeys.

We have had pet monkeys at home from time to time, and though I knew their proclivities for evil I accidentally let two of them escape once when we were all away. When we returned the house looked exactly as if a hurricane had blown in one window and out the other. The pair of monkeys were subdued and scared, as if they had come to suddenly from their mad orgy and had realized the awfulness of what they had done.

It took a week to get the house back into shape again. Pictures had been pulled off the walls, curtains torn, upholstery ripped out by its roots and lights all dragged from their wall sockets. The saddest damage was to the sideboard where most of our glassware and silver were kept. The devilish monkeys had even taken ashes out of the fireplace and scattered them everywhere; had torn pages from my favourite books; and had destroyed all our potted plants.

The curious part of it was that the monkeys were two well-behaved pets of my daughter, in good health and always exercised properly. They just became temporarily insane and, while out-

rageous, were really ingenious in their mutilation of my home.

Whether such behaviour is related to human conduct or not I must leave to the reader to judge. Certainly it is not characteristic of other animals. Even a puppy who might chew a few things to pieces would tire of his play long before he did any serious damage.

I have been told by banana planters in the tropics that the same tendency is shown by a troop of monkeys entering a cultivated area. They tear off one piece of fruit after another, take one bite from each and drop it no matter how ripe and delicious it is.

Compare such vandalism with the superb parsimony of many other animals supposed to be far down the list in their relationship to human beings. The prairie "dog," for instance, painstakingly building its craters high against the rain and burrowing deep with its food and family. The beaver is another, weaving branches into a dam, slaving day and night against the oncoming winter.

In comparison, the average monkey is a worthless and slovenly vagrant no matter how amusing nor how much like a man he may seem to be.

Even in the jungle he suffers in comparison with other animals. He accomplishes absolutely nothing, never builds shelters, and has no thought of storing food. While the spider is spinning and the lowly ant providing a larder for its young the monkey is only screeching in the treetops.

I think that it is the inconsistency in monkey psychology and ability that undermines his position as man's ancestor more than anything else. An orang or chimpanzee will learn to do rather wonderful things with a club. Yet it apparently does not occur to them to use the club as a weapon. With all the dry sticks of great variety available in the jungle one does not see or hear of an orang using one to work with as he will do so readily in a zoo.

A chimpanzee will pick up a pan or a chair and hurl it over his head to make a noise that will express his rage. But it remains for the baboon, far down the scale of monkey intelligence, actually to throw a missile of offence. I have seen one of these creatures deliberately hurl stones at people, using an underhand toss. The stones were thrown with great rapidity and accuracy, and flew hard enough to injure a man at seventy-five feet.

I repeat that it does surprise me, after countless generations of evolution, that no wild monkey has sense enough to pick up a club and swat anything with it!

On the other hand, the moment I damn the monkey tribe there jump into my mind a score of incidents that have revealed almost human mentality among them.

Once I was taking some moving pictures of an orang against leafy background so that he would appear to be in his natural surroundings. It was a very hot day and my orang had to work out in the sun. About halfway through the job he suddenly walked over to a nearby bush, broke off a thick cluster of leaves and placed them on top of his head as a shelter against the sun's rays. I doubt if a child of twelve or fifteen would have thought of doing such a thing.

Another time we had a young female gorilla that moped a great deal. We tried changing her diet and giving her more exercise, but did not succeed in altering her mood. One holiday afternoon a child passed the cage carrying a doll. She stopped and held out the doll to the gorilla, just to show what a nice doll it was. The child was

terrified when the gorilla snatched the doll out of her hand and retreated to a far corner of the cage.

The child soon got over its fright and wept loudly at the loss of her doll. But when we tried to take it from the arms of the gorilla she, too, wept loudly. Finally we persuaded the child to leave her doll with the animal. The gorilla, on her part, was happy at last. For many weeks she cuddled the doll until it finally fell to pieces.

Altogether, so far as I can see, the man-from-monkey theory is a pretty complicated business. Just when apes or monkeys begin to show some signs of intelligence they suddenly prove more stupid or depraved than other animals.

Monkeys are not so intelligent as apes and are much lower in classification, yet they have chattering vocabularies that give them far better communication than the apes. Both show ingenuity in securing or mastering some article; but quickly lose interest once they have succeeded.

It makes me wonder sometimes what a clever dog or beaver would do if he had a monkey's hands.

On the other hand, monkeys may be too smart to work!

## Chapter VI

# Studio Revels

MY monkey adventures, and similar ones with other animals, were too good to lose. I concluded that I must preserve some of them in enduring form. Also I wanted moving pictures for the animal lectures I was developing. Thus I presently became a "movie director" and I'll wager that the thrills I got out of my "animal studio" would match those of the director on the biggest lot in Hollywood.

It was a case of figuring on reels of monkeys, coatis, kinkajous, phalangers, echidnas and the like, so that the film presented to an audience would be novel both in its intimacy and in its unusual topics. Also, in order not to pass my reptilian friends, I planned to include snappy likenesses of the fer-de-lance, death adder, mamba, cobra, and others of their clan.

I never cared for lantern slides in illustrating animals. I tried taking a few real monkeys to lectures, but after several disastrous experiences, gave it up. Snakes, carried in separate cloth bags

which were transported in a suitcase, were practical illustrations if nobody in the audience fainted. However, it got so that whenever I carried a suitcase, even for a week-end party, people would shy away from me.

The plan of putting the whole aggregation of my subjects on film where they would do as I wanted them to without alarming anybody was far and away the best thought. Besides, it was wonderfully advantageous to carry an active collection of apes, a few elephants, various other animals and about a hundred feet of snakes in a five-reel can fourteen inches square! But if anybody thinks that in order to make a series of moving pictures of animals you simply invest in a motion-picture camera, point it this way and that and turn the crank, the idea should be immediately discarded.

Owing to the work at the Park during the day I built the studio on the home plot, in Westchester County, where I could tumble into bed after strenuous sessions. Wanting to start the thing right, I began by visiting among the movie people. I had a chance to talk to such men as Ludwig G. B. Erb, John A. Berst, Herbert Hoagland,

Harold Edel, Ira Lowry, and others who were then building the movie industry. Observing that film work and electricity went hand in hand, I spent most of a vacation among the maze of switchboards and controls backstage in the New York Hippodrome, where Joe Elsner gave me instructions in how the "juice" was handled.

Then the camera was purchased and I soon found myself casting director of a wild crowd. A motion-picture electrician, with spare time at night, was my assistant. This young man was a wizard at the switches and he lived in an atmosphere of dazzling blue flashes. With a smile he took shocks that made me wince and once sat me down so hard that my neck clicked. "Sure the stuff will sting you, if it gets a chance!" said Andy, scorning rubber insulating mats and rewiring circuits without bothering to pull the switches. But he was just as afraid of snakes as I was of his juice.

A large stove heated the studio. A copper pan to evaporate water sat on top of it. The idea was to produce moisture, as the cameras at that time generated static sparks unless the air were humid. Electrical markings from this cause

marred the film. Surrounding our stove was a screen of sheet iron. This fire screen was simply pulled around the stove, leaving an opening to put in coal. This stove soon played a part in our adventures.

Our first job was to film a series of poisonous snakes I wanted for a lecture. A sanded stage had been prepared. Each reptile was in a separate fibre receptacle. The camera could be electrically started and stopped from a cord hooked to my belt. This gave me a chance of watching the snakes.

Andy struck his arcs and dropped in the quartz lights, then retired to the far end of the room. The fer-de-lance coiled beautifully, registered a stroke like a lancer and was lifted back to its fibre case on a long rod, a method I had long used in handling poisonous serpents. They will cling to such a staff to keep from falling. A tic-polonga, the cobra's Indian rival in deadliness, was filmed next. Then an African puff adder and a desert asp. The latter acted as if it had been rehearsed. In fine style it shovelled sand over its back by flattening the sides of the body.

Andy began to lose some of his nervousness

about the snakes and tip-toed forward as the pallid creature sent rippling waves along its flattened sides and sunk until only the top of its head with the curious horns above and silvery eyes were showing. Andy even fussed over one of the arcs as I was putting the asp back in its receptacle.

I had saved the most peppery specimen for the last. This was a large cobra and his manipulation would be an entirely different matter. He was a wicked fellow, about six feet long. When I knocked open the top of his case he rose in combat attitude and spread his hood, struck at me with a hiss, then slid out on the open floor to fight more freely. It was a job getting him on the sanded platform, for he insisted on sliding off, rushing along the floor and suddenly rearing to fight. I finally got him back, made a scene of his rearing pose and began to change lenses to get a close-up of his head and hood without moving the camera any nearer. Right there I smelled smoke.

My first thought was an overheated wire. But the odour wasn't rubbery.

Without turning around I shouted to Andy:

"What's afire?"

"Put him back!" came Andy's high-pitched reply.

Not daring to take my eyes from the cobra I got the long rod under him. He clung to it, was swung into the fibre case and, as luck had it, the lid banged down before he had a chance to slide out. I swung around.

For a moment it seemed as if Andy had disappeared. But no, there he was, inside the screen with the stove, which had been going full tilt to make the place tropically hot for the snakes. A haze arose from Andy. He was almost on fire, but not quite. He sizzled in the enclosure until I latched the cobra's case, having preferred a bad scorching to staying in the open with the cobra.

As Andy is now master electrician in one of the finest picture palaces in the land, and as I've long threatened to tell this story, I know he won't be angry when he reads it.

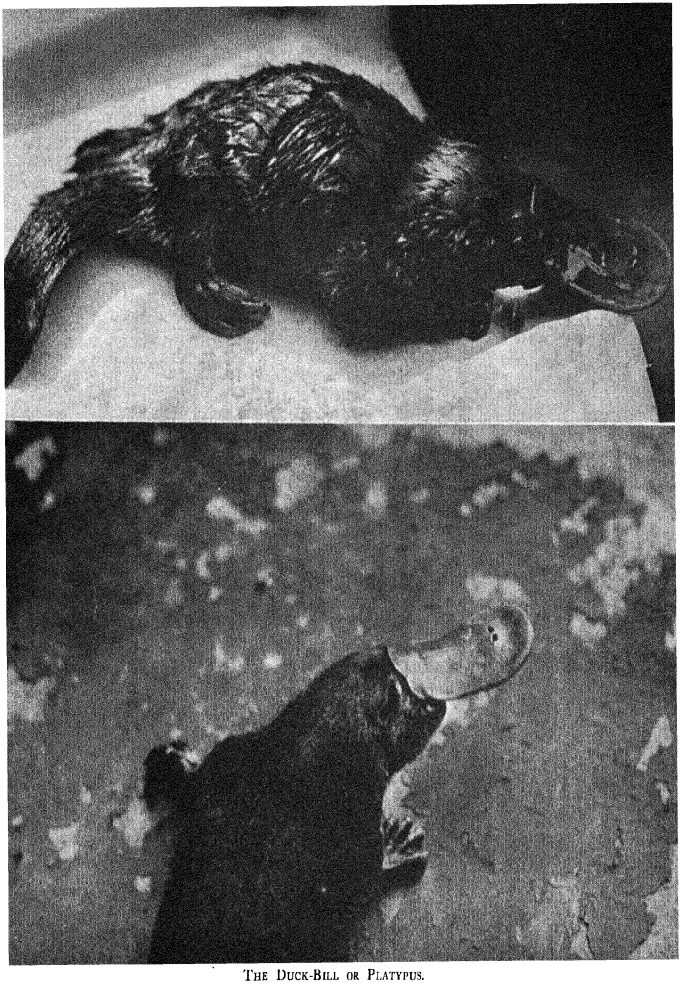
It was not long before a bigger idea than lecture films shaped up in the studio. This was to prepare reels from apes through elephants down to mice, through reptiles, amphibians and insects —all to be used for teaching. Generously the

New York Zoological Society granted me permission to film all its collections.

For the smaller animals studio effects and props were important. These required materials for me to arrange scenes on short notice: a bit of desert with its sand and cacti, a swamp with reeds and pool, an edge of meadow with bordering stone wall, the entrance of a cave, a ledge, the base of a tree, or the like. I collected and classified these materials in bins and on shelves. Problems would arise where it was necessary to construct something unusual. The arrival of a prairie rattler illustrated the need of a set of this kind. Here was an inhabitant of actual prairie-dog town, something that had not been filmed out-of-doors. Several mounds of cement were moulded over mesh forms and one of the burrows connected with a runway extending into a box for the reptile beneath the stage. The rattler was started upward and into view by an assistant beneath the stage. It slowly crawled from what appeared to be a deserted prairie-dog burrow. The emergence of the serpent from the "weathered" type of burrow could not have been obtained in any other way than to wander over the Great Plains awaiting the

GIANT ANT-EATER, OF TROPICAL AMERICA.

Attaining a weight of around seventy-five pounds it can put up quite a battle with its powerful front claws. Its mouth, however, is just large enough to shoot out a whiplike tongue, close to a foot long and used for sweeping ants from their burrows.



THE DUCK-BILL OR PLATYPUS.

The illustration shows the first specimen of this Australian oddity ever to reach a zoological collection alive outside of its native country. It was exhibited in the New York Zoological Park. This animal is the size of a musk-rat, is semi-aquatic, has a beak like a duck, lays eggs, and when the young are hatched, rears them with milk.

appearance of such a reptile. Cement sets like this were broken up and thrown out after the film had been developed and found to be all right.

I had often to change "atmospheres" for new arrivals very quickly as it was impossible to anticipate what my next subject would be. Specimens came from almost every part of the world.

For instance, a fight between a mongoose and a cobra called for a set with characteristic East Indian background, with an open glade for action. The actors were hard to get and I figured that both would be temperamental. It was necessary to arrange permission with the government to receive the mongoose, which is somewhat like a ferret. It is barred from this country owing to the possibility of its breeding and becoming a menace to poultry. This is the case in the West Indies where, to the sorrow of the British and French, these animals were introduced some years ago with the idea of destroying the fer-de-lance. They didn't altogether exterminate the New World viper and are now a terrible pest to poultry raisers and prey cruelly upon native wild birds.

I built my set to represent an opening in the jungle, with a hollow log as the lair of the cobra.

The serpent arrived, having cost five British pounds. I ordered one with a particularly vivid "spectacle" marking on its hood, as the curious marking would add to the drama of the photography.

We tamed the mongoose until it wandered around the set as if at home. When all was ready the cobra was cautiously started up through a chute from beneath the stage to the rear of the hollow log. The studio assistants wore leather mits with gauntlets and leather leggings in case the cobra got away under the stage. However, the battle was a failure, owing to its brevity. Induced to glide up the chute and out of the hollow log the cobra made a fine entrance, reared and spread the hood, but was killed almost instantly by the mongoose, which gave the camera a bare chance to run off more than a few seconds' of film.

This set was too elaborate to tear down without another attempt and a second cobra was ordered by cable from a dealer in London. It arrived a month later and the positions of the principals were reversed. The serpent was made to feel at home in the glade, which was encased

in panels of glass, the front removable for camera work. The mongoose was introduced through the chute in the hollow log. The resulting fight was fine—the mongoose winning, but with much more caution and delay than in the first battle.

While waiting for the second cobra I made a film of a big chimpanzee from the Zoological Park. My idea was to illustrate the keen mentality of the big ape. During the job I had a pretty exciting adventure. The creature was mature, being considerably over a hundred pounds in weight and more than a match for a powerful man. She had been purchased by the Zoological Society from a theatrical performer who had been exhibiting her on the stage.

About the time of attaining maturity chimpanzees usually become dangerous and unmanageable. My subject had approached that condition. There was a rumour that the owner's reason for disposing of her came from an incident during a performance when she was alleged to have slid over the footlights among the startled musicians, seized a glittering trombone and returned to the stage, where, with a war-whoop penetrating to the lobby she swung the instrument around her head

and hurled it into the wings! Acting on this story, I was ready for emergency, but not the one I soon faced.

Arriving at the Park the chimp was given a commodious indoor cage which communicated with a barred outdoor arena. As the lighting in this arena was excellent I decided to produce a series of studies in it. Scenes like this are of value in analyzing animal psychology. The chimp's former owner, a resourceful trainer, assisted in the work and brought the props with which the animal had worked. As there was no possibility of her escaping and with the trainer directing operations, I thought it safe to be in the cage with her, but to have no delays.

There were demonstrations of acrobatics, some of which would have been difficult for a human. We were two-thirds through and the big ape was behaving well. She was induced to sew, a humorous and dextrous exhibition, and to mark upon a slate, which she did with apparent interest, rubbing everything out and starting it over many times. I wanted a good close-up of this, showing the motions of her long hands. As the camera was moved up and re-focused I noted that the beast

was becoming restless. Suddenly the trainer spoke a sharp word. It was like a spark to gunpowder.

With a challenge between a screech and a yell, the chimp threw her slate across the arena. She hurled her chair the other way. Then she waved the table over her head. The stiff black hair on her body stood on end and she appeared gigantic. Her blazing yellow eyes rested upon me while I stood rooted to the spot with consternation. My glance also took in the alarming spectacle of the trainer tip-toeing toward the metal door behind the ape. He left the cage and the door clanged, leaving me alone with the enraged animal.

Men have been killed, mangled and broken by big chimpanzees. Something of the kind was indicated for me as the finish of this adventure. The chimp began a slow tramp, with stamping feet, in a circle about me and the camera. She swung one arm, then the other, in sweeps that would have knocked a man flat. This circular war dance, characteristic of chimpanzees, grew smaller until its diameter was a bare ten feet. Her hair bristled higher and higher, and she seemed to grow larger. A step would have pre-

cipitated a crisis. My sole thought was to dash the heavy camera and tripod at her if she rushed.

Then, through the stamping tread, came the rattle of the door and the trainer appeared with a gun. It was the kind of gun placed beneath a Christmas tree for a child of about five years. It had a tin barrel and a cherry stock, but the man pointed it at the ape with the sharp warning —"*Look out!*"

Instantly and to my relief she collapsed with a whimper and seemed to shrink to half her size. She retreated to a far corner with hands before her face. Pale and shaky the trainer covered my retreat with the gun.

"She's afraid of firearms," he said, "and I've managed her fits of temper with this thing. I forgot to bring it into the cage in the first place!"

Another experience and one with less thrill, though unique in the time consumed, covered the shedding and renewal of antlers of a large elk. This process is characteristic of all male deer. It takes place every year, the massive head-weapons dropping off each spring. A pair of disk-like

scars is left in their place. These scars are pushed off about a month later by swellings which appear beneath them and soon develop into bulbous growths which are covered with a furry skin called "velvet." Growth of the new antlers is rapid, sometimes as much as half an inch the day, and they soon start to branch and indicate their future character. They are fairly firm, but rubbery at the tips, filled with coursing blood and liable to grave injury. They are full size in about five months when the blood vessels at their base are constricted and the antlers turn into bone. The "velvet" is then rubbed off and the stag again bellows his challenge.

These events of a year were followed with my camera, the film story starting in October when the stag charged the range fence with a crash of recently hardened antlers. Some bits of action were picked up through the fall and winter, showing the fighting habits. I filmed the big events in the spring. First, the antlers dropped off. Then it was necessary to convince the big elk that he would be fed only at a certain spot for close-up work on his head. This made it possible for me to take a complete series of short scenes showing

the development and sprouting of the antlers, like the growth of a plant. There was no vacation for me that summer. The film records ended just where the action started, at the range fence, with a charge of the buck exactly a year later.

Filming of a beaver colony was going along at the same time. My plan was to show these animals building an island of mud in a stream, and upon this a mound-like house of long sticks gnawed down by the chisel-like teeth. There was a round entrance at the level of the water and when the house was completed the animals would go down-stream, build a dam and raise the water to submerge the house entrance. This would provide depth of water to evade enemies.

Study of the colony soon revealed the fact to me that the most important operations were not underway until close to sundown and continued through the night! But by having everything ready, with the camera carrying a telephoto lens, there was a short period when it was possible to work if using highly sensitive film. I visited the spot at the critical time, day after day, for weeks. An assistant finally informed me that ten thousand feet of film had been "shot." I edited this

down to a single reel. To obtain it we had worked through the entire late summer and autumn, all for fifteen minutes' projection.

My "studio" swung into indoor work again with the fall when specimens were coming from all parts of the world. Luminous beetles arrived from Central America. The phosphorescent light from their thoracic lobes was so powerful that in a dark room a watch could be read a yard away. This was demonstrated on the film. "Walking leaves" arrived from Ceylon. A collector in the tropics shipped a gauze contrivance of several compartments containing tarantulas. One of them escaped and for a week we shivered whenever a hand brushed fibrous surface in a dark corner.

Looking back, in recalling incidents that stand out, I have keen recollection of a handsome skunk which was on the list to be filmed. It had been the subject of very specific correspondence. A set was arranged to show a stone wall with grassy foreground. From a crevice in the rocks was arranged the usual backstage chute and liberating cage. Emergence of the animal from the crevice, stamping of forefeet, raising of bushy tail and

wandering out of the scene were figured as easily induced bits of action.

A fine specimen came from an animal dealer who had supplied similar examples to the Zoo. He was known as a specialist, because by humane methods he rendered these animals incapable of evil deeds. But by some ghastly oversight our vivacious actor was not of the innocuous type, though calm enough in his cage to feed from our fingers.

When the camera was focused on the stone wall an assistant behind the scene opened the cage into the chute. The creature emerged from the crevice and peered around. No finer result could have been produced. The indicator showed a run of forty feet of film. Lenses were shifted for a close-up. We were ready for the characteristic stamping of forefeet and to induce it made some energetic motions.

Then the worst happened! In an instant we realized the awful character of the trusted beast. Retreat was precipitate and conference verged on the hysterical. Decision was for one of us to crawl under the stage and obtain the cage, throw some pieces of meat into it and then come to the

front. Finally, and possibly under fire, the volunteer would set the cage in the grassy space.

The man who went on that mission was pale and we shuddered during his advance. The studio was in a populous neighbourhood. Removal of the black and white terror was of tremendous importance. But, as so often happens in my work, the animal did the unexpected. It retreated into the crevice of the stone wall. The man disappeared under the stage. A moment later he shouted "*He's in!*" Then we knew that this villain of the cast, possibly timid about the sputter of the arc lights, had gone into the cage and the door was down.

The cage was reverently covered with a motor robe and carried to an automobile with as much care as dynamite. Then we drove, carefully over rough places, until we were in the open country. We kept on going until we found some rocks with enticing crevices.

Anyone observing our care in removing that covered box would have rushed for the sheriff. The plan was to rescue simultaneously the motor robe and to pull out the cage door. The latter went flying and my assistant leaped for the car with the robe. The car was turned homeward.

## Chapter VII

# Wild Parties

NOT all my adventures were of my own seeking. Experimental work with my charges, in the studio and in the Park, naturally led to excitement. But a great deal that was hair-raising happened without the slightest warning to any of us.

In my first chapter I told how Congo, the pygmy elephant, was caught in the door of my office, and how we pacified him by staging a fake argument. But not all elephants—or other animals, for that matter—are as easily susceptible to suggestion or as tractable as was Congo. There are criminals among animals just as there are among men.

We had a big Indian elephant named Gunda, with wicked eyes and a distinctly cunning look on his face. For no reason at all that I was conscious of, he hated me with a deep abiding hatred. He had other pet and violent aversions among those who worked about the place. His own keeper, an intelligent fellow named Thuman, he

greatly feared. An angry shout from Thuman would send the huge Gunda cowering into a corner.

Gunda bided his time. And though we knew he was a "bad" elephant little did we dream of the sinister passion for revenge that was boiling in his brain.

In accordance with routine Thuman started to take Gunda out of the inner cage into his yard one morning for recreation. He walked beside the towering beast, guiding him by hooking his elephant iron not ungently under Gunda's loose chin.

Just before Gunda reached the door he gave a sharp sidewise jerk of his head which knocked Thuman off his feet and sent the elephant hook spinning across the floor. In an instant he flew for the helpless man with the cold fury of a deliberate murderer who at last has his victim at his mercy.

One has to know the incredible recklessness of elephant anger to appreciate the dreadful predicament in which Thuman now found himself. Only for a second was he stunned by his fall. Before Gunda reached him he knew that his chance for

escape from the stall was very slight, especially so long as Gunda's mountainous bulk filled the only exit.

Gunda now set about dispatching his man in the ordinary elephant way. In the dim light he tried to stamp on Thuman's body. Had he succeeded in planting one big foot he would have finished the job then and there, crushing the life out of Thuman in the twinkling of an eye. But luckily Thuman had fallen near a corner. As a result Gunda couldn't get his big head in close enough to place either of his forefeet.

Gunda tried kneeling. This was more effective. And though Thuman wedged himself as close to the wall as he could get, Gunda's massive knees grazed his body and jammed him painfully against the steel-plated walls. As Gunda wrathfully rose Thuman made a quick move to wriggle through to a refuse box which was connected by a small trapdoor. But Gunda was too quick for him. He seized Thuman's leg in his trunk and jerked him back with a wrench that nearly dislocated the hip.

Before Thuman could crawl away again Gunda swung viciously down with his terrible tusks

which were nearly four feet long. One tusk struck the steel wall and broke off halfway to its base. The loud noise of the fracture attracted the attention of a keeper at the farther end of the long building. But in the brief space of time before help could come Thuman spent the most horrible moments of his life. While he tried to cling to the broken tusk to save himself from the other, he was threshed about with a force that would have beaten a weaker man to a pulp. Finally his grip broke and Gunda rammed the good tusk through Thuman's thigh.

The other keeper arrived in time, as he thought, to see his friend killed by a mad elephant. He had brought his pitchfork with him. And while Gunda still bent over the prostrate and helpless Thuman, he plunged its tines into the tender stern of the hysterical elephant. With a scream Gunda turned and rushed through the doorway to annihilate his tormentor. The rescuer neatly sidestepped and closed the door. This keeper's name was Richards. He had years of experience with elephants and but for his bravery Thuman would have been mangled beyond recognition.

Thuman lived, but we had to execute Gunda.

Carl Akeley did the job mercifully with a single round from a small-calibre high-powered hunting rifle. Thuman knew, as we all knew, that the criminal elephant takes no heed of consequences. For instance, there was the case of a wild elephant in Burma that sighted a railroad train coming down the track which led through a portion of the jungle. Probably he had never seen a locomotive before. Anyway, his actions showed that he at once concluded that this long, large, black and noisy creature had no right to share the neighbourhood with him. He charged and met the train head-on. Although the locomotive weighed nearly fifty tons he smashed its front end in and completely derailed it. Of course the elephant was instantly killed.

I remember another male elephant that was "going bad," but still under fair control. Early one Sunday morning, just before the time when automobiles started to roll into the zoo grounds, the superintendent of the place received an excited telephone call to come to the elephant house. He arrived to find a pale and trembling keeper and no elephant. The keeper pointed to a great hole in the side of the building. The elephant

had battered his way through the side and was gone. Bricks and débris were scattered as from a blast. Already visitors were beginning to filter into the park.

A gardener dashed upon the scene. He told a gasping tale of the elephant cavorting in the creek several hundred yards away and of a trail of overturned benches and broken guard wires.

The superintendent grasped the keeper by the shoulder and spoke slowly and kindly.

"Open the yard gate and the door leading into the good stall. I'm going down to get him."

The agitated keeper watched his chief depart.

I'll continue the story as the superintendent told it to me:

"I went down to the creek and there he was—an awful sight. He was covered with glistening mud up to the top of his back and raising his trunk he shot spray twenty-five feet high. He was having a wonderful time, but the novelty was wearing off. I expected to see him lunge out at any minute and continue on the rampage.

"I went right up to him and, although my knees were inclined to wobble, spoke to him in the most matter-of-fact tone:

" 'Hey, what on earth are you doing down here! Ain't you ashamed of yourself? You come right along back with me or you'll get lost.'

"He wheeled around and I was ready to jump, but he came out of the mud, looked around and gave a little squeal. I know that sound. It means friendly greeting from an elephant.

" 'Come on now—you come right along home with me,' I said, as if speaking to a child who needed advice, and he trudged along after me. I didn't have a pick or anything in my hands, just walked along a little in advance of his head, putting a hand behind me, beneath his trunk to guide him. I felt chilly all over, but we were half back to the elephant house before anything happened. Then he stopped—to pull up a little flower!

"The thing that saved me was the elephant's fear. After the first few minutes of the mud bath he had started to ponder that he was in a strange place and didn't know where to go. When I showed up, acting in a calm and natural manner, he was probably as glad to see me as a person who has been lost."

To the public the big cats are the most terrifying of all animals. And yet you could take half

the bolts out of the lion, tiger or leopard cages and they'd never know the difference. They are crafty enough to watch for an opening to sneak through, and they would take advantage of a good opening in a flash, but they are not continually fretting around, ransacking their cages for weak spots the way so many other animals are. I think the way to put it is that the lion and tiger are more "sporting" in their philosophy.

There are over a hundred controlling chains in our lion house, all leading to the sliding steel doors which divide the sleeping compartments of the animals from their exhibition cages. All these chains run through metal conduits and emerge hanging in rows in a wide alley beneath the cages. This alley is well lighted. In addition, to prevent any serious error, the alley is painted white with bold black stripes between each section of chains. Large numerals designate the cage and animals to which each chain belongs.

One morning a new keeper pulled the wrong chain! He made his fatal mistake during the routine washing that takes place every morning. While this washing goes on each animal in turn is made to go into his sleeping den. If a lion or

tiger hesitates or is stubborn he may get a squirt from the hose to make him move on. As they all know this, a mere gesture toward the hose usually is enough to send the beast scuttling for his refuge. As each animal goes into its den, the man on the cage level shouts down to his assistant below who pulls the chain closing the den's sliding steel door. This shuts the animal in and the cleaner can enter safely and go on with his work.

When a cage is scrubbed the keeper tells his assistant in the alley to pull the chain marked "sleeping den" and let the lion or tiger amble out again.

On this particular morning the new assistant was down below closing den doors as each lion emerged, in order that the public would not be cheated by our charge sulking out of sight. "All right!" shouted the cleaner when he had finished number one and the lion had trotted out. In turn he reported two, three, four and five. When he finished six and went over into seven, the lion in six didn't come out right away. So while he was cleaning number seven he kept peeping through the small hole in the metal partition separating the two cages to see if number six lion had

emerged so that its sleeping-den door could be closed.

The delay apparently confused the new keeper. So when he heard an "All right!" some minutes later he didn't close the door of den number six, but opened the sleeping door of den number seven, the cage in which the cleaner was at work! The unfortunate keeper was happily scrubbing away in front of the cage when he happened to look up. Outside the bars stood an early visitor to the park, a fat squat man who wore a peculiar look on his face. This look so fascinated the keeper that he paused to enjoy it. It was a look of horror and bewilderment, just as if the visitor were about to have some sort of terrible fit.

Then, suddenly, the keeper realized that his look of horror was directed into the cage behind him. He whirled about and found himself face to face with Hannibal, our largest and fiercest lion.

When the keeper finally got control of his feelings he did the one thing that would save his life. He took the lion completely by surprise. He emitted a blood-curdling yell, sprang into the air and with all his strength hurled his water-filled

pail and his wet mop full in the face of the astonished beast. Hannibal was so unnerved by this attack that he tried to beat a hasty retreat over the slippery floor. His feet flew out from under him and he turned an undignified somersault back into his sleeping den. Poor Hannibal couldn't be persuaded to come out of his sleeping quarters for more than a week.

Of course, among the bears there are a good many different kinds of temperament. Probably the polar bear is the worst customer in that he has plenty of courage and doesn't hesitate to be treacherous if it suits his fancy. The grizzly is less aggressive, but he is not to be trusted. A few years ago one attacked Ned Frost, a Wyoming guide, while he was asleep in his blankets, and would have killed him but for the bedding.

I saw a good example of bear brains while I was travelling with a circus some years ago. I had no official part in the show, merely being anxious to get some first-hand observations. The brown bear cage had a ventilator two feet long and a foot wide near the top at the back of the wagon. The small slide covering it was opened

from the outside by the keeper when he wanted to give the bears air.

One morning a hard spring rain made it necessary to confine most of the animals, less they catch cold. However, the keeper thought a little wetting would do his bears good. So he left their ventilators wide open. Presently he saw the bear cage rocking to and fro as if the inmates were nervous. He peered in and found one big grandfather bear scraping away at the ventilator.

"All right, old man," he told the shaggy old fellow, "I'll close it if you don't like being wet."

Although the weather in the next town was dry and hot, a thunderstorm was threatening. There were clouds of dust and the thunder rumbled. The keeper was annoyed when he found the ventilators to the bear cage closed. He promptly opened them. But scarcely had he turned his back when he heard a scratching sound.

The grandfather bear was at work on the ventilator. He had got his claws through the bars, which were *inside the ventilator*, had hooked them into the wood and was gently but surely closing

the slide. He was now not only able to protect himself from the rain, but apparently was getting ready for it in plenty of time.

A group of beavers were added to our collection at the Zoo not long ago. We put them in the big beaver enclosure containing a stream which made previous inmates very happy.

But the newcomers somehow didn't like their new neighbourhood. They didn't complain or seem downhearted. They busily wandered about during the day examining the four-foot fence and the pile of brush and leaves that we had put near the stream with which they were meant to build their winter quarters. After dark that night they set to work. It would have taken several men to have accomplished what they did before the keepers discovered them next morning.

First they had transported the branches to one point of the fence. On top of the branches they piled water-soaked leaves, settling them down to fill the interstices. On the leaves, and mixed with them, they used sticky mud, all of which they carried between their paws and their chins. It was a fine ramp leading to the top of the fence. Had they been discovered an hour later the job

would have been done and they all would have walked across it to freedom.

Another time we planned, for our beavers, to build a dam in a certain spot that would give a good view of their work from the visitors' fence. We laid a plank on edge across the little brook that ran through their place to indicate the site we had chosen. Plenty of sticks and logs and mud were made available. Water soon began to trickle over the top of the board. Surely the beavers would take the hint and build there.

Twenty-four hours later all the mud and sticks were piled against the fence, thirty feet away from our board. We had the keepers bring all the material back to the vicinity of the board and left the beavers to their own devices. Again we found the building materials piled neatly down by the fence, and again we had it all brought back. We proposed to "fight it out on these lines if it took all summer." On the third move the beavers politely submitted to our views and built a fine dam right where the board was laid.

As captives, deer and antelopes are the most stupid of animals. To be born and reared in captivity makes little difference in their relative in-

telligence, except that such specimens lose their fear of man and are really more dangerous than the wild kind.

I remember that our official photographer made a dummy keeper and put it into a corral. When he had his movie camera ready he turned a zebra in with the dummy. Instantly the zebra caught sight of the helpless "keeper" and made a dash for it. Seizing it in his teeth he tore it loose, threw it down and trampled it to bits; not a pretty picture for the fellow who tended the creature.

One of our staff was attacked by a full-grown buck deer. Luckily he realized his danger and did not lose his head. As the buck charged he waited. Usually in such a charge there is a brief pause just before the final thrust, in which the animal tosses its antlers as if to be sure of his aim. In this pause the man seized one antler and pulled himself around to the animal's side. Had he lost his footing he would probably have been quickly gored to death.

The battle was now more even. The deer pranced and the man held on for his life, pressing as much of his weight as possible on the animal's neck. Presently he was able to reach over and

get hold of the deer's off foreleg. By lifting it he rendered the deer helpless.

If a hoofed animal gets an idea it saturates the brain and crowds out all other ideas. A keeper may have years of trouble getting a giraffe to walk out of a stall into a fine sunny yard, because the giraffe was once in a circus and slipped coming off a car with a steep gangway. It may never be willing to emerge from a door without a wild leap.

## Chapter VIII

# Buying "Dynamite"

AS the reader may already have gathered, the purchase and shipment of our new specimens is one of the most fruitful sources of adventure in my strange business. My experiences in escorting an oriental shipment form a good example.

I received word to leave immediately for San Francisco where some big orang-utans had just arrived from Singapore. There was also, in addition, a series of assorted animals from which I was to buy what was practical. I was not surprised on arrival to find a number of rival purchasers from zoos and circuses who had come to meet the same ship.

I bought some reptiles, some pygmy Philippine cattle or anoas, a husky male orang-utan weighing close to a hundred and fifty pounds and a baby of the same species. I thought the latter would be an interesting little friend for the many children who know the Park and recognized their individual pets. The work of caring for this

baby, with its finicky appetite and a snuffling cold, was a job in itself; but I took the risk as it was a particularly intelligent looking example. I brought the baby through all right, but it was the big male which gave me the real job. He acquired country-wide fame during the four days' overland trip to New York! Here are the pungent details of that unforgettable journey:

After the usual custom clearance a truck took my cases and the big orang-utan to a theatrical warehouse. It was necessary to leave them there for about two days, while I attended to formalities relating to government quarantine of the wild cattle I had bought. The cattle were to follow across in a month, cared for by express employees.

Unfortunately there was no place to put my big orang temporarily in a zoo as the local one was an open air collection. I found a good space near a sunny window at the warehouse. By nailing two strips of two by four timber to the floor and spiking these to the orang's cage, there was no danger of him walking it around the place by shaking the bars. A bright little Irishman, on duty during the day, said he would keep an eye on him. The understanding was that I would come

morning, noon and early evening to inspect and feed the animal. Meanwhile my baby orang waited outside in a taxicab. When I had the old fellow settled I took the infant to the hotel and in deference to the management went skyward with him in the laundry elevator. After the management discovered what I had in my room the ensuing arguments about violations of rules were continuous, but as they could show nothing specifying orang-utans I managed to keep my baby with me. He soon yanked the telephone wire out by the roots and got me into lots of trouble by other similar tricks.

During the stay in San Francisco I arranged with a Chinese restaurant to cook some rice and dry some loaves of graham bread for my charges. Fresh bread is not good for animals. Going into the Chinaman's spotless kitchen I inspected a batch of rice that was just right. Every grain was separate, nicely puffed, not too moist or too dry. As no container except a fair-sized aluminum pot was at hand, one of the Chinamen stuttered his willingness to walk over to my place. I told him the rice was for an animal, a big monkey, but he didn't seem to have the faintest

idea what I was talking about. He carried the pot of rice and I lugged the bread and some bananas.

I found the warehouse was dark and forbidding. A watchman admitted us. Inside, a single lamp burned high overhead on a suspended cord. It showed dim outlines of covered pianos and stacks of scenery. Among all this loomed the orang cage, showing only the bars and a black interior. The big fellow was in the shadow of its depths, wrapped in his tan blanket, of which he was very fond. As soon as it grew dark he threw this blanket over his head, clutched it under his chin and stretched out to doze.

The Chinaman stepped to the bars to peer in. He was holding the pot of rice. Fearing that he might be startled I grabbed him at the rear of the belt, but wasn't quite quick enough. The rice smelled good to the orang, and, even in the dim light, it looked good. Instantly a great, clay-coloured face, surrounded with wisps of red hair appeared at the bars. The top of the head and shoulders were covered with the blanket. A hairy hand, of excessive length, clutched the blanket under the chin. Darting from this apparition

was an arm, with hand nearly twelve inches long. This great member dove into the pot of rice and scooped up a tremendous fistful. There was a smacking of lips denoting an appetite in keeping with the picture. The Chinaman was horrified, but he made only a single sound; it was no louder than that of a little bird—just a sort of peep. The bowl of rice crashed to the floor. I felt the Chinaman's belt slip through my fingers as he fled.

My return to the East with my animals was routed by the fastest trains and best connection at Chicago. The matter of taking the orangs as excess baggage puzzled the railroad people, but was finally arranged. A carpenter built me a little travelling house for the baby and everything went aboard the baggage car of a crack train over the Union Pacific route. The passenger traffic manager gave me a letter to employees to extend all courtesies. Remembering past difficulties, I asked for a specific paragraph to dining-car stewards to give me anything which I might order and have it cooked under my personal direction. No food was put aboard except a dozen loaves of stale bread. Everything else could be obtained in the dining-cars.

The big orang's cage had a sliding panel of teakwood, with many holes bored in it. This provided protection when the cage was in open transportation. I didn't intend to keep the front in place while the animal was in the baggage car because he would not get enough air.

The baggage cars of the transcontinental fliers are just as long as the Pullmans. They have at their head end a steam turbine and a big dynamo, the former fed by a flexible pipe from the locomotive. The idea of this plant is to supply the elaborate lighting and fan equipment of the trains, where the ordinary belted generators on the Pullman trucks would be unable to keep the batteries charged. This apparatus keeps a man constantly on duty. With this man and the baggageman to keep an eye on the orang it seemed safe for me to remove the panel from the front of the cage. But, as an added precaution, I fastened the cage to the steam pipes.

My compartment was seven cars back, the only space I could get. But I promised the men in the baggage car that I would be up at least three times a day. Porters were instructed to quickly pass word back to me in case of emergency.

## Buying "Dynamite"

Around midnight of the first day's run there was a loud knocking at my compartment door. The porter apologized but said I was needed up in front. Staggering sleepily through the long avenue of swaying corridors and green curtains I came upon an irate Pullman conductor, a heavy man who had just cause for complaint. From what he told me, he had, from the first, felt little respect for an animal that wrapped itself in a blanket and looked like a tramp snoozing in the back of a big packing case.

It seemed that, though there was a desk at the head of the car, the conductor had absent-mindedly paused at the orang's cage to sort some of his car slips. Possibly the train struck a curve, awakening the orang, for when the conductor started away the animal was sitting up, still wrapped in his blanket. The conductor started by with no thought of evading the cage. Suddenly the orang shot out a hand completely enveloping the official's leg and brought him down flat! It was lucky the poor man hadn't broken both knee-caps. Now he indignantly demanded that the panel of the cage be locked in place to keep the beast from tripping up somebody else.

I argued that the car was very wide and that he had had ample room to pass, and now that he knew what might happen he could take precautions. But he was angrily obdurate. There was nothing to do but comply. Luckily it was cool in the car because we were coming down the slope of the Sierras. I put up the panel while the orang watched me with a lowering eye, though we were already on friendly terms.

When I visited my orang in the morning with cooked oatmeal, apples and bananas, the turbine mechanic pointed considerable wreckage out to me. What had happened was that as dawn had filtered into the car there had come a series of crashing sounds. The orang was rising and, wishing to open his bedroom shutter, began to smash it. He did a thorough job. The panel had been split into half a dozen pieces and hurled in all directions. After this he patted his blanket into a seat and patiently awaited breakfast.

I fed him the entire bowl of oatmeal from a tablespoon. When he finished he lolled back with an inscrutable gleam in his crafty eyes while the morning's housecleaning was performed in his and the baby's cage. Meanwhile the little fellow

was coaxed to take proper nourishment and had some treatment for his cold.

We ran into Ogden, Utah, for a half-hour stop. It was good to get out and stretch and breathe the clean, dry air. But up ahead there soon arose a commotion. I heard shouts and yells and laughs. The train crew were changing engines, but this was never attended by anything more apparent than a bump and hiss of adjusted air-brakes. I gathered that the excitement was at the baggage car. Instantly I concluded that my orang had something to do with the rumpus.

It *was* the orang. I found the baggage car was so full of crumpled paper that it looked like a safe receptacle for loose china. Moreover, the bulk of paper kept growing. It expanded and rolled out as if a giant were whipping cream. What had happened was that a newsboy had boarded the head of the train with a large bundle of papers to sell. The orang had grabbed the bunch and uttered a deep-chested whoop. What a joy it must have been, with nothing for a spirited orang to do in a monotonous baggage car, to be thus provided with recreation! He rapidly dissected page after page, waving them violently

and watching the mass fluff up into billowing mounds.

I unhesitatingly paid the boy for his whole bundle of newspapers.

The Ogden papers promptly published an account of the episode and it was wired ahead to Chicago that Number Two was carrying a very eccentric passenger. This story bore fruit as I progressed eastward.

That evening my anthropoid associate ate a hearty supper of fruit and stale bread. On leaving the car I was comforted to note that he had thrown the blanket over his shoulders as if preparing to retire at an early hour. However, around two in the morning there was another knocking at my compartment door. The porter didn't stop to apologize.

"Come right away, suh! Yo' big monkey have a long knife and walks all around fo' to cut baggage!"

I envied some of the peaceful snores sifting through green curtains.

This is what had happened: The heavy bread knife which I used to cut hard, stale bread into slices, had been slipped behind a protruding slat

in the car. It was hanging there by the handle when the baggageman started to shift trunks at Cheyenne. Fearing that the knife would be hidden behind some new baggage, he thoughtfully placed it on the top of the orang's cage. It was easy to surmise what followed. The ape had been awakened by the commotion in the car. He soon noted something had been laid on top of his cage. A careful squinting through crevices showed this something, and it looked interesting. The several openings in the top between the boards of teak were about half an inch wide. The night was long and the orang was refreshed from retiring at an early hour. Here was something to do! By sticking the end of his little finger through one crack, then the other, he worked the knife to the front. When it was near enough he made a curling reach upward through the bars and seized it.

In characteristic fashion the orang experimented with the shaft of shining steel, banging here and there until he discovered the end would stick in the wood. It was fun to do this and yank it out again. But the amusement was curtailed. The thing would only stick a little way

into the hard teak of the cage, or in the stubborn floor outside. Across the car was an interesting pile of leather baggage. It looked as if it could be dug good and deep. How could it be reached? Why, by a mighty heaving at the bars which stood a chance of slipping the cage from the troublesome rope, restraining it at the rear. That heave was probably a herculean affair, but orangs have great power. The cage nearly upset backward but it also slipped the cords running over a cleat at the top and jumped forward.

The commotion attracted the man at the turbine. He saw the cage advancing in jumps. At short intervals between jumps a long arm stretched forth, waving a shining knife. It was at this point that word was passed to me. I saw at once that it was hazardous to go near the cage. The orang had no idea of stabbing anybody; in fact, he had not the remotest inkling that the knife was a weapon. He was simply delighted with our interest as we danced around, and he kept on shoving the blade through chinks in the sides and back in demonstration that it was a plaything of varied use. I finally got it from him, by offering him in exchange, a long-spouted brass oil-can,

which was demonstrated by giving it a squeeze. Here, he instantly decided was something appearing to yield jets of nectar. He dropped the knife and stuck the spout of the oil-can in his mouth. The taste didn't appeal to him, but the new game was fun. I got the knife and we moved the cage into place, securely tied it and clinched a couple of nails over the cords.

This episode, possibly a bit elaborated, was also wired to Chicago, for as we stopped at Omaha there was considerable platform gossip during my rush around for strips and nails to repair the broken panel. It would be needed for the street transportation from one railroad station to the other, in Chicago.

As a result of all this advance publicity, a crowd of newspaper men awaited me and my Bornean protégé at Chicago when Number Two rolled into the terminal. The panel had to be temporarily removed and he was amply photographed. From Chicago to New York he rested and we reached our destination without further adventure.

I had another orang travelling companion that came into Philadelphia on a freighter. It was a

smaller one, though not a baby. He was a pet of the captain, but had such a number of accumulated misdemeanours that the officer wanted to donate him to the Park. He telephoned New York and asked me to come down on the first train I could get as he was leaving port. Custom clearance was quickly arranged, but when I asked the captain for the cage he said there wasn't any and he wanted to cast off in a quarter of an hour! The orang weighed about fifty pounds. When I spoke to him he threw long arms around my neck and I went ashore carrying the creature like an overgrown child. I hailed a taxi and drove to the Broad Street Station. It took only about two minutes at the terminal to gather a seething escort, but I went to the ticket office and asked whether I could take my "child" into the smoker on half fare—or what could I do? The ticket agent was so astonished he referred me to the station master. They sold me one ticket and sent a rocking chair into the baggage compartment for me.

One morning I received a telephone call from one of the older animal dealers whose disordered gloomy places are fast disappearing. The man

was excited and urged me to hurry down, that he had two big king cobras loose. We wanted to buy a pair of these creatures but I didn't relish the job of capturing them. Nevertheless the head-keeper and I started down. We carried a large fibre satchel in which were two deep, burlap bags, and a staff with a noose at the end.

The king cobra holds the palm as the largest and most active of all poisonous serpents. It grows to be fifteen feet long and is built like a great whip. From its size and extremely deadly venom it is by far the most formidable of any serpent. But added to all this is its curiously alert mentality or intelligence, and its common habit of deliberately pursuing and attacking humans. It is Indo-Malayan and fortunately not generally common.

We found the dealer in a bad state of excitement. He had had a shipment of birds from India and among the cages was a large case of the usual Oriental teakwood with a few holes at the top. It was heavy and he had caried it up to a room where he broke up boxes and cages, intending to knock off the top and carry the "python" it appeared to contain to the downstairs snake

cages. As he expected to find a twelve to fifteen footer, stupid on being exposed to the light after its long journey, he anticipated no trouble in two men carrying the beast—one at the head and another at the tail—leaving the box behind to be broken up.

He knocked off part of the cover and at the first glance was surprised to see so much space in the case. He expected to find the highly piled coils of the Indian python. The weight of the case had deceived him as teak is very heavy. Another look told the story. There were many loops of pale olive, no thicker than a man's wrist. As the dealer brandished the hammer in fright, an orange-coloured head with glowing eyes rose straight up. He backed for the door and the apparition continued to rise directly upward until the cobra had reared to the level of the man's breast, giving him a fearless preparatory stare. By this time the man had retreated through the door, stepping on the feet of the assistant who had come to help him. They both fell backward against the balustrade in the dark hallway. Just as the dealer closed the door he caught the flash of a second cobra rearing beside the first, the two

like great candlesticks. And they stared venomously at him!

I know only too well that curious stare of the king cobra. Its eyes are strangely brilliant—not luminous—but *alert*. The stare is piercing, as if to analyze and anticipate one's moves. The colour of the reptile's eyes usually matches the hue of its throat and head which are of ruddy yellow like an orange skin, giving the anterior portion of the snake distinct character in contrast to the pale olive body.

The dealer was terrified that the snakes would escape. There were two windows in the room, but they were safe because the place had been used for transferring large birds and the sashes were covered with fine but strong mesh, cut in panels stapled over the entire casing from top to bottom. The room, however, was about eighteen feet square, and it was filled with trash, broken boxes and their covers, which were piled waist and shoulder high. There were rats in the old building and the floor of the room had not been examined for years, owing to the litter. The dealer feared that rats might have gnawed through the floor to make a meeting place of the room and to

enlarge their travelling channels. If so, the cobras could escape into the building. He wrung his hands at the thought of king cobras at liberty in downtown New York and implored me to get busy. I'll confess, that right there I was somewhat apprehensive about going up to that room.

The first thing the dealer did was to take a key from his pocket and unlock the door. Then he backed off while we peeked in. There was nothing in sight. Fortunately, there was some cleared space on our side. The door swung inward and jammed on the floor when half way opened. I momentarily closed it to make more room. There was a stout piece of wooden strip loose on the floor which the head keeper appropriated as a staff. We had the two burlap bags and the stick with the noose.

Next we cautiously peered around, gently shoving a broken box here and there before we saw the first snake. A greenish fold protruded from beneath a case. The cobra was asleep. But I knew what he would do if we touched him: boil out from the shelter and rear in combat attitude, possibly come right at us. However, I figured we

could handle him with the two sticks if the second cobra didn't join the party.

"Go around behind me and open the door so we have a getaway; I'm going to stir him up!" I cautioned the head-keeper. He quietly moved behind me and grasped the handle. *The door was locked!*

My anger at the cowardly dealer for locking us in was hard to repress. But I had to grind my teeth and knock softly at the door. We didn't dare start any vibration by kicking it. There was no response. It was probable that the man was cowering downstairs.

We were in a fine mess! The door was too stout to be kicked through and the windows were covered with mesh. I told my companion not to hesitate, but swing hard and disable the cobra if he came at us. As there was nothing to do but start I poked the greenish coil.

Instantly there was a hiss like a muffled sneeze, deeper in tone than the characteristic sneezing hiss of the common Indian cobra—and out and up the serpent came, turning to us with his intent stare. His neck slowly expanded into the long narrow hood of his species, showing black and white spots between the scales.

That slow expanding of the hood was a favourable sign. The snake was hesitating between anger and surprise. I knew that here was the critical moment to get him. If the noose didn't work he would get one of us—or there would be a dead cobra.

My assistant slowly waggled his stick as I reached forward and upward with the noose. I saw the cobra's intent eyes give a flicking glance at the noose. There was also a slight movement of his head. But instantly the eyes gathered intensity in their gaze at me. Quickly the thin noose slipped over his head. But still he didn't move. A side swing of the pole tightened the noose and we pulled him down, the constricting cord narrowing his hood about three inches from the head.

The way that long body poured out from under the boxes was terrifying. There were fully twelve feet of him. He furiously chewed the stick, embedding his fangs again and again in it. When my assistant got his stick across the snake's head I grasped the brute by the neck. This is not so dangerous as it sounds if one knows how to do it. The idea was to back him into our bag. Mean-

while he was raising an awful rumpus in the room, throwing his body around and crashing over boxes right and left. I yanked my end toward a corner, the other man pulling the serpent hand over hand to the bag, then starting to shove the tail portion in.

We were successfully backing our first cobra in when we saw the other one. Impressions are sometimes instantaneous. I remember now that the throat markings were different and I realized the two were a pair. She gave us more of a shock than the first, being high on the boxes and rearing fully four feet besides. She looked balefully over the scene like an avenger about to descend.

"Swing for that one!" I shouted, gathering the bag around the first snake. He was helping, if anything, in backing into the bag in his effort to pull his head away. Catching the edge of the bag I waited for him to yank back hard—and when he did I let go. It was a fifty-fifty chance. He might have shot out like a rocket; but he didn't and he was not given an instant's handicap. There is a way of letting go such a bag with one hand and spinning it with the other that

instantly seals the serpent inside. I learned this years before and had taught it to all the keepers of the Reptile Department. The trick caught His Majesty by surprise and gave us two or three minutes leeway before he could push his head past the twists. All this was happening in less time than it takes to tell it.

At this moment there was an awful clatter beside me. It was my assistant trying to hold down the head and neck of the second snake. Now it was my turn to waggle the noose staff and stand ready. The lady pulled loose once and made a magnificent sweep at us, but missed by a couple of feet. We nearly climbed the wall in our scrambling jumps to duck that strike. A cobra doesn't strike like a viper, the latter being so quick there is a mere flash in the action. The king cobra sweeps forward in its strike and by a jump you can evade the movement if it isn't followed.

Now it was the cobra or ourselves and I was prepared to end it with a kill when the head-keeper made a swing between a blow and a push and pinned the creature's neck against the top of a tilting case. The case lay fairly firm. I fol-

lowed this by jamming the noosing staff nearer the head and holding with all my strength as she lashed and whipped her body all around the room.

"I have a good grip—pin the head!" I yelled. My man's stick advanced over the head. All at once we had her, grasped firmly by the neck like the first. Here was victory! By using his knee to lever the stick in down pressure, he pinioned her with one hand and grasped her with the other.

With my assistant now holding the snake's neck in a two-fisted grip and half squatting on the reptiles' anterior quarter, I tied the first bag. During the action with the lady cobra it had been rising and pitching from side to side like a drunken thing. We backed number two into a bag, which was a lively but not difficult act as there was nothing else to bother us. The next thing for us to do was to get the heaviest piece of wood in the room and batter down that infernal door. Here was a chance to vent our feelings. The racket we made in the job was satisfying to both of us. One panel was split in several places. A moment later we should have had splinters flying

into the hall when the door opened and the owner peeked in. One look at his face was enough to still the thoughts of the verbal abuse which was ready on my lips. The dealer, who was an oldish man, was as pale as clay, perspiring and shaking. He gasped for a statement of results and I told him we had both cobras.

I have never seen a man recover his poise so quickly. He was keen for a dicker. Within five minutes he was rubbing his hands and telling us what a fine pair of cobras we had. The head keeper gave me a slow wink. We were also recovering our own poise and breath. King cobras were sold for about a hundred dollars apiece in those days before the war, a price that meant a good profit for the dealer. Such a price may seem ridiculous for a creature of the kind, but the truth of the matter was that daring native snake-catchers would occasionally trap or snare king cobras, bring them into the Chinese animal dealers' shops in Singapore and receive their price. Then the buyer, having a tremendous respect for the specimen, would get rid of it as quickly as he could. Such creatures were shipped along with other animals and there was an extremely small

market for them. I had for some time been objecting to this indiscriminate shipping of deadly snakes and insisting that they should be transported only under the most responsible care. There was too much danger of their boxes being broken during careless handling or accident.

But to return to the action: "I'll give you a hundred dollars for the *two* snakes," I told the dealer.

He wouldn't listen to such a price, but was crafty enough to quote slightly lower than the average. I turned to the head keeper:

"Take them both upstairs and turn them loose where we found them."

That was enough. It closed the dicker. It was our revenge for the locked door.

There was some humour in the situation, but the really funny thing happened as we stopped for lunch. There was a restaurant on Park Row famous for its corned beef and much frequented by newspaper men along toward pay day when pocket money was getting short. We decided this place would be a good lunching spot where we could deposit our case while we ate. It wasn't far to lug the fibre receptacle in that direc-

tion and we shoved it under the table between us when we started the meal.

I had just sat down when someone slapped me on the back. It proved to be a veteran reporter of *The Times* staff whom I had always liked. Having an intense dislike for snakes he had in the past scolded me occasionally for leaving my satchel of lecture specimens in various parts of the editorial rooms when I went out on assignments. I now told him about our lively experience with the cobras and he was keenly interested, even breathing hard at some of the details.

"Those devils must be attracting a lot of interest at the Park!" he exclaimed.

"Not yet," was my answer. "I thought you understood. The thing happened only this morning. It's a long run uptown and we were hungry so we've just stopped in here on the way home. The cobras are right here with us! You've been kicking the satchel they're in for the past ten minutes!"

According to normal popular description, the fellow's knife and fork should have fallen with a clatter. But he only quietly laid his fork across an unfinished piece of pie—and walked out! He

had a corking story in *The Times* the next morning and said nothing but complimentary things about both of us.

On another occasion I had gone to bring in two monster pythons—which, by the way, are still living. Each was in a teakwood case about four feet square. Such cases have rows of air-holes and a hinged top. You raise the lid and there is the big snake. There is no mesh covering.

The snakes had arrived from an Indian port and there was a custom examination. I told the officer what I had, but he was a bit grouchy. I don't know what he expected to see, but when he was greeted with the spectacle of two bodies as big around as furnace pipe, coiled in mounds, he nearly keeled over.

"*Shut 'em down!*" he yelled.

There is little danger of a python trying to escape when a case is first opened because the serpent is for the moment blinded and sleepy from its long fast and confinement. It may raise a head and look around, but that is all unless the case is left open ten minutes or more. Then it may decide to prowl. If so it would take a dozen men to put such a monster back again!

My two charges were soon on a fast train, carried as excess baggage as has been my custom whenever possible on such trips. As they required no further attention and were properly stowed, with locks securely snapped over the hasps, I was about to make my way back to the Pullman when the two conductors appeared, both train and Pullman conductors. They had heard about the big serpents and wanted to see them. As theirs was an entirely courteous request, I had no objection to throwing back the tops for a couple of minutes. The men drew in behind me. The locks were unsnapped and I simultaneously threw back both lids. A head six inches long rose inquiringly and a blue-black tongue as long as one's finger described an up-and-down arc, as forked tongues do when the owner is curious.

I told the conductors about the length of the respective serpents and gave them a few other points, but my audience remained silent. I turned around to tell them there was no danger. There was nobody there!.

Locking the cases I went through the train and finally found the conductors. "Where did you fellows go?"

"You mean, *when* did we go," snapped the train conductor. "We thought those things were behind bars and got out as fast as we could on our toes, but the baggageman jumped through the side door!"

Hoofed animals require more thought in shipment than the big snakes or carnivores. They are not so secure on their feet as the shorter-legged, soft-footed kinds of animals, and they spend the greater part of the time standing while in their travelling quarters.

This means that their crates must be carefully built in order to approximately "fit" them, or at least to fit their temperaments. In buying animals and selling duplicates I have crated and shipped large numbers of hoofed species all over the states and a number to foreign ports. But I never build a crate without first measuring the animal. This is easily done, no matter how wild the creature may be. I note some patch of ground on which it stands, observing a pebble in front of it or some other mark, and then something similar behind it. I then measure the spot. Sometimes I watch the animal as it stands near a fence and count the number of mesh panels or bars

along its length. Its width of horns or breadth of shoulders, as well as its height may thus be determined.

Crates may be divided into two classes: one is narrow so the animal cannot turn, yet is wide enough to enable it to lie down; the other is wide enough to enable the inmate to turn readily. It is highly important to keep away from anything between these extremes because an animal may struggle to turn and become jammed in a crate. No-turn crates are, of course, cheaper to ship and are really the best for nervous animals. They are also used, almost without exception, for extremely large specimens. Crates have a vertically sliding door at the rear for entrance of an animal and this is slightly raised for cleaning. There is also a vertically movable panel near the floor on the front for temporary insertion of the water pan and for serving of hay, or, in occasional instances, some grain. But grain is risky to use during shipment unless an expert animal man actually measures out each feeding and notes results, or the trip is to be an extremely long one. There is always the danger of overfeeding—and colic.

The biggest crate I ever handled came into New

York on a ship from Africa and contained a practically adult giraffe. The vessel sent in a wireless when she was close to port announcing that the animal was aboard. We immediately queried the height of the crate. The answer indicated that the crate altitude added to the height of the lowest-slung truck obtainable produced a measurement that would never go through the vehicle runway of a ferry-boat—and the vessel was to dock at Staten Island!

When she arrived the profile of the crate looked like the side of a barn. I promptly ordered my truck to lie to in the city and await telephone advice. A power lighter was engaged and the captain said he knew a dock north of the Brooklyn Bridge where we could land the crate and the truck could continue up the easterly side of the city without coming in contact with the elevated except at Thirty-fourth Street, where it was high. Thus there would not be any trouble until we struck the overhead trolley wires of the Bronx, where we would have to look out.

All went well. The truck met me, the crate was transferred and we proceeded towards the distant Bronx, with me trailing the towering load

in a Ford. When a repair shop came into view I gave the truck our prearranged signal to stop—three squawks on the horn. It was getting on toward dusk and there wasn't time for detailed explanation. I was afraid of the trolley wires and wanted to see what was going to happen if we didn't make the Park before dark.

An efficient looking mechanic, saturated in grease to the roots of his hair, crawled from beneath a dissected car where he had been swearing and doing something in the illumination of a greasy drop-lamp. I told him to bring his largest wrench and come out on the street. He appeared with a monkey wrench of proportions capable of taking a locomotive apart. I pointed to the truck and to my car, spoke about trolley wires and explained that we wanted light directed upward, to see if we had enough headroom. He was a man of few words but keen perception.

"I get'cha," he said, and opening the jaws of the wrench just wide enough to grasp the underpart of each searchlight bracket, put a large foot on the front axle of my Ford to prevent the car being lifted bodily. He bent one and then the other light upward at the precise angle to give

the car the appearance of having severely bumped a preceding vehicle.

This was exactly what I wanted. It gave me a satisfactory analysis of our situation and the animal was delivered, after due caution but without trouble, that same night. And while the giraffe had been in its crate for weeks, without turning, it proved to be in the pink of condition. By morning it was airily swinging about its big corral as if it had been there for years!

There were so many experiences in chaperoning animals that I began to feel pretty well seasoned in this game. I was learning a great deal about animal psychology in skipping my experiences through buffaloes, giraffes, giant pythons and the like.

Once I was the escort from a big preserve in the Berkshires of "Apache," one of the finest bison ever to be exhibited and a flock of elk accompanying him. Apache was the type of buffalo that has made the American nickel look like real money. The only trouble with him was that he required a crate so big we could not get it through the ordinary freight car door. The elk, already stowed, moved off in a line of cars which were to

be shunted and reassembled farther down the line.

I sent Keeper Gleason ahead with the elk. He had accompanied me to do the cleaning. It was up to me to stay with Apache—on a bleak and windy platform, waiting for a car with a higher door.

It wasn't long before a car rolled up, pushed by a switch engine. The freightmaster had no help. Apache's crate empty would have weighed close to four hundred pounds; this in turn was held down by the four-legged giant's two thousand pounds of beef and bone. As a result everybody in sight, including engineer and fireman of the switch engine, was called to give us a hand to start it moving. We levered it up with crowbars, got some pieces of pipe under it, rolled it into the car and threw in a couple of bales of hay.

I gave the big fellow some water while near a hydrant. Although his eyes showed a lot of the white edge and he snorted in a way to make the uninitiated jump, he drank more than half of the sixteen-quart pail and began to eat some hay which I had shaken in to him.

By this time I had become acquainted with the engineer, a kindly soul, whose name was Bill.

Possibly he was a bit solicitous about me because he knew what I had in store—and I didn't. Bill had a moustache like a walrus and continually smoked a short pipe which sizzled like a leaky steam joint. He wore a peaked and thin cloth cap which at one time had been broadly stamped around its edge with some brand of goods or food, now but faintly suggested through its veneer of coal dust.

Bill asked me if I had eaten my supper. I told him there hadn't been a chance to get any, owing to the mix-up with the bull's crate. I asked him if there was time to run out to a coffee wagon at the edge of the yards, to get a bite and buy some pipe tobacco as I had run out of the latter.

He looked disturbed and sorry and said there wasn't time because he had orders to get my car out of the way. He had to take it out to a siding and leave it there for a string coming through which would pick me up and put me in contact with the cars which had gone out ahead. So that was that and Bill started for his engine.

Evidently deciding that I didn't look like a knockabout railroader and was peaked with the cold, he hesitated, then he invited me to ride in

the engine. Its hissing, heat-radiating bulk looked so tremendously inviting that I climbed aboard. I still had visions that the car would be dropped not too far from a coffee wagon. But Bill completely shattered this illusion. He opened the throttle of his dumpy four-wheeler until I was soon dancing and jumping around the steel floor of the cab.

Presently Bill raised the hinged lid of his seat and drew forth a much rumpled paper grocery bag. He next rummaged around, found a newspaper and tore off a page. "I had a sandwich left from m'lunch," he said. "And y'might as well have it for supper. Here's some terbaccer, too," he added. He yanked a huge tinfoil package from his hip pocket, pouring a mixture as black as tea leaves into the newspage. "They'll pick y'up in a while," said Bill when I left him. "We gotta hop."

We shook hands when we parted. It was a kindly touch and I appreciated it. The engine pulled away. A lone switchman appeared from somewhere, threw over the ground-lock and climbed aboard. Then Bill streaked along the straightaway, his trail of smoke hinting at activi-

ties of his spidery fireman. Such are the chance acquaintances of an animal chaperone.

After some acrobatic manoeuvres I gained the floor of the car and rejoined Apache. Once inside, I rolled the sliding doors shut against a bitter wind. There was still enough light to investigate the sandwich Bill had given me. It was of homemade bread with a fried egg and nothing from the hands of a professional chef ever tasted better.

The appeciation of Bill's tobacco was a different story. Three or four minutes' tussle with it in a pipe I had enjoyed for months convinced me that here was a brand few mortal men were strong enough to endure. Its effect on my tongue was similar to tabasco sauce.

The warming I had got from Bill's engine soon wore away. Apache's car was ghastly cold. I stamped and walked around and waited. Then I got out and ran up and down the track beside the solitary car—and finally climbed back into it. It was now pitch dark. Not knowing what on earth to do I listened to hear where Apache's breath was coming from. I was curious to see whether his head was high or low, and whether

he was still standing or lying down. Right there I made a tremendously important discovery. He was lying down and radiating *heat!*

I felt like cheering. I rushed for the hay and shook one bale layer after another loose until it formed a high pile beside the crate. Then I burrowed right into that mound and within five minutes was comfortable and after a minute or so more was fast asleep.

I was awakened by the slam of a bumper and the car jumped, but this didn't bother me any as I had probably been sleeping for several hours. It was merely an incident of the night. Before I dropped off to sleep again there was the snorting of an engine somewhere ahead or behind. My only reaction was a very brief decision that the motion of a freight car was curiously different from that of a Pullman. I met the other animals the next morning and Gleason swung the batch into New York.

Today, whenever I look at a buffalo, I have a feeling of affection for it; and on seeing a switch engine I often think of homemade bread.

## Chapter IX

# Playing with Fire

THE things that had interested me particularly among the reptiles were the fang mechanisms and poisons of different kinds of snakes. Fangs of a poisonous snake consist of a pair of hypodermic teeth in the upper jaw connected with venom glands in the temples. With some of the vipers they are long hypodermic needles, but among some of the deadliest reptiles, as of the cobra type, they are shorter than stubby rose thorns. With all, however, they are hollow and have the opening at the tip for the discharge of poison.

Fusing my investigations with the work of Weir-Mitchell, Calmette, Noguchi and Langmann, gross observations showed that snake venoms varied greatly in effect. I found that the bites of some serpents produce tremendous damage in human blood by destroying the red cells, breaking down the walls of the blood vessels and generally destroying the tissues. In bites from other species there is little of this dramatic mani-

festation, for the lethal fluid is at work in attacking nerve centres. This latter action is characteristic of the cobras and their allies, the victim being seized with an inability to breathe, owing to paralysis of the muscles that control the walls of the chest.

Never before had such an array of poisonous serpents been assembled for study as I had in the reptile house in New York. It was truly a wonderful opportunity of comparison in extracting their respective venoms.

Such points as the following were of peculiar value in my research: Of the New World poisonous serpents the South American bushmaster had proportionately the longest fangs; a twelve-foot specimen (received dead) from Costa Rica had fangs just a shade under two inches in length and as coarse as the needle of a veterinary syringe. The fer-de-lance ranked next in proportionately longest fangs. Of the New World vipers the North American water moccasin, which grows to be five feet, or more, in length had the proportionately smallest fangs; the copperhead snake had proportionately the next smallest. There was a considerable variation in proportionate fang

length among the different kinds of North American rattlesnakes. Ranking way above the others in the great proportionate length of fangs was the diamond-back rattlesnake of the southeastern states. In this development it rivalled the tropical species. I have rated this type as among the most dangerous reptiles of the New World.

I collected the venom of all these species for analysis and study. The method of obtaining was dangerous unless one used great care and remained consistently cautious.

Incidentally, I have never improved or changed the method I first adopted. My only accessories were a glass tumbler or ordinary drinking glass, a table, a long piece of heavy wire bent like a poker—or a thin pole with a blunt, curved hook at the end—and a stick like a walking cane.

I used this outfit as follows: A serpent was lifted from its glass-fronted case on the end of the bent wire, or, if very large and heavy, on the pole with the blunt hook. It clung to this by a loop of its body to keep from falling. Next it was placed on the table where it coiled to strike. Usually I manoeuvred quickly to press its head down with my stick, reach forward and grasp it

by the neck. It had to be firmly grasped by the thumb and forefinger immediately behind the angle of its jaw bones, or the outlines of the head. A poisonous serpent is really so devilish in temper and so keenly aware of the power of its fangs that if one were to allow even a quarter of an inch of the neck to be uncovered between the head and the finger tips the enraged reptile would twist around and bury the fangs in the fingers. Also, one had to be prepared to snap his hand back out of danger if the reptile slipped its head from beneath the stick—which often happened.

With the serpent safely grasped in one hand and its body supported in the otner I was ready to extract its poison by allowing it to bite through the sheet of parchment tied over the mouth of the glass. The fangs were always driven through by a flashing close of the jaws. Contraction of the muscles operating the jaws squeezed the poison glands, forcing venom forward and through the hollow fangs. A jet of poison instantly flew from the tip of each hypodermic tooth. To obtain quite a bit more than normally delivered at a bite I would squeeze the head over the glands.

This operation went on through whole series of

serpents. Sometimes as many as a hundred were handled during a couple of hours. The reptiles' glands would rapidly refill. The same subjects went through the process again within a week's time. They were in no way harmed beyond a ruffling of temper.

After I have worked with a good series the glass will contain an inch depth of the poison. From most species it is clear yellow, or amber, and slightly viscid, looking a good deal like orange juice. It cannot be kept in a fluid condition because it so quickly decomposes. It is dried and stored for laboratory purposes. This is done by pouring it into flat dishes, such as soup plates. To prevent contamination by dust these dishes are placed under bell glasses. Evaporation is hastened by cups of sulphuric acid placed within the bell glass in a separate container. In drying the venom loses about two-thirds of its bulk and finally forms a gleaming yellow veneer, which, in contraction, cracks in all directions. This cracking produces a crystallized appearance and the glittering flakes in a vial add to the idea. Consequently, a vial of dried venom is sometimes, improperly, referred to as "crystallized" snake poi-

son. There is no actual crystallization but simply a cracking into particles in drying.

In the dried state the venom can be kept for years without losing strength. At any time it can be immediately rendered fluid for experimental work by dissolving the flakes in sterilized water. I found that dried venom, rendered fluid in this way, was just as deadly as freshly extracted poison. Weir-Mitchell told me he had tested some that was *nearly twenty years* old and found it highly active. He, by the way, was one of the early investigators of the chemical nature of snake poison. Noguchi told me he had found it at practically full strength after being dried five years. It weakened, however, if exposed to strong light.

These investigations laid down the foundation for the preparation of a serum for snake bite now generally distributed to points of hazard all over the United States. The work also fitted in with similar investigations going on in other countries.

The pioneer in actually producing a serum for snake bites was Dr. Albert Calmette of the Pasteur Institute, at Lille, France. He mixed the venom of the *tic-polonga*, an Indian viper and the

cobra, immunized horses with the solution and used the serum as an anti-venine for accidents in India. Later he made a specific serum for each type. I secured some of his first tubes as a protection in handling the exotic poisonous serpents we had accumulated in our New York collection.

Calmette early noted the marked variance in action of poisons from different kinds of snakes: that of the viper destroying the blood and of the cobra acting on the nerve centres. At the same time, in North and South America the difference of venoms among the vipers themselves was receiving intensive study.

A few years ago more than twenty-five thousand humans were annually being killed in India by poisonous serpents. Several thousand a year were dying in Brazil from the same cause. With the study of snake venom so well advanced and experimental work with serum so encouraging, investigations speeded up and broadened.

Producers of anti-venomous serum soon realized they were calling on a natural force to assist them. However, while they knew its manifestations they were still in the position of the electromechanic in his definition of electricity. The

highly specialized electrical expert in the force he produces or controls will frankly admit he doesn't know whether electricity travels *through* a wire, or *outside* of it. There was the same doubt about the nature of the forces producing anti-venomous or neutralizing serums—also called *sera* in the plural—and there is yet.

It was seen that when repeated small doses of a certain poison were injected into an animal, Nature stepped in to protect it against the damaging shocks. An immunity was built up, rather quickly in some instances and slowly in others. What produced this immunity? There was the stumbling-block. Nobody knew exactly what took place, but elements were created in the blood, which greatly reduced or altogether prevented damaging effects from further injections or absorptions of the specific type of poison producing the change. In other words, the poison was neutralized.

These fortifying elements slowly built up to great power in an animal under the process of immunization. Further they could be separated from the blood bulk of an immunized subject and used to produce immediate neutralization in a

human who had come in accidental contact with the type of poison primarily used.

If a horse had been immunized against snake poison the serous portion of its blood injected into a human who had been bitten by a poisonous serpent rendered the victim largely immune to the action of the reptile's poison in neutralizing the lethal fluid. Even though there had been a delay in injecting the antivenomous serum and the victim of the accident had a badly swollen arm or leg, or might even be close to desperate condition, the symptoms were relieved and recovery took place.

By a comparatively painless process a small tubular needle was inserted into a blood vessel in the neck of the immunized animal and a considerable quantity of blood was drawn. The blood then went through processes in eliminating the red portion. The yellow, or serous portion, was further filtered to remove all unnecessary elements. Coming through the last stage of treatment it still continued to carry that mysterious element, producing neutralization in the subject into which it might later be injected. Injected into the human sufferer its effects lasted long enough for

complete recovery of damaged tissue and blood destruction, or shocked nerve centres. After that its effect passed away. One such injection did not long immunize a human, although a certain amount of resistance might temporarily be established.

Such work has resulted in the saving, say in a period of twenty years, of approximately a quarter of a million human lives throughout the world, as well as a large number of valuable domestic animals.

Dr. Afranio do Amaral, one of Brazil's great toxicologists, told me that in twenty years' development of serum in his country, the deaths from the bites of poisonous snakes had been reduced from an estimated five thousand a year to under one hundred; this, despite the fact that the population of Brazil had greatly increased!

In my contact with this development I later went to Brazil to visit and study the Instituto Butantan, located in the suburbs of São Paulo. The plant is also known as the *Instituto Soro Therapico*, meaning an institute for the study of serum treatment. It is maintained by the government and has attracted the attention of the

scientific world, hence its international renown. Its success and development are due mostly to the energy and high technical knowledge of Doctors Vital Brazil and Amaral.

A glance at a map shows the magnitude of Brazil. It is larger than the area of the United States, but unlike the States has a much greater area teeming with wild life. In the United States there are far-flung stretches of the Great Plains and the Bad Lands, and the great deserts of the Southwest. These corresponding thousands of square miles in Brazil are covered with tropical jungles, wild forests, or swamps, some of which are being slowly reclaimed. Such a country in the warm latitudes has a very large number of species of poisonous reptiles. Many tropical countries are menaced by their poisonous reptiles, but Brazil was the first to organize a strong defence on the home grounds.

Brazil is inhabited by a race of serpents belonging to a genus known as *Bothrops*. Among the species are the deadly *jararaca* (fer-de-lance), the larger *jararacucū*, the *urutū*, prehensile-tailed palm vipers and others. The largest is the bushmaster or *surucucū*, growing to be over twelve

feet long. There is a large and savage rattlesnake and a number of brilliantly-coloured species known as coral snakes.

Investigation has demonstrated to the South American scientists that they have four *types* of venom to deal with, demanding four specific grades of serum: one for the lance-heads or *Bothrops* species; another for the bushmaster; one for the rattlesnake; and the fourth for the coral snakes. They make a fifth, or polyvalent serum, which may be used when the victim does not know what kind of snake has bitten him and effects are puzzling in indicating the nature of the poison. This polyvalent serum is produced by immunization with a mixture of the several types of poisons. It is not nearly so efficacious, however, as a specific serum.

Antivenine is produced by repeatedly injecting horses with poison obtained from the snakes. The doses at first are extremely small. They are gradually increased in size. When the horses are thoroughly immune, after about eight months of treatment, the blood is drawn from them and the serous portion separated. It is placed in small tubes sealed with a glass-blower's flame. Each

tube constitutes treatment for one bite. If the offending serpent is large and symptoms are exceptionally grave the contents of several tubes are injected. The tubes will keep for years.

So specific are the different grades of serum that the type prepared by immunization with coral snake poison has little effect if used after the bites of the thick-bodied vipers. Indeed, all three grades of serum of the vipers are but mildly efficacious if not specifically used for the designated type of snake. The immunity built up in the horse is so powerful that the animal may be finally injected with many times a deadly dose and suffer little ill effect. This immunity slowly wears away and the horse must be again injected if serum is to be obtained later on.

Dr. Brazil explained to me that figuring drop for drop of the venom the tropical rattlesnake is the most deadly of the South American reptiles. That of the *jararaca* type is second in potency; and the poison of the bushmaster third. However, he says that the bushmaster is more dangerous than the others owing to its great size, length of fangs and large amount of poison injected at a bite.

While the Brazilian rattlesnake does not appear much different from some of the North American species of its genus, its venom is white (colourless), instead of yellow, as is the case with the northern kinds. Its bite produces a characteristic effect upon the nerve centres, which is not the case with the rattlers of the North. Curiously enough, despite this difference, we have the incongruous situation that serum produced by immunization of the South American reptile is highly efficacious in neutralizing the poison of the northern rattlesnakes—and also of the copperhead. On the other hand, serum produced by immunization with poison of the North American snakes has but slight effect in neutralizing the venom of the tropical type.

A steadily increasing hazard from contact with venomous snakes in the United States has arisen from the growth of hiking, camping and long-distance automobile touring. Through cooperation with the institute at São Paulo, Brazil, and the providing of large quantities of poison from the serpents in the reptile house in New York a fair amount of serum was for some time steadily and gratuitously supplied to this country.

It was several tubes of this kind that saved the life of our Head Keeper Toomey who was bitten in the hand by a huge Texas rattler.

Dr. Amaral of Brazil came to the United States some years ago and assisted in establishing, and became director of the Antivenine Institute of America. Here specific serum is now made for bites of the serpents of North America and of the Central American tropics. My part of that quest is over, except to serve on the scientific board of the Institute.

The thrilling part of the work was the early investigation when we were "milking" the snakes a hundred at a time, and particularly in the days when there wasn't any serum and one took a long chance every minute of the task.

I remember working side by side with Noguchi handling a batch of big diamond-back rattlers. After a tussle with one of these powerful rascals my hand would feel cramped and tired. Noguchi would pin his specimen down, grasp its neck and extract the venom, sometimes as much as a tablespoonful from one of our six-foot devils. Then he would drop the snake into a barrel. After

that, with a smile, he would point to the next and, with a little bow, say:

"Your snake."

We would work along like Alphonse and Gaston, taking turns. He was invariably cheerful and had lost most of the fingers of one hand from previous accidents. He always handled the rattlers with his mutilated hand, remarking that if anything happened he wanted to save the good one.

Well I remember the first announcement of Calmette's serum and how carefully I stowed the first tubes. Calmette's large, autographed portrait hangs near my desk today. I would rather have it than a throne decoration.

About the time I was doing this snake work that great jurist and my good friend of newspaper days, Recorder Goff, came to see the Park. He brought some friends. We walked around and returned to my office in the reptile house close to dusk. The visitors were impressed with the long passages behind the serpent cages. The lights were snapped on for a moment to show them how active some of the reptiles were as night

came on, an exhibition which made my visitors a bit nervous. The Recorder flourished his blackthorn cane and said he was ready for anything that might get loose.

"Young man," he said, "they are shivery things, but keep hold of the serpent's tail. It will guide you to accomplishment. Your investigations of these poisons will result in something worth while."

The party then preceded me down the passageway toward the outside door. I was just pulling the electric switches at the panel when a yell reverberated through the corridor. There was a scuffle.

"Anything the matter?" I cried.

"No," came the calm voice of the Recorder. "My friend here just stepped on the hose!"

## Chapter X

# The Fight Goes On

THE more work we did in the direction of making snake bites safe, the more snake bites there seemed to be! Of course what this meant was that the public was beginning to hear what we were doing and, in emergency, to take advantage of what we had learned.

When the news spread around that I had brought a number of precious ampules of highly concentrated serum for snake-bite back from a South American trip lively times immediately developed. Everybody anywhere near the home state who had the misfortune to be bitten by a serpent wired or telephoned to me for help. It looked as if a lot of the rattlers and copperheads in the East had suddenly decided to try their fangs against the gift tendered by my Brazilian colleagues.

A long distance telephone message came to my home late one evening from Ithaca. A man had been bitten by a big captive rattler. My daughter took two of the little boxes containing serum,

jumped into her auto and shot it out of the drive like a departing fire engine. She headed for Grand Central Station which I now had on the telephone inquiring for the fastest train for the West. As it developed that she couldn't make a direct train for Ithaca on the Lehigh she delivered the tubes to a conductor of a New York Central night flier. This train cut ten minutes from its running time to Syracuse, whence an automobile made the dash to Ithaca at an average of more than a mile a minute. It arrived with its floor boards charred through from the heat of the exhaust pipe. The victim received his injection about seven in the morning, and, although he was in a desperate condition, he was soon on the way to recovery. This was the first of a number of such rushed deliveries and the fame of the serum grew.

Meanwhile several areas in the Southwest had begun to call for additional tubes from my diminishing stock, all of which was everywhere dispatched gratuitously. There had been a number of accidents in the southwestern states and I ceased sending it out when just enough was left to protect my keepers in the Park against acci-

dents. We were now up against it. I couldn't keep pestering my Brazilian friends to send me serum as a courtesy and the government wouldn't permit them to send it in commercially owing to a technicality in the Treasury Department. There was a clause in the law relating to production and testing of serum. The Brazilians weren't following the stipulations of this clause. So, although the institute at São Paulo had shown the world a marvellous work and Dr. Vital Brazil was conceded to be a pioneer and expert of the keenest type, the product was barred from the United States if he attempted to sell it. The incongruous part about the stipulation was that Dr. Brazil could give his serum away in unlimited quantities and the recipient in the United States could in turn donate it, but it could not be sold.

At this point Colonel Martin L. Crimmins of the regular army, stationed at San Antonio, Texas, a keen reptile student and one who had been insistent about maintaining a stock of the product, grew indignant at finding the supply exhausted. Noting the increasing number of accidents among children he had himself immunized

with repeated small doses of the poison and became *in person* a stock for emergency cases.

There was also developing a healthful publicity about all these events. A cure was known for a considerable hazard, but we couldn't get it. In fact, there was a whole gallon of rattlesnake venom at Dr. Brazil's headquarters which I had presented to the cause. It was enough to produce immunization among a large series of horses and supply the United States for years.

Then, abruptly, light broke through the clouds. Dr. Afranio do Amaral arrived in the States from Brazil and the H. K. Mulford Company, a veteran organization in the production of vaccines, decided to produce the serum if the brilliant Brazilian could be induced to take charge. Amaral accepted.

A scientific department was formed to assist the Mulford production. It was called the Antivenin Institute of America and was composed of technical experts serving without remuneration. The institute published a scientific magazine on matters relating to habits and distribution of poisonous reptiles and the treatment of accident cases therefrom. Dr. Thomas Barbour, the noted

reptile systematist of Harvard University, became prominently associated. He assumed charge of experimental work in the Central American tropics. The guidance of experimental stations in the United States, situated on both coasts and in the central areas as well as in the South, was placed in my charge.

I had thought that with delivery of the gallon of rattlesnake venom to Dr. Brazil my work in snake poison was done. But it now started all over again. Amaral and I first worked together. When he was settled at the Institute I kept it up alone and sent poison to him. Then another institution wanted a quantity for experiments. It wouldn't have been fair to refuse them when the others were getting it. Mentally, and almost literally, I was smeared with serpent poison as vessels of the shining yellow stuff were continually being dehydrated in my office.

But Amaral was a rapid organizer. He gathered a collection of reptiles at his laboratory and from these acquired enough poison to carry on immunization among his horses from which he could produce serum for the States.

Once again it looked as if I were through with

my "snake milking." I was, for the time being, and through forever, I hope, with the wholesale handling of angry rattlers, copperheads and moccasins. However, it was all to start again, after a moderate lapse of time—with cobras!

This last series of poison parties started when two gentlemen called at my office for a conference. The result was that my expectation of taking a rest in handling poisonous reptiles evaporated in thin air. The callers were Dr. Adolph Monaelesser, a noted surgeon, and Professor Alvin Tenny, of Columbia University. It seemed that Dr. Monaelesser had decided to give up his surgical practice and concentrate on the application of modified snake venoms in the treatment of nervous disorders, and also in treating certain abnormal growths. He had, in the past, been provided with small quantities of venom by Dr. Calmette in France. Now he wanted me to become associated with him in his work and handle for him the extracting and drying of the poisons. He needed two types, the venom of vipers in treating nervous disorders and of cobra for cancerous afflictions.

One of the first things he wanted to do was to

reduce the lethal action of the venom before actually diluting it. Knowing that it lost strength when in a dry state if exposed to the light, he intensified the process by treating it with the X-ray. Two methods of obtaining the poison were used. That of the vipers was obtained in the usual way, by holding them and having them bite through parchment tied over a glass. Another method was used with the cobras, owing to their very short and stout fangs and loss of venom adhering to the parchment. They were held in the usual way and permitted to close their jaws upon a small square of stout glass with polished edge. A little pool made up of six or eight drops of nearly colourless fluid would be left upon the glass.

Cobra venom not only differs from that of the vipers in lacking the amber hue, but it adheres to the glass more tenaciously. The viper poison may be knocked clear of the glass by several slight jars when dry, flaking off in little quadrate particles. In contrast the cobra poison must be vigorously scraped off. It adheres almost with the tenacity of varnish.

I was startled to learn that a considerable

amount of it was needed, for I would rather handle two dozen vipers than one cobra. The latter is a strong twisty type of snake and if it gets away will close it jaws on the first object it touches, hanging on like a bulldog in order to saturate the wound with its particularly powerful poison. If a vein is thus punctured there is little hope of the victim coming out of it, despite the immediate use of serum.

In scraping the glass to obtain the yields from a number of cobras I learned something about this specific venom that was new to me—and also very unpleasant. Realizing the danger of minute splinters of the dried venom flying or possibly floating upward and coming in contact with my eyes, I wore goggles. To be doubly safe, when there was a lot to scrape, I placed the glass under a larger piece of glass on high pegs thus making a little transparent table through which I could look. Cobra venom is characteristic in being absorbed through mucous membranes. Coming in contact with the moist conjunctiva of the eye it might cause serious trouble.

The scraping was accomplished, the venom collected on a steel wafer-like blade and deposited

in a test-tube. But, despite my precautions, there was trouble within half an hour. I developed a dull pain in my chest, a pain which built up to the magnitude and symptoms of a misplaced stomach ache. It soon grew severe enough to make me walk around, caved-in like a pugilist who has stopped a punch he didn't like.

Being of an observant nature and uneasily realizing that this was a condition worth study I kept close tally of the symptoms, thinking it might be necessary for me to do something medically. I purposely didn't take my pulse, realizing I was a bit scared and would feel worse after getting a mentally speeded count. The sensation finally passed off within a couple of hours with no remaining symptoms except a feeling that I had been punched and a restlessness which seemed to have something to do with it.

When the venom was to be scraped the next time I took it into a room where a broad band of sun hit the table, made a couple of passes with the scraper and watched results. A surprising thing happened. The stuff actually *smoked*. By this I mean that during the scraping it fumed off a fine dust which curled as lightly as smoke in

the beam of sun, flowed from under the glass cover and upward in the still air of the room. In the illumination arranged it was easy to see that exceedingly thin, ascending spiral and step back from it. The remedy was simple. I arranged a slight air current to carry the smoky dust away from the table, but not strong enough to agitate the visible portion being scraped free. From then on I was free from unpleasant symptoms.

Dr. Monaelesser and his assistant had similar experiences in Paris where they had gone to confer with Calmette. In preparing to fluidify some venom I had sent him he poured some upon a piece of paper and tapped it so the particles fell upon the platform of a delicate scale. The treatment sent some of the fine particles afloat and he inhaled them. His symptoms were more prolonged than mine and his assistant was similarly ill.

A big black, spitting cobra from Africa promised to give plenty of poison. He frequently showered the glass front of his cage in an endeavour to send jets of the fluid from his fangs towards visitors' eyes. I made a glass-fronted box for him and put him in it, then crouched down and peered

at him. He sent jet after jet against the glass until we could barely see through it. The subsequent scraping yielded a generous amount of the whitish powder.

Repeating the experiment a week later we found that while his venom glands stored a similar quantity, the specific gravity of the poison was very much lighter and that it lacked in heavy fluid content. A comparison might be made between light and heavy snow. If one takes a tube of snow falling in low temperature and melts it, it will yield but a small quantity of water, while so-called "heavy" snow, falling during a higher temperature may yield a water content fifty per cent of its former displacement. We also found that fluid from the freshly filled glands was not so highly toxic as from a serpent that had had a rest from biting for some time.

Summed up, this points to an inactive poisonous reptile being particularly dangerous. Further, serpents that have just issued from their hibernating dens in the spring, with glands of venom retained from the previous autumn, are far more menacing than a specimen met prowling during the summer months. It was a rattler of

the former type that bit Charles Snyder, my former head keeper, and killed him. Snyder at first refused to concede that a puncture of but one fang could be very serious and toiled out of the woods three miles from the ledge where the accident occurred. His idea was to seek treatment at a nearby town, and not to bother before he got there. But by the time he reached the road a warning hum through pulse and brain convinced him that it was to be a battle for life. He pluckily fought, but lost.

What is the chemical analysis of this fluid which Nature has so potently brewed and for which she has provided hypodermic teeth for its injection? Monaelesser's definition is the most simply expressed and the best I have seen unless one wishes to read many pages of technical deduction, which are not particularly helpful and among various writers not always in accord. We were discussing a simple definition to answer the frequent question as to just what the venom is. He thought a moment and wrote the following on the back of an envelope:

The density of snake venom is somewhat greater than that of water. It is composed of a

mixture, in variable proportions, of proteid substance, mucus and débris of epithelial cells, some fatty matter and salts such as calcium chlorides and phosphates, also ammonia and magnesia.

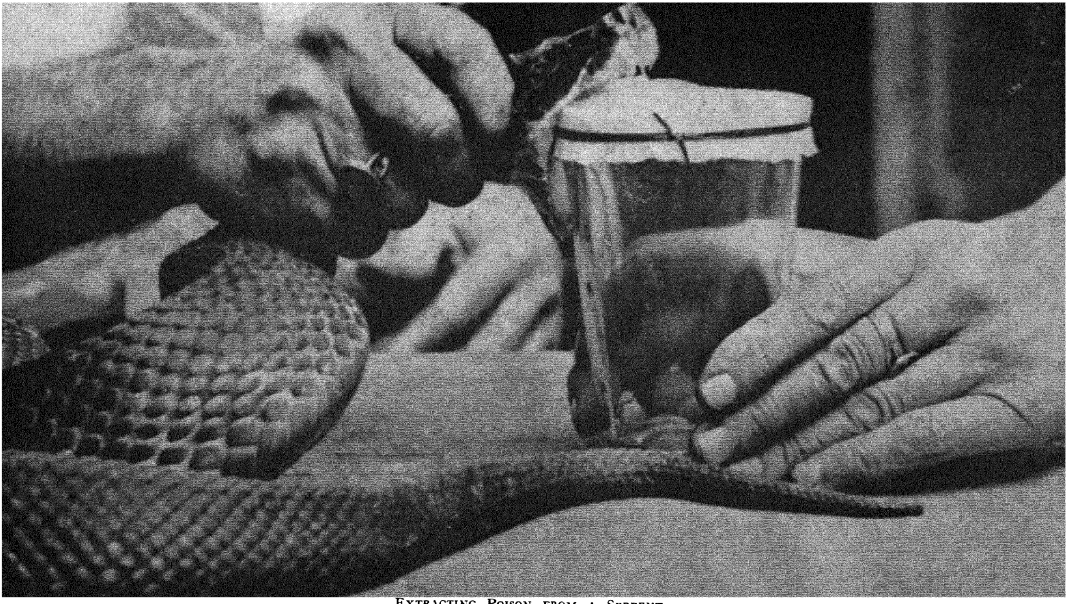
That is a well-rounded answer and will satisfy anyone but the ultra-technical investigator.

A curious slant about the whole thing is that if an analytical chemist were given some of the poison, without explanation, and asked for a report, he would, possibly in more detailed and technical terms, provide the same answer. Not knowing what it was, he would consider it merely an animal fluid, probably obtained from the stomach walls. He would find nothing unusual about it, no outstanding elements to make it seem peculiar, nothing to indicate that it was a poison, one of Nature's deadliest, and no chemical reaction to warn him that a drop of it getting into his blood could kill him! Then again another anomaly crops up, as Monaelesser is demonstrating. Highly diluted and thus in restraint it appears that the venom's properties of producing shock and tissue change may even be productive of much

good in inducing processes of rejuvenation or correction. Surely here lies a great field for the research work of tomorrow.

During this period the Park had many notable visitors, but two persons, whom we never met so far as we know, were the most interesting. Their visit was not exactly scientific, but I feel I should not omit it from my story. They provided one of the greatest mysteries ever recorded in cosmopolitan New York. And with every detail told, in strictest regard for the truth, the tale is so strange that even Conan Doyle might have doubted its being seriously considered by his immortal Sherlock Holmes.

There are two passageways behind the big cages in the Reptile House. One extends east and west and is about a hundred feet long. The other runs north and south and is about sixty feet long. These passages have a row of high wooden doors, sheathed in galvanized metal. The doors run on tracks and open into the serpent cages. They are secured with heavy locks. The ceilings, walls and doors are painted gray; the cement floor is likewise painted until it glows like a ballroom in reflecting the overhead row of lights. Every



EXTRACTING POISON FROM A SERPENT.

The venom is used in producing neutralizing serum to treat snake bites by repeatedly injecting small quantities into horses. The snake strikes its fangs, which are like stout hypodermic needles, through the parchment and the operator obtains more poison than would normally be yielded at a bite, by compressing the venom glands in the temples.

FORCE FEEDING A STUBBORN PYTHON, WHICH HAS REFUSED TO EAT.

Several rabbits have been killed and sewed together with twine. They are run down the serpent's throat with a smooth bamboo pole. The height of the action at the moment was with the keeper (nearly invisible) wrestling with the python's tail.

brass knob, even the brass valves of the long rows of hot-water pipes are kept polished. These spotless passages look like part of a ship and their care indicates the discipline in a building where there is so much that is silently and sinuously dangerous.

Keepers of the Reptile House are on duty before the staff officers arrive. One morning as I came into the Reptile House from behind the scenes I found the head keeper and the watchman standing behind the end cage of the shorter passage. The first thing I noted was a litter of matches on the floor—an unheard of thing in this area where one reaches down to pick up a single offending pebble. But there was more than the matches.

Lying on the floor of the passageway was a cleverly-made contrivance like a jointed staff. It could be bent to any angle in reaching around a corner. There was a movable jaw at the end and by a short lever-like attachment this jaw closed tightly against a rigid jaw when a cord was pulled. It was a good device for picking up a dangerous serpent. Lying beside it was a carpenter's brace with extension bit for cutting out a large round

hole. There were a pair of pliers, a metal cutting chisel and a hammer.

The tools had been put to skilful use. The metal sheathing of the door had been neatly cut with the chisel in a series of radiating lines and the metal turned back with the pliers in a circle of flaps, leaving an area of the wooden door exposed. This had been neatly cut through with the extension bit. The hole was large enough to admit the jointed staff, but at the moment was plugged with a polishing cloth from a nearby shelf, stuffed in by unknown hands.

This was not all. The men took me around to the great glass panel forming the front of the cage within the exhibition hall. A deep scratch on the glass made a triangle of the lower corner, although the glass had not been tapped and broken. Most surprising, however, was an object on the floor. It was a violin case. The end of it had been cut out and was replaced with a little sliding metal door, also operated with a cord and lever mechanism. The cage contained two cobras, the deadliest specimens in our whole collection.

As the serpents glared at us, we realized there had been a frustrated attempt at robbery. If it

had been successful, the cobras would be gone. Where? The door at the end of the passageway which leads outside and which was seldom used, had been unbolted from the inside. This had been the getaway.

The first deductions were simple enough. The watchman visits the building about once every hour during the night to check up the fires and recording thermometers. He comes in through the basement and up a spiral stairway. The basement entrance of the building had been unlocked. The Park, however, is a locked area in itself at night, being surrounded by a high fence with barbed top. As no doors or windows were jimmied, the burglars had entered by the basement. All of the upstairs lights had been cut off at the switchboard when the head keeper left the previous evening.

It had not been a long job to cut through the metal-sheathed door. Obviously that hole had been intended for reaching through with the jointed and jawed staff, grasping a cobra and shoving it out a broken corner of the glass into the violin case. Everything had been ready for knocking out the corner of glass when the return-

ing watchman was probably heard. The getaway had undoubtedly been investigated and made ready in case of emergency. As the watchman's feet clanged on the spiral, metal stairway, the marauders hastily departed.

One thing impressed me as particularly strange. The tools were of exceptionally good quality and had been skilfully used. There was an unmistakable, workmanlike neatness in cutting and bending back the metal and cutting through the wood. The long staff was well made and so was the metal door of the violin case, even the corners being rounded off with a file as a good mechanic unconsciously finishes a job. But the mass of paper matches in the passageway, leading in a trail to the front of the cage was wholly out of keeping in a job like this.

Marauders of such mechanical precision should have had flashlamps, not paper matches. They must have burned several packages, but had left none of the covers with the scratch strip. And then again, men desperate enough to attempt a job like this could have hidden in a dozen dark places to evade the watchman and his lantern—then returned to the job.

At least two persons had been concerned, one doing the mechanical work while the other scratched matches. I could imagine the mutterings of impatience as the matches went out, the stops for sufficient light properly to strike the chisel. Men on a job like that must have been impatient for the crisis of reaching in and grasping the cobras and shoving them toward the hole in the glass and into the violin case.

We called in the police, of course, and there was much writing with stubby pencils in memorandum books. Following the police came the detectives who asked many questions. We had a long conference and there was the usual check-up, of existing evidence, but I wasn't at all impressed that anything would come of it. The detectives were inclined to favour the theory of a new and diabolical type of murder, a fair theory considering the circumstances.

Since that day I've often sat and looked at that violin case and pondered. I have thought of things that could be done, so devilish it isn't well to cite them, but I'm not inclined to favour the murder theory. I think somebody wanted those cobras for a harmless but *eccentric* purpose.

I have seen some curious characters on the Reptile House floor. One was an East Indian, who came at times of day when few people were about. I watched him from a palm-screened corner as he went toward the cobras and straightened, as if he were bowing. I strolled by him, with a faint, friendly nod, and thought I noted a reproachful look in his dark eyes. About what? Possibly about those captive cobras, considered by some of the cults to contain the souls of the departed. He had no reason to blame me for neglect of the serpents. The skins of all our reptilian inmates glow with the lustre of health and their patterns are as bright as if squeezed from a paint tube. They all receive the best of care, no matter how poisonous they are.

There were several other visitors I remembered. One who would stand an hour in front of the King cobra, with his hand in a curious position, as motionless as if carved in stone.

But I can't forget that violin case. Such a receptacle, of all things, and the exact mechanical nicety in doing the job, so far as it went! But matches for illumination, in combination with modern tools! The episode remains checked solely by a large symbol of interrogation.

## Chapter XI

# Snake Charming

MY interest in reptiles has naturally led me down some strange alleyways of information. And I have not overlooked the fact that the serpent is one of the chief symbols of mystery in ancient lore. The so-called "snake charming" of today is one of the survivals of man's early obeisance to this form of beast.

I recall a dinner on the terrace of the Continental Hotel, at Tangier, in Morocco. Hadj Mohammed Beni Brik was dining with me. He flowed in white draperies set off with a high scarlet tarboosh which the Mohammedan wears until he goes to bed.

A native snake charmer sighted our party. Accompanied by a long-whiskered attendant carrying a dirty looking drum much like a nail keg, he took his station about ten yards from us. The attendant squatted on the grass and began to thump his drum. We didn't pay much attention to them at first. The drum never ceased. It was *thump-thump, thump-thump*, always in the same

cadence. Meanwhile the "charmer" played with a few skinny and harmless serpents. I recognized the species; they were whip-snakes from the semi-desert area back of the coast. Our attention finally encouraged him and he started some tricks. One was interesting.

A basket of his outfit was stuffed with dry grass, the kind lining the sun-baked roads. He took a wad of this grass and clawed it out close to our table. Grasping a handful he breathed into it and it started to smoke, then burst into flames. He did this with several bundles. We wondered if he concealed and scratched a match within the bundle. He calculated our thought and made some of the bundles smoke a long time. We examined some of the charred patches but couldn't find a trace of a match. He burned all his straw, did a few more tricks and took some of our money. The drum still kept up its incessant thump.

Deciding that I was too good a prospect to leave, the man returned to his reptiles. His manoeuvres were about exhausted, but a hopeful gleam lurked in his large, dark eyes. Grasping the tail of a six-foot whip-snake in his teeth he

started to rotate like a whirling dervish. He turned faster and faster until the serpent stood straight out. The drum never changed its cadence. It looked as if the tail of the serpent would give way and the reptile fly straight at the table. I felt sorry for the snake.

"Stop him," was my request to Mohammed Beni Brik.

There was a flow of words mixing drawl with nasal intonance and the snake changed its angle like the slowing unit of a circle swing. The drum continued until the last coin of the final collection dropped into the upturned basket cover; then it stopped.

"Did the drum annoy anybody here?" asked Mohammed.

"It has been thumping for three quarters of an hour," I said gently.

Mohammed began to apologize: "His performance was not wonderful and his serpents are not of the exciting kind, but I thought it would interest you. The native drum always accompanies such exhibitions."

"No, no, Mohammed, I am not complaining or annoyed. I feared he would bite off the ser-

pent's tail. I hardly noticed the drum. If anything, it was soothing. I am interested in the effects of sounds."

We spent a half hour going into an analysis of intonance—for Mohammed had a keen mind and had read a great deal. As usual, here I was on a vacation trip, but talking shop again!

If a dishpan had been beaten for three quarters of an hour that day we would have been badly jarred. By that I don't mean any more volume than the drum, but a higher pitch of vibration. The human ear is fond of slow vibrations. That is one reason why the deeper-toned drum has been associated with almost every human race. With many uncivilized races drum vibrations predominate in satisfying them in the production of artificial sounds. It was study of intonance that brought the radio industry to its present magnitude and put the tottering phonograph back on its feet.

When the radio came to the stage where loud speaker horns could be used it grew like wildfire, partly because it made lots of noise rather magically produced. Engineers realized that this "noise" covered only a part of the scale of vibra-

tions produced by the broadcasting stations. Take a yardstick for example and call it the full band of sound vibrations, from high pitch to low. Say that the first foot and a half represents the higher-pitched notes in music and when you get towards the middle you approach vibrations of medium frequency—using a radio term in indicating the vibration of the speaker mechanism. From eighteen up to thirty-six inches, or the latter half of the yardstick, is the approach and realm of the low frequency sound, the drum and bass instruments. Early radio horns didn't cover much more of the band than the upper eighteen inches of the yardstick illustration.

Cones were introduced and slower vibrations were heard. Speaker mechanisms were improved and reproduction crept on down the band until a bass background could be noted. People were then willing to pay more for radio sets. The novelty had worn off, but owners were getting real music, more soothing music because of its slower vibrations. A horn that had been satisfying because it made more noise than the neighbour's outfit was now thrown out because it was too shrill. This hit the phonograph because it,

too, sounded shrill compared to the range of slow vibrations produced by improved radio. Then, by electric recording of records, electric pick-up arm and amplifying devices, phonograph records were made to produce low tones and the phonograph came back. It is the deep tones which made radio as popular as it is today. If it had continued strident many would have become sick of it. This principle applies equally to the drum. The human is pleasurably susceptible to low pitches and may be swayed by such sounds. This has led to some curious observations in sound pitches that I have made of what might be called actual snake charming—very different from the mere trickster's exhibition at the table in Tangier.

There is fascination in the thought of snake charming. Playing on the belief that serpents can be charmed we have the performance of the circus—the "snake enchantress" and her family of boas or pythons. Her serpents in their subdued actions may convince the members of a sideshow audience the reptiles are drugged or hypnotized. Yet they are neither drugged nor charmed, even though this act of the circus is no fake. The snakes are tamed, or, as the saying

goes, "broken to handle." They are so accustomed to handling by the owner that they permit her to twine them around her neck or body. They are, of course, of the non-venomous kinds. They travel in padded trunks in folds of the best woolen blankets and are fed on Sundays when the show is quiet.

Circus "snake charming" has slight relation to the subject I am coming to, except to define something readily understood and possible to learn by those who are not afraid of reptiles. The man who swung the serpent in his teeth may be classed under this head. There is nothing strange about him. But there is still one thing about this kind of person that must be checked off. Like monkeys, dogs and some other animals, serpents exhibit nervousness when in contact with *some* people. These people may have no fear of snakes and be calm enough in their actions, but something inexplicable is out of harmony with the tame boa or python, which restlessly glides from one hand to the other in an emphatic endeavour to get away from contact it doesn't like.

I am not trying to inject mystery here. All of us have observed that intelligent dogs show either

interest, indifference or dislike towards visitors. Humans may display the same reaction. We feel an immediate liking for some person or a dislike that forms like a flash. There appears to be more than mere visual impression in such interests or antipathies, something we feel, yet fail to understand. Isn't it possible that animals, with their keener sense, feel such effects more markedly? And that certain types among them strongly react to influence we unconsciously exert? We might say that some humans exert a "power" over certain animals while others do not, and some repel such animals.

I can add to this point by giving specific observations. Monkeys are particularly keen in reaction. The docile kinds are eager to make friends with anybody who is interested in them and will jump to one's lap or perch on the shoulder. I have watched them with various people. With an animal so cute and interesting as a monkey there is an inclination to stroke and pet the creature. With some, the monkey will cuddle down and friendship is immediately established, but with other persons there is a slight start and clearly illustrated uneasiness on the animal's part

while it endeavours to slip away. The touch of a hand appears sufficient to produce the reaction.

Returning to the serpent: clad in clean overlapping scales which are soft and thin and which, under microscopic examination, seem to be extremely sensitive in the array of delicate nerves, a touch to them is probably magnified in its influence over the effect upon a monkey or a dog. There may be just a brush of relationship here to sound vibrations as the invisible but constant nerve tremor of the human and other living creatures surely varies in its "frequencies." Bearing the serpent's sensitive scales in mind we come to what I define as true "snake charming."

Among the Hindus and Arabs are some men, a few, who seem to have mysterious power in handling snakes. They can pick up wild specimens of the deadly types and the reptiles become calm and submit to handling. This power is not altogether limited to men of Oriental origin. I have watched men of American birth handle rattlesnakes with impunity. They did not claim to be snake charmers. They were interested in snakes. The reptiles were quiet and clung to their hands like so many tame king snakes. Their

rattles were passive, except when an observer waved a hand at them. Placed on the ground they coiled, rattled and prepared to strike when onlookers made a threatening step in their direction.

If I gently reached towards such a specimen with my hand, while keeping a safe distance, I noted no softening in their attitude during the slow advance. The owner could reach down, however, and pick them up without their striking and they again were quiet. I have tried to handle one while wearing heavy mitts so as to take no chances, but, despite the most gentle movements, they were very angry when I picked them up.

As the man figuring in these particular experiments was in no way freaky I could talk to him and ask many questions. When I asked how he had acquired his mastery he replied he didn't know, but thought he had always unconsciously possessed it. He had been interested in snakes from youth. Years before he had been highly apprehensive of the rattlers' fangs, but, becoming bolder, had taken chances and finally commenced to pick them up with his bare hands. They seldom resented and then only to rattle for a mo-

ment. Towards others these same reptiles were savage, as poisonous serpents usually remain.

The Hindu and Arab snake charmers are usually descended through families of snake charmers. But even among these types only a few can do remarkable things. Some are mere fakirs.

I met one of the unusual types in the country back of Algiers. We were looking for an interesting old Arab who told fortunes in the sand. We had heard of his quaint character and curious prophecies. A travelling snake charmer came along on his way to the coast where some big touring steamers were expected. He said, however, he intended to spend the winter at Biskra, that the air there was much better for his snakes. These men can be awful liars but he explained he had been making his way for a couple of hundred kilometers from inland, where he had gone for cobras. There is a species in the region bordering the Sahara. He had a sort of harness-like strap over his shoulders from which were suspended several little kegs containing his snakes. Each had a white cloth cover to shield it from the sun.

I was properly introduced by the interpreter and the old fellow seemed to take keen interest

in me other than mere greed to pick up some money. He had a batch of fine fresh cobras, sleek and fat, and a few desert whip-snakes. Without any precaution he opened a little slide in a keg and hauled out three cobras. They were full of fight and reared to face us, uttering the characteristic sneeze-like hiss. He said he would show they knew their home and placed the keg on the sand. In a minute or so they dropped down, started on a glide of investigation, but one after another made for the keg and as they reached it seemed to almost snap in. He took them out again and asked me to closely approach them. I advanced to a safe distance of about a yard. They can't strike that far. They hissed, wheezed and struck at me repeatedly.

It was then that he did one of the remarkable things I have referred to. He reached into that bevy of deviltry, palm downward, and the cobra under his approaching hand contracted its hood and lowered to the sand. It seemed to be pacified. He picked it up casually, walked to the keg and it glided in. He repeated the performance with the other two except to hold the last one for a moment in a gentle grasp by the neck. It did

not struggle, but he tapped it on the nose. It opened the mouth slightly—*and there were the fangs!*

I gave him a generous present in money with the word that it might speed him on his journey —and was invited to go with him on a hunt.

"In one of those new steel-bellied wagons that creeps and does not sink," the interpreter translated, "we could go fast and to many interesting spots."

He was referring to the light Renaults and Citroens equipped with caterpillar treads which are now being used for desert travel.

From my personal experience of years with serpents of many kinds, both wild and in captivity, it would seem I have no power over them except the ability of taming the good-natured kinds, which are not restless in my hands.

Another phase of snake charming relates to the use of music. Here again I have noted strange things which appear to be well understood by some Hindus and relate to sound frequencies formerly mentioned. With most of the lower caste Hindu snake charmers there is faking in the use of music. The famous cobra dance is a fake, eas-

ily duplicated. I have several times demonstrated this in the living room of my home with a cobra from the laboratory. While my guests were inclined to sit on the backs of their chairs, I have shown them that the rearing cobras of the Hindu are not dancing to the shrill notes of the reed-like instrument employed but nervously following motions of the man's body that is characteristic of a snake in constantly shifting its position during preparation to strike to the best advantage.

The actual effect of music on snakes has to do mostly with nervous cobras which seem to be susceptible to certain vibrations. It has nothing to do with snake "dances." It pertains to enticing a cobra from some hiding place when it is captured by the charmers, sometimes hired for the purpose. It also includes remarkable effects upon the cobras by certain strains of music.

The reason for music affecting snakes is a mystery. It has been doubted by some scientific men, but I believe in it after close observation. Certain sound vibrations attract a serpent and others momentarily render it helpless. I am inclined to think that the latter are pitches so strident—to the snake—that they are magnified a hundred-

fold over those, which, to the human ear, seem merely to irritate. As the ears of snakes are deeply embedded, very crude affairs, I do not think these reptiles actually hear, but *feel* such vibrations over the surface of their sensitive scales.

Quite recently I closely watched some studies along these lines by a young Hindu from one of our universities. While he did not understand just what pitches of music, or sound frequencies, were necessary to affect the cobras, he was in possession of the elongated, guitar-like intrument called the *sitar* and used by Oriental snake charmers. He also knew how to play it. We spent several hours in front of the cobra cages but noted no positive results. Then we moved to the cage containing the King cobra, thirteen feet long.

We opened the panel over the mesh ventilator in the rear so we could watch him and he would get the full effect of the music.

The whine of the *sitar* was soon filling the passageway. The cobra had reared to watch us.

After a few minutes we noted that he swayed slightly, then fell forward. He lay for a couple of seconds, then sprang back to his rearing pose. This happened again in about five minutes and

the brief collapse was preceded by a shudder along his neck. The occurrence was witnessed by two veteran keepers of the Reptile House.

My Oriental friend had produced the effective pitch or vibration, but couldn't classify it, or remember in what note or chord it had occurred. He went repeatedly over the same passages of music without result. Playing the next day he produced the effect three times. The frequency or vibration was possibly produced by unconscious force in striking the strings of the *sitar*, or in some synchronization or blending of a former note with one that followed.

We were encouraged, however, to extend the experiments and try radio music. We set up a receiver and powerful speaker.

Results were curious, for we played several orchestras without results. I had anticipated results, if any, from saxophone strains, but we had the most marked reaction of all during the piano prelude to a song. The cobra fell forward and lay partially on his side for several seconds. We had another of these collapses during a song. I realize how horribly unethical it would be to give the name of the artist.

It was probably a piano note in the song that produced the affecting pitch. I am convinced that the production of such pitches at will is understood by some of the Hindu snake charmers.

There are mysteries about true snake charming —and there is something to it.

## Chapter XII

# A New Angle

ALMOST without my realizing it, I found that my work with animals was sweeping me into another branch of natural science. This was the observation and study of weather conditions, not only at home in New York where we kept our specimens but in the parts of the world which were their habitats.

In searching for and observing cold-blooded creatures, whose vivacity or sluggishness is produced by environmental temperature, it gradually became a habit for me to watch the weather and seek all ways to anticipate its changes. I had to do this, for instance, in the spring when visiting a snake den for rattlers or copperheads needed for poison experimentation. It was then a case of an auto ride for a hundred miles or more to a sufficiently remote range of ledgy hills for serpents to be really numerous. They usually collect near some specific crevice among the rocks that is too deep for penetration by frost. All the serpents for a mile or two around come to this

crevice. Their fall travel to such shelter is similar to the migration of birds. They are guided by a strange instinct that seems uncanny, over rocks, through tangles of brush, up the canyons, then ascending the slopes to the exact spot.

On the proper spring days they emerge in numbers. Note that designation of "proper" days. A few may come out on any sunny day, returning again before the chill of late afternoon comes on and possibly staying in for a week during the vagaries of spring weather. They dislike a wind that blows against the ledge and many of them go back if broken clouds cause the sun to be intermittent. But there is the *kind* of a day that brings all of them out, to lie in groups, intertwined until they look like patches of bright-patterned tapestry.

That kind of a day comes when the young leaves are just uncurling from the buds, giving the woods the effect of a green haze while the air is soft and almost motionless. The temperature is usually about seventy in the shade. Simply to wait for this kind of day would be like shooting at something in the dark. Spring days may look fine in the morning, but fail to hold steady. It

may suddenly grow cloudy or a cold wind blow up. The kind of day I am describing is caused by definite, far flung and steadily moving conditions on the weather map. Air pressures and wind directions figure in the production of this condition which may be determined a day or so in advance. It results from a sluggish gradient of "Low" crossing North America from west to east along the northern states, the winds gently flowing around it and towards it. In the area in advance of it, where I am to do my hunting, the wind is naturally flowing from the south. On noting this condition I make one of my regular trips to the snake ledges, always being careful about whom I take along, as these dens are rather secret places and I dislike the idea of having them raided by irresponsible persons who might again return and wantonly slaughter the reptiles. There are dens of this kind where the reptiles have never done any harm to anyone, anywhere in the area, and to which I have returned for more than twenty years.

Thus the weather has influenced a great part of my work and I couldn't write a book of experiences without a chapter about such contacts.

# A New Angle

There have been times when weather calculation has saved me from rather hazardous conditions. Then again the weather has been a background of fascinating interest when other things were dull. The point of the wind means this or that. Sky manifestations—a drift of neutral stratus clouds, mountainous cumulus, which can mean much or little according to the air pressure. Or barely discernible streaks of cirrus, to be regarded as warnings of a storm and the convergence of the dustlike streaks at the horizon indicating the direction of the approaching storm.

The weather map is easy to understand. Movements of "Highs," which are the clear areas, and the "Lows," which are disturbed spaces or storms, follow definite tracks. Given this daily map, an aneroid barometer, which is as easy to read as an alarm clock and shows the proximity by pressure of the "High" and "Low," and a view of a windvane or smoking chimney, any high school student can see what is happening.

Once I suggested to one of the government staff that the weather map be published generally in the daily papers, as it is published in a comparative few. My idea was that the public could

then learn to comprehend the map and the suffering local forecaster need only point to probable ensuing conditions and soft-pedal too definite prophecies. "Highs" and "Lows" occasionally do contrary things by switching over on side tracks or detouring around what might be called an atmospheric obstacle. The reply my suggestion received was that such an arrangement would create a heavenly condition of relief for the Bureau, but it wouldn't do. The public wanted the prediction in exact terms, even though it maligned the weather man.

An example of how a weather forecast can go terribly wrong and arouse the ire of the man who daily looks at the "weather report" but doesn't know how the thing is done, occurred during the writing of this chapter. Unfortunately this is more likely to happen when storms are of particular vigour. There was a storm of considerable intensity crossing the United States on what might be called the southern track, which has an inland branch extending from it and leading northward. The storm was immediately west of Alabama and conditions indicated that it would continue eastward, thence quickly working its

way up the coast—a normal course. The barometer was falling to the east of it. If it reached the coast there would have been strong northeast winds, flowing towards it and around it. These are cold winds and bring rain. The forecast was made to this effect and the anticipation was naturally of a cold northeast storm. That forecast had to be estimated right then and there to get the report to the daily papers. But it was made at a precarious time.

The storm was close to the branching track. Indications *pointed* to it coming east, but it didn't. It left the usual eastbound and switched up the northern course. No more unfortunate thing could happen for the weather man's peace of mind. There was his storm, in plain sight—to him—but in changing its course it handed him the meanest kind of a trick in completely reversing, from every angle, his forecast to the public. Passing to the west and north of the eastern cities the counterclockwise wind flowing around it pushed up from the south the soft warm air of the Gulf Stream. And because its precipitating area was in its advance, this was thrust to the north of the region under forecast and there was

an ideal day with the bluest of skies and balmy breezes!

Fortunately, I am not called upon to make predictions except among technically interested friends who realize what can happen. I make many predictions to myself, and if things go radically different the result is just as satisfying and possibly more interesting, as I know just what it means and how it happened. And at any rate I have been prepared for the emergency. But my sympathy is extended to the government forecaster who must snap predictions to the public. These are spread broadcast and grimly noted. He is like a witness in court sternly held to yes or no—which in his case is rain or shine—with no chance of extenuating explanation. He is a profound scientist who thoroughly understands his specialty and without him the modern world would be in a sorry mess. He should be entitled to publish an explanatory paragraph under each forecast about what may happen—or doesn't happen.

I have always enjoyed steaming into the hurricane zone during the time of year these storms may show up. The hurricane and the typhoon are

the same type of storm. They come into being over stretches of tropical ocean where the heat of the water causes great areas of air to rise. These ascents of moisture-laden air induce extensive drafts to rush in from the sides. A rotary motion is set up, partly from the in-rush, partly from the earth's rotation and possibly stimulated by the stiff trade winds blowing in opposite directions north and south of the sluggish area where the cyclone is born. This established rotary area in hurricanes north of the equator turns in a direction opposite to the hands of a clock. In similar storms south of the equator the swirl is clockwise. With the great twisting area well established the whole thing begins to move in a definite direction, carried along by the general air drift. Heated air from the sea rises from its centre with greater velocity as the feed-in from the sides grows in magnitude. With its advance, which constantly adds immense quantities of water vapour piling up in seething clouds of great density, the cyclone grows in bulk, area and fury until there is a great circular storm of a hundred to three hundred miles in diameter. Circular winds sweep within it at speeds of a hundred miles or more an hour. In

the centre is a calm, though the sea is in confused turmoil. This calm centre is the so-called "eye" of the cyclone. It may be from five to twenty-five miles in diameter. It is often free of clouds and deceptive to the uninitiated in its brief sunlight or glimpse of moon.

There is a mistaken idea that such storms race ahead at great speeds. True, near the centre of a hurricane the wind may blow ninety to more than a hundred miles an hour, but it is blowing in a great circle within the storm, a circle not visually apparent to the observer as the wind seems to go straight by. The whole area of this enormous swirling storm seldom moves faster than from ten to twenty miles an hour.

The tremendous accumulation of cloud masses by rising to contact with cooler strata of air condense to produce such torrential rains that one can barely breathe within their fury. The horizontally driven rain really cuts one's skin and the uproar of wind is too gigantic to be described. Owing to the great diameter of the disturbance and its slow passage these conditions may endure for hours.

Imagine a horizontally spinning disk approach-

ing you, turning counterclockwise. As it comes to you the approaching semicircle, or its first half, spins from left to right. The centre passes and there is a hole in it. The latter half of the disk, or the following semicircle is naturally spinning from right to left. This is the explanation of how the wind "reverses" after the centre of a hurricane has passed. As the eye or centre of the storm goes over there is a brief calm. It may last half an hour, or slightly longer. Then comes the wind of the following half, from another direction. This explains how some people, in describing a hurricane experience, speak of *two* storms. It is all the same storm, confusing the uninformed observer by its calm centre.

In remembering the revolving disk we should not be misled about one thing. The most severe winds of tropical cyclones are near their centre. In many of these storms only the internal diameter of a hundred miles, or less, is actually severe. Outside of that area the wind may not blow harder than forty to fifty miles an hour.

Apply this description of a hurricane's form to the fall and winter storms of our northern latitudes. They also are cyclones, meaning

they are circular and revolve, although with less energy than the tropical storm. They may be a thousand miles or more in diameter and many cross the states from ocean to ocean, moving in easterly direction in three to four days. Some come from the southwest and others move up the coast. The reason they "last" so long is owing to their great size, requiring considerable time in passing. Some of them have a large and comparatively calm centre. This may be a hundred miles in diameter and take hours to pass over. Then the wind reverses on the opposite side. We say it is going to clear because the wind has "changed" to the west. That means we are on the opposite or clearing side of the storm. Such storms carry most of their precipitation in the forward or advancing semicircle, or even but a portion of this where damp winds flow in from that side. The following half may be strong in tempestuous winds and ragged clouds, or "wind clouds," but it is comparatively clear.

Wind direction announces the approach and position of such storms. The barometer, an instrument for showing varying air pressure, usually indicates the severity of a storm and its rate

of movement, coming or going. The approach of storms is shown by falling barometer, as storms are shallows in the earth's atmosphere or what the meteorologist calls a "Low." The barometer is therefore a highly important instrument on shore and shipboard. No other type of cyclonic storm creates such a rapid and excessive fall of the barometer as the hurricane.

To be fair to the hurricane or typhoon it should be said that they have definite zones in the several seas wherein they whirl their vigorous ways. These storms occur in the China Sea, the Bay of Bengal, east of Madagascar and east of Australia, with Samoa also a point of dramatic visitation. The West Indian type travels westward, in the opposite direction from our northern storms.

Approaching the longitude of the West Indies the tendency of hurricanes is to make their way north and east after their grand sweep across the Atlantic. In other words, they seem to change their mind and seek to get north and run across the one-way boulevard of the northern Atlantic storms. Once they come west of the West Indies there is no telling what their course will be. The "Highs" of the weather map determine the situa-

tion. At times, particularly in August, a great plateau of high air pressure lies almost across the northern Atlantic and forms an impassable barrier. If there is a break in this pressure, forming a lane of "Low," the hurricane squeezes through, changes its course and moves northeast, following the usual direction of northern disturbances. This accounts for the many recurved tracks on a hurricane chart showing the passage of these storms during a period of years.

A tropical cyclone caroms off air pressure of a point or two over 30 inches reading of the barometer. With knowledge of these storms a threatened coast watches anxiously for a "High" coming out of the west.

Unfortunately, the "Highs," or police of the air, are often not in a favourable situation ahead, nor are conditions enticing to the hurricane for a move northward at sea. Hence some of the great West Indian cyclones are not thrust back or turned northward until they have swept up on the Gulf Coast or the Atlantic Coast with tremendous destruction from wind and tidal rise.

What happens if a steamer is advised about the approach of one of these storms? With the

modern wireless the sea is well charted, and there is no chance of a hurricane being anywhere near the steamer lanes without all vessels with radio equipment being advised of the approximate position of the centre, its indicated or present direction of travel and the speed at which it is moving. This is not difficult because vessels exchange barometer readings and wind directions, indicating whether they are ahead or behind the disturbance, north or south of it. These observations are picked up by weather stations in Cuba, Mexico and the United States, classified, charted and studied, then revised and reported to all ships.

If a storm is distinctly dangerous, these reports may come at hourly periods so the captain may calculate getting by ahead, going to the rear, or slowing down to wait for the centre to pass.

I was on a vessel which passed through the edge of a hurricane. From the position of the storm the captain had stated he was pretty sure we would not get much of it without materially changing our course and speed. The air was full of weather reports and the authorities ashore were charting its progress like the course of a ship. It appeared to be about two hundred and fifty miles

in diameter. One vessel was reporting swells fifty feet high. The day before we brushed it the air was as clear as a bell, but at sunset there was a pinker sky than usual and when the sun went down a gray veil swept out like dust. The barometer was steady and stars could be seen.

I was awakened about daybreak by the slow pitch of the ship. A heavy swell was running, which looked like hillocks of oil, big fellows long and broad with barely a ripple on them. When the sun rose there was no sign of the storm save a coppery glow which quickly changed to gray, a hazy unbroken veil, without a streak or dapple.

There were rapid developments. The barometer started to slack off. A bank of clouds came up from the edge of the sea ahead and to port of us, rising higher and higher and in all sorts of shapes. They were the thickest kind of clouds, like heads of cauliflower, coarser than thunder clouds and of various hues. Some boiled up in dark olive, parts of them were white as steam, others were like lead and mixed in the mass were areas like oil smoke. There was no continuous wind, although some nasty squalls would roughen the swells and then die away. The cloud masses

kept rising and the barometer falling. The mountainous clouds kept going up and up until they were almost overhead. Then the lower part became a solid dull gray. It was a sinister sight and we wondered when we would get inside the area of steady wind.

Around eleven I noticed a few scattered black rags against a dirty green ahead. They were mean looking wisps, stretched out in such a way you could see they were hurrying. It was not long after, that rows of this scud could be seen low down and rising—or we were coming nearer to them. I noticed a single wisp far from the others, racing overhead. It was now blowing hard. The sea had begun to boil. It grew darker and explosive squalls came along with the wind. They passed with a roar, carrying sheets of mist that looked like racing fog. The swells were rising to dramatic proportions.

It began to blow steadily in gusts of long sustained force until the gale was roaring over us. The wind grew stronger until it made an incessant noise that had an irritating effect on our nerves. The swells were becoming enormous and were smoking with long streamers of spindrift. It was

a magnificent sight to see the ship dig her nose into the sea and send geysers over her bow.

Not feeling particularly well I went to the smoking room for consolation. On returning to a sheltered place on deck where I was cautioned to hang tight, I gazed upon a scene of majestic fury. The spindrift was so thick that one couldn't see the great swells. The ocean was like a great field of drifting snow, almost like an arctic scene, a seething field of white in which the great rise and fall of the ship appeared out of place as the swells were hidden.

We ran out of the hurricane in a few hours and the ugly range of different coloured clouds grew lower on the horizon. The difference in running out of it was that the sky to the rearward of the hurricane was beautifully clear—no coppery stain or gray—only the ugly turrets with the parade of black rags along the skyline. I could imagine what was happening in the inside hundred miles where the winds were far stronger and more sustained.

Not long after we dodged ahead of another hurricane in making Havana from the southward. The cyclone had given the Leeward Islands a

mighty slap and was still bound a bit north of westward through the Caribbean. By this time, owing to the abundance of radio advice, I was well enough acquainted with this storm to know its first name.

Meanwhile an invitation had been extended and I keenly anticipated accepting it. It was to visit Father Giuseppe Lanza, famous in the annals of weather science as the "Prophet of Hurricanes." His internationally-known observatory is at the Jesuit centre of learning, Belén University. It stands on a hill outside Havana with its façades in view from the sea as one comes up from the tropics.

Havana is within the broad cyclone lane about a day ahead of the schedule of the powerful storms which brush the southern coast of the United States. The curve these disturbances often follow is northeasterly near the Straits of Florida. It is sometimes abrupt, sometimes blunt. Some of them go westward across the Gulf of Mexico. Their course may be particularly well calculated, if within observation of Havana, as to what portion of the United States may be struck, and, if not, what course the storm is likely

to follow in curling upward into the northern Atlantic ship lanes. This renders advice from Belén of great value and keenly sought when hurricane signals are on the air.

While I was in Havana the disturbance we had been noting passed to the south. One of the fruit boats was warned and smartly dodged it. There was anxiety that it might curve northward and pass over Havana. It had smeared the sky with a dirty olive-gray and ragged clouds could be seen flying to the south. There were heavy rains over the Isle of Pines. It was crossing the Caribbean, however, holding a course towards Yucatan. I remember Father Lanza's statement to the Havana papers. Translated, it read: "*The perturbation continues westward south of the island. It will not disturb us. We may rest content.*"

On reaching Belén University I was impressed by its great size. It forms a square, its imposing facades of three-story height being about four hundred feet long. On the top over the face of one of the facades I caught a glimpse of some of the weather instruments, the wind vane and revolving anemometers or wind measuring devices.

A glittering border of lightning rods guarded the installation.

Entering the enormous foyer with its smooth tiled floors I soon noted that the inner portion of the great institution contains four park-like quadrangles separated by high arched passages. There seem to be miles of tiled floors.

Father Lanza is tall, spare and erect, about sixty and with iron-gray hair. In his sombre black robe he at first seemed a stern and formal personage, but his manner was gentle and cordial, and within five minutes we were acquainted. I told him how I had looked forward to meeting him and to talking to him right in the observatory. He did me the honour of saying he knew my work, and to show he was not passing mere compliments mentioned two of my scientific books and studies of snake venoms.

We came to a great room in the upper portion. This was the observatory and here the life histories of many hurricanes had been written. From here warnings of great importance had flashed over seas and to lands in advance of the cyclones.

Visualize a room nearly a hundred feet square

with high ceiling, which in the centre rises in a blunt dome. The floor is of the same smooth tile. Overhead is a circle marked with the points of the compass and in the centre of the design a big golden arrow. It is moving, slowly changing its point. The arrow is attached to the bottom of the shaft of the wind vane, the shaft piercing the vaulted ceiling.

In the centre of this great room, impressing me like the exhibition hall of a museum, is a glass-topped desk which is as isolated as a central bureau of information. This is Father Lanza's desk. Off to one side is another desk. A youngish man sits there with charts and papers scattered before him. He is busy with the telephone and fills in spaces on a chart. The whole big square is margined with metal-framed windows giving uninterrupted vision on all sides as from the bridge of a ship. What a place it was from which to observe a tropical storm!

I remembered that the barometer had been low off Belize, Honduras; that there were squally and unsettled conditions. Was anything brewing down there? It is the birthplace for occasional hurricanes which sweep directly northward to-

wards Cuba, although the greater number come across the Atlantic.

The assistant was consulted. What was happening off Belize? That portion of the Caribbean was an open book in a moment. The wind was southeast over a considerable area, the normal trades; a bit stiff, perhaps, but blowing in the normal direction. There was no indication of a definite disturbance centre as the winds would be flowing around the same. The barometer was 29.78, slightly lower than normal, but the pressure towards the tropics was inclined to slack off at this time of the year. The squalls had been noted and already indicated on the chart. The area was under strict observation.

Regularly spaced on heavy tables as orderly as museum exhibits, and all under glass, were the instruments. Some had revolving drums of smoked paper. Others were drawing red, green or blue lines with automatically ink-fed pens. From each of them came a faint ticking caused by the clock mechanisms slowly turning the cylindrical records for a revolution of a day or a week, as the case might be. Air-pressure, humidity, wind direction, wind variation and velocity were

thus being recorded, the paper cylinders to be later cut open and pasted flat in the series of album records of the observatory.

We later went up an iron staircase to the open observatory above to look at the other devices, including the anemometers. These latter are composed of four cups, mounted like a four spoke wheel, the cups being halves of hollow balls to catch the wind. At the base is a dial like a speedometer showing the wind speed in miles per hour.

I asked what was the highest wind velocity during a hurricane the observatory had recorded. I was told that once during a wind of close to one hundred and twenty-five miles an hour the anemometer towers had been bent over, in fact blown flat to the roof; that during the same storm it was possible there were gusts of wind approaching one hundred and fifty miles an hour; that this appeared to be about the maximum for any hurricane or typhoon except for a possible instantaneous, almost explosive gust; and that reports of higher velocities were largely based upon inaccurate instruments or unsupported calculation.

I noted barograph charts traced during hurri-

canes that showed readings as low as 27.40 and was told that the lowest the station ever heard of was from a Dutch vessel just south of Cuba, which came into Havana and reported a reading of 27.05.

Father Lanza was so astonished that he visited the vessel and checked her mercurial barometers to see if they were reading correctly. He found them to be in a condition of absolute accuracy. The captain of this vessel had gone straight through the centre of a hurricane to make a short cut, but had by no means saved time in thus battling with the storm. He could easily have kept to one side of it and utilized its outside rim of wind to his stern to swing him quickly over a course but moderately bent around the receding portion of the cyclone.

Weather adventures shifted to various places—to Africa; for weather can be characteristically interesting no matter where you go.

Our steamer was tied alongside landing pontoons at Algiers. Bulletins had been posted for sailing at midnight. Behind the town lay hills which were burning-hot and dusty in the summer. Behind these were higher ridges, and farther back

the sand began. Beyond all this was a background which one felt—the opening sweep into the Sahara.

There are times when the wind flows from the desert and dominates the southern border of the Mediterranean. Such a wind was blowing on this day, high up, over the hills. The town was stifling, the sky brassy, instead of Mediterranean blue. Both sky and water of this area runs to hues in blue which must be seen to be fully realized. And, curiously enough, these wonderful hues are produced by entirely different effects: the former from the clear dry air and the latter from refraction of light from coral reefs and beds of gleaming sand.

Here, as in the Caribbean, was interest from my weatherwise point of view. Without acquaintance with conditions it would have been simply *hot*. But, to me, a great manifestation was taking place. There was a "*Presence*." It was the Sirocco, the "Yellow Wind." It blew from the Sahara to the sea and the sky was tinted with dust from the desert sands, the finest of particles.

I prowled around the Arab quarter and decided

to go into the hills during the evening and feel the wind where I would meet it flowing over the crests. We had dinner in a lovely garden and left in a big Renault, the body of which was dull as slate, while its metal parts from hubs to lamp rims were polished to the glitter of new hardware.

That is one thing about the Latins and Mohammedans I have particularly noted. They take care of their cars. No matter how old the vehicle is it is scrupulously clean and the moving parts carefully lubricated. When you raise the bonnet of even an ancient vehicle you find the engine as clean as marine machinery, and shelved beside it the inevitable oil can, rubbed until it looks like pink gold.

My chauffeur was a young Moslem in tasseled tarboosh. Not once during the hours I was with him did he speak, smile or turn his head. He was absolutely reckless, but marvellously skilful. It was dusk on starting the ascent and dark before the car was up. Precise steering shot us around many turns. Then the grade flattened. There was the effect of a great furnace door thrown open. A moment later we were bathed in a burning wind.

To me the dry heat of the Sirocco was exhilarating. It even went a bit to my head. There was a place to lounge and talk on grass as dry as a mat. We were under a strange moon. It looked twice the size of the moon of other climes, flat and red like a hot stove-plate. This illusion of size comes from wind-driven sand particles at great altitude producing refraction of the moon's rays. A monotonous throb of soft-headed drum, which was being struck by dextrous knuckles, came up the slopes. There was entertainment in the open quadrangle of some house in the hills.

The Sirocco may blow for a few days or longer; then it may start again. Its influence is woven into the lives of those who live near the desert. It has various names. Along the Algerian coast it is called the Sirocco, to the west the "Harmattan," and in Egypt the "Khamseen." It is the breath of the Sahara and, near its source, may rage in violent local storms.

This was far from my familiar area of tropical cyclones, but I was getting an idea of the Yellow Wind—a very different thing. It was a hot draft rushing towards cooler air of the sea.

There are times when this wind blows one way during the day and reverses at night. Back in the region of the desert the heated air rushes upward and fans outward as it seeks travelling channels. Its upward movement is swifter in some areas than others. Air must rush in to take the place of that which ascends. This causes sandstorms and whirlwinds.

The great general flow which starts towards the sea may blow across into Italy and southern Spain, even into southern France, and attain such magnitude that these countries are dusted with desert sand. It may rush into the Atlantic between Cape Verde and Cape Lopez as the "Harmattan." In that region it is sometimes so impregnated with dust that the air appears like fog. Leaves turn whitish and even the negroes become gray and pale, but the dust is so fine it won't wash off; it saturates. For days the sun is faintly red. The extreme dryness of the wind is often marked. Panels of wood crack and snap; the covers of books, even those side by side, become bent as before a fire. It is this wind with its several names which piles the desert with hills of sand looking like mountainous waves of the sea, and

which in its gentler moods wrinkles the sand into motionless ripples.

I asked the French officer who had accompanied me if he had seen severe sandstorms in the desert.

"Many times," he said. "There is no shelter as on a ship. The sand tempest rushes across the sky, but ahead of it there is still the opening of narrowing but brilliant sky. The effect is as if you were in a great theatre where some awful thing is being staged and yet enough light is coming in from the entrance behind you to illustrate the wild scenery. Overhead are boiling clouds of yellow sand like velvet in tacked-up folds, and in the middle is the whirlwind like a great column holding up the roof.

"The whirlwinds are rather frequent, sometimes large and frightful. They belong to the same race of furies as do waterspouts at sea and curiously enough they look much the same. Imagine this spectacle: the Arabs in our reconnoitering party had been chanting a song to Allah all day. They knew a storm was coming. Picture the change from sunlit desert to background as black as night. A moment ago I pictured a scene

in a theatre. Now I will describe grand opera. Against the black background were six of the whirlwind terrors marching towards us. They were lit by the glow beyond the advancing edge of the tempest. They looked as big around at their base as oil-tanks, but towered to more slender size above and seemed to be half a mile high. A mile away we could hear their incessant hiss. As they do not move rapidly ahead, we retreated to escape to one side. Then they changed their course and marched in a satanic parade parallel to us. Several writhed at the top as if boring into the sky. One finally bent at its middle and seemed to lose its solidity above and pour off streams of sand like some highly inflammable thing that quickly burns away."

The Arabs classify the beginnings of the Yellow Wind into three types. The rapid approach of great clouds of sand flying close to the ground —the typical Simoom of the desert. This is held in the greatest fear. There is no escape from it and a caravan must lie down and wait. The big sheet or *habaiah* is unfurled from each camel and spread over man and beast. They sometimes lie flat for hours. Heaven help the outfit not well

equipped! Whole caravans have been engulfed in such storms.

The second type rushes across the sky in seething masses of clouds, which are sand. The advance is of yellowish tinge but grows black as the sun is shut off. This may be but the second phase of the first, with the sand rising to the upper strata. It is also called the *Haboub.* The third is a violent tempest with whirlwinds or sand-spouts and is possibly a more pronounced phase of the second type, which, at its inception would have overwhelmed a caravan.

It would seem as if all types of life would abandon such areas, but this is not the case. There are remarkable forms of adaptation. There are little rats called *jerboas* which run on long hind-legs as thin as a match. The forelimbs are mere tiny hands. They are fleet and coloured like the sand. They have a long balancing tail, with decorative pad of black and white fur at the tip. This tip is, in fact, more than decorative, as the pad is like a little snow-shoe to keep the end from sinking in the sand. The tail is carried in upward curve when the creatures run. When they stop it is rested on the ground so that the whole body is

as firm as a little tripod. The feet have furry pads to prevent their becoming imbedded in the soft sand. I kept one for several years, not giving it a drop of water. It fed on dry corn and loved stems of dry grass. The only moisture it had came from occasional bits of greens, of which it was not over fond.

There are many other kinds of desert creatures of pale hues to match the sand. The Sahara is not the lifeless region so many visualize. There are central lifeless areas of nothing but drifting sand, but again there are many oases, and desert animals are to be found far out from such spots upon the sandy wastes.

But it seems curious that animals continue to live in such areas when they could migrate to the more hospitable regions of Africa. They could retreat from the desert if they wished, but such is not their inclination. It appears that many have actually come to the desert and have undergone remarkable adaptive changes. There are lizards which are called "sand fishes." The natives catch them with a metal net. Their motions in the fine sand are much the same as if they were in water. They wriggle and swim and have a

wedge-shaped nose to make their progress faster. There are others with toes so flat they look like feathers, a development that enables them to run on the yielding surface. There are desert vipers which do not glide, in fact, could not readily do so on powdery sand. They flatten the body and throw the distended loops sideways, almost running over the soft surface. They seem to have no inclination to retreat from the Sahara; it would seem as if they had moved to it and became adapted to it.

Human beings also seek the desert, swift moving and fiery people. The dry heat has produced very different types from the damp tropics and grasslands of lower continental Africa. There are permanent villages on the margins of the Sahara and at the larger oases. Again there are little settlements of brightly coloured tents, here today and gone tomorrow. The mariner knows the reefs of the sea and where to steer. The nomadic tribes know the oases and where they may obtain water.

There is plenty of animal life between the Algerian coast and the Sahara. Close to where we were, among the canyons, were Barbary "apes"

—the only monkeys of northern Africa. This is the same kind occurring on Gibraltar where these monkeys were probably introduced by the Moors. Then, again, behind the farther mountain ridges, where the sand begins, are cobras, brown, dusty-looking cobras which put on all the airs of those from India.

This species of cobra is the most famous serpent in history. Painters have portrayed it as the asp of Cleopatra. There is a fine inspiration in painting a cobra rearing in decorative fashion from a basket of fruit, but I doubt if the faithful slaves ever smuggled one of these creatures to the suicidal queen. You could not keep a cobra from bobbing its head out to see what was going on. If Cleopatra decided to depart by serpent poisoning she was probably served with a desert viper, which has a retiring disposition and might hide in a basket of fruit.

Such are the children of the desert winds.

The Sirocco burns, but benefits. It is declared that, when it blows, those who come within its influence having malarial fever are soon better. In its blast, infected wounds quickly heal and are cured. I heard that it is even impossible to vaccinate successfully while it is blowing.

## Chapter XIII

# Romance in the Field

A SCIENTIST sometimes takes holiday jaunts, but few of his trips are made just for the fun of travelling. After work with the collection and care of wild animals there is no thrill like that of meeting them in their native haunts. Moreover, in no other way can I so well understand their needs and their mentalities. My case is like that of a dweller in New York trying to act as guardian of a bred and born Chinaman who has been transplanted from his Oriental home to the white man's land. Not until the New Yorker has seen China and lived there as the Asiatic lives would he be able to conserve the health and spirits of his guest.

The aftermath of a field trip is as vital as the trip itself. A perfect maze of details always seems to develop around a series of collected specimens. Furthermore, a whole phase of zoological science relates to the continual checking of the validity of species and their varieties, or subspecies, as the latter are called, and also of the

frequent addition of subspecies to the lists. New species among the larger forms are now rather rare, but they still occur from time to time.

Systematic workers are as particular to avoid errors in their definitions and analyses of species and subspecies as the druggist in compounding his prescriptions. Fellow scientists are always watching like hawks and there is disagreement at the slightest slip. If a technical worker names anything new there always is a chance of the addition to the lists getting a thumbs-down from a dissenting scientist or a group of them. Then the "discovery" goes promptly into the lists of "synonyms." There are few technical workers who haven't had some of their findings thus thrown out. The scientific fraternity is a stern jury. Some of the fast workers have had so many things thrown out that their names are more familiar among the synonyms than the standing lists. I once named a new species of Central American rattler and the name stood for several years when it was thrown out on the allegation that it was albinistic. The man who did this was an old friend—and we are good friends yet. The next time I found what looked to be a new species

—some Mexican horned toads—I sent them to a nationally known scientist in Washington and he named them in my honour.

Specimens for scientific study are of little value unless they arrive in good shape alive or in pickled form with precise data as to the locality in which they were collected. This doesn't mean, if a specimen comes from Brazil, that the word "Brazil" on a tag accompanying it helps much. The location must be far more exact and narrowed down to a state or province. If the latter is large, the value of the specimen is enhanced when the location of capture is fixed precisely.

Suppose a specimen of serpent arrives and appears utterly strange and one wishes to identify it. For zoological park purposes gross locality is sufficient and starts one on his way to "run it down." Gross locality, in this instance, is sufficient to begin search in the detailed scientific books.

There are over two thousand species of serpents and a considerable number of families. The first thing to do is to decide upon the family. This coarse differentiation is not difficult because a scientist is supposed at a glance to recognize the

members of the different families. The next thing to decide upon is its genus. This is not so easy. Such reptiles are classified by the number of rows of scales around the body, whether the scales are smooth or keeled (having a ridge running lengthwise) the arrangement of the plates on the top of the head, count of the lip plates (labials) and cross shields beneath the body—and there is a job. For these may run up to a couple of hundred.

Once you get your specimen assigned to a genus there may be an array of a dozen or more species within that genus—in some instances several dozen. There is usually a scientific key for each genus relating to scale counts, head plates and the like. Colouration and markings may not be of much help because reptiles run towards certain "styles" in markings. They may be "longitudinally" striped or "transversely" banded, and so on.

It is a fascinating game, this "landing" of a doubtful specimen and in most cases requires detailed scientific knowledge. Scientists of the big museums and biological departments of the universities spend hours or days in making scale

counts of "pickled" specimens. I have known such workers to carry a pin in their hand, ready for an interruption; when it occurs they stick the pin in the scale where they left off, remember the count, and continue after a consulting colleague has gone his way.

I know of one scientific worker who went through a series of over four thousand pickled rattlesnakes in solving some of the problems of relationship in the *Crotalus* genus. He counted the scale rows on the greater number of the specimens. These professional workers, in signifying the relationship of zoological specimens are as keen and particular as analytical chemists in defining and separating the brands of their specialties. Both are analogous. All branches of true science are conducted with this time-consuming and painstaking care.

There is also an unending search as to priority among scientific names. This means that the technical lists are constantly changing. With the thousands upon thousands of scientific names, the expert in nomenclature keeps finding errors or indicated changes in assignment of species to this or that genus. From latest deductions of relation-

ship or discovery it turns out often that a generic or specific name must fall and be substituted, owing to its having been preoccupied in the lists by some other group or form which is miles away in relationship.

It is unpardonable to present a new list, even of a small block of species occurring within a restricted area, without being up to date in nomenclature. To do this one must be on the mailing lists of all specialists working along his lines, and as these articles come in he must index them as to subject, general locality and name of the author. Such an index must be backed by an extensive scientific library for cross-checking and purposes of general deduction.

In preparing a descriptive list of the poisonous serpents of the New World I was not satisfied that I could properly present it until I had a great amount of first hand information gained by trips from Canada to the Argentine, and coast to coast across the United States. While this work was a matter of barely ten thousand words it involved the examination of a large number of authors' extras, detailed correspondence, study of many alcoholic specimens and visits among the

museums. The proof was twice held up for the examination of detailed papers, and the printing was finally delayed for analysis of rumoured findings of a specialist, who finally forwarded me an advance outline of his article. In this way the work appeared in that essentially proper form of scientific writings—up to date in every particular.

Let me outline a sample trip in quest of data. Some studies called me to Rio. The twelve-day run was as calm as a July excursion to the fishing banks. Among other things I wanted to see what a Brazilian zoo looked like. I knew there was a fine collection at Rio de Janeiro. Soon after arrival I was rewarded by an incident in this zoo that made me laugh for a week.

The zoo is outside of Rio at the base of tropical hills. I walked from it to the collections where I was met by the sympathetic Director. When we were well back on a winding path through tree ferns the clouds overhead suddenly lowered and it grew very dark. A flash and almost simultaneous crash made us jump. Even while the echoes were booming and rolling, a darkness like night settled down around us. There were no

buildings in which to run for shelter as it was an open air collection. And as there were four ladies and three men in our party, something had to be done and done quickly or we might be half drowned by the coming tropical downpour.

The Director ran ahead and called to us to follow. We could see a thatched structure looming ahead. The Director's keys jingled. He ushered us through a narrow door and we stood on a wooden floor. A rushing sound broke into a crash of rain—and how it can rain at Rio! But not a drop, only the merest spray came back at us. This was real comfort. For, we had been desperate a moment before, with four ladies in summer dresses. There was a flash of yellow light. One of the men, in sheer relief, had lighted a cigarette.

"A storeroom?" he asked of the Director. It was so dark we could scarcely see.

"No," replied the Director, "the anacondas' den! This is the only place we can go."

The answer was given in the nonchalant manner of the cultured Brazilian and despite the rain I could feel the dead silence of the group, occasioned by the awful realization that we had

escaped the storm only to find ourselves in far more horrible company.

We stood, silent and apprehensive, while the tempest streamed by. Somebody had grasped my coat-tails and I'm sure our host was similarly kept in contact. A flash of lightning gave a brief but brilliant introduction to our surroundings. There were shelves on all sides of us. Big tan-coloured serpents were stretched on these in oblong coils.

"Boas," said the Director in a tone indicating apology that the lightning was so brief.

I could feel a stir. My surmise was that the group was twisting to see what would be revealed on the open side. There, dimly discernible in the murk and rain, *was* a sight: in this opening, which was like a little yard containing big, sprawling stumps of trees and covered with mesh were yard upon yard of olive bodies. They ranged in size from fire hose to fair-sized water pipe. *A few were slowly moving!*

"I'd give a million to be back at the *Gloria*," hissed a man's voice behind me.

"Are you the one who's hanging on my coat-tail?" I asked.

"Yes, and if you take a step I'll jump right on

your back. You know these infernal things and can help to choke 'em if they get familiar."

"Nonsense," I said. "They won't bother you. Señor Director, how many serpents are here?"

"Twenty," was the proud answer. "The largest measures five metres! We shall have the light again soon and can see them better."

It was a tensely silent party except for the remarks of the Director to relieve what he considered a monotonous wait. My wife and I didn't mind, but the rest of the party probably figured that Daniel's biblical experience with the lions had nothing on them. Daniel had only a few lions, and the Lord looked after him. Furthermore, he was a saint. We were not saints. What kind of an ending would there be for us among various serpents festooning the shelves like dry goods?

There was a ripping crash behind us. I confess that I jumped. Just how much the others jumped I don't know, but my coat was almost pulled off. The Director had courteously yanked over a stump from one corner. It had been nailed to the floor as a sort of step ladder for the boas to climb upon the shelves.

"A seat for the ladies," he said.

My wife persuaded the ladies to sit down. They held hands.

I passed a cigarette case. Nobody took one. The Director was speaking. He was telling something I had wanted to hear for a long time. Here was an authoritative Brazilian scientist, who had explored his country, describing in calm tones, the sizes of the big South American serpents.

He said the largest anaconda he had ever seen was between six and seven metres long, or around twenty-two feet. He had heard of slightly larger specimens from careful observers, but doubted if the anaconda ever attained a greater length than twenty-five feet and one that size would be very rare. When they were in excess of eighteen feet every extra foot of length meant a marked increase of bulk or thickness of such exceptional specimens. An example eighteen feet long would be about nine inches in diameter at the thickest part. A twenty foot specimen would be about twelve inches in diameter, while a twenty-five foot example he estimated would be at least fifteen inches thick and might weigh close to three hundred pounds—a truly gigantic serpent.

There were three large kinds of serpents in South America, the boa constrictor, seldom growing to be fifteen feet long; the yellow anaconda, which grew to be twenty feet long; and the common anaconda, which was the largest. The most common native name for this great serpent was *Sucuri*.

He was emphatic in denouncing the sensational tales of fly-by-night explorers who told about serpents forty and even fifty feet long, with bodies as thick as a barrel and said to be capable of swallowing a full-grown tapir. He thought some explorers might have seen big serpents among the reeds along the rivers, but that only a portion of a big body was visible and excited conjecture as to length had formed the basis for misleading descriptions written at a later time.

He mentioned a photograph made by an explorer showing the trail of a great anaconda across a mud flat. The trail looked very wide and the maker of the photographic record had declared the monster must have been close to three feet in diameter, which called for a length of about forty feet—a serpent nine feet in circumference!

There was a reasonable explanation for this

wide trail in the mud. In the first place the anaconda might have swallowed a third-grown tapir, a feat not difficult for a big specimen. The size of the prey would then have materially increased a portion of the reptile's girth and the weight had necessitated a slight lateral kinking here and there along the serpent's lengthy body as it sought to gain purchase on the soft ground in moving forward. This lateral motion of the body could have widened the trail a good deal over the actual diameter of the anaconda.

These were valuable points from an expert on his home ground. In reciprocation I told him that in about thirty years' records from reliable animal traders, scientists from expeditions and personal measurements of many specimens, I could give him fair estimates of lengths of the three great pythons of the Old World. One is confined to Africa; another ranges over India, the Malay Peninsula and Java; and the third and largest inhabits Burma, the Malay Peninsula and Archipelago. The African species goes a bit over twenty feet and the Indian species reaches twenty-five. The great reticulated or regal python appears to attain a length of thirty-five feet, being

the largest serpent in the world. I have several reliable records of thirty-foot specimens. One of these weighed three hundred pounds, but specimens reliably recorded to be over thirty feet are very rarely reported. In the thirty years since the opening of the Zoological Park I have been unable to obtain a specimen longer than twenty-four feet, which goes to show that any serpent twenty-five feet long is very exceptional. The great Indian pythons are proportionately more slender than the South American anaconda.

The party huddled on the log had not entered the discussion, but remained silent and watching. It was getting lighter. The rain was slacking off. The Director stepped to the little door.

"We can soon go out. I will run back to the ticket office and get umbrellas for the ladies. The trees will drip."

We were soon outside and everybody started talking. It was interesting to see how soon speech returned to our party and how happy they were.

A thing that soon impressed me was the great flock of buzzards. They did not carry the atmosphere commonly associated with buzzards for they looked too clean and in fine feather. There were

a couple of hundred of them and they had taken possession of the place like so many pets.

A keeper came up with a hand-cart of meat for the big cats and the bears. The meat was covered with a tarpaulin. Instantly the buzzards mobbed this man: a couple rode on the cart and he had a flank escort of dozens running along with their pigeon-toed gait. As he threw a chunk of meat to a tiger, a buzzard stole a strip of meat from the cart. This bird toddled up the path with a dozen after him. Meanwhile the tiger was having his troubles. The bone jammed between the floor and lower framework of the bars. He couldn't pull it through. A mob of buzzards took turns in yanking at the meat from the outside. It was a tug of war while the tiger exploded with snorts and stentorian exhalations. The keeper turned back, banged the bone with an iron and the tiger retreated with it. Now the feathered gang rushed up and waited at the next cage. They knew the course of that cart as well as the horse of a milk wagon knows its route.

Along the line was an enormous seal. It had come from somewhere on the southern coast of the Argentine. It towered as high as our heads when

resting on its flippers. Fishes like shad were thrown to this mammoth. As buzzards are especially fond of fish the throng of carrion was moved to utter dejection as the great seal swallowed each fish whole at a gurgling gulp. All of the watching buzzards made a little bow in unison as each fish went down.

Still farther along was an arched enclosure, which, to our astonishment, contained a buzzard *exhibit*. A pailful of scraps was thrown in and another scattered outside to the waiting escort. We noted that each batch took opposite views. The outside buzzards tried to beat their way into the cage, while those in the cage danced along the mesh to get at the meat on the walk.

The friend who had hung on my coat-tails during the sojourn with the anacondas spoke Portuguese. He was talking with the keeper:

"Listen to what this man says. He wants us to know that every once in a while he opens the buzzards' cage, shoos out the crowd from inside and runs in a fresh batch. That's why the gang outside is anxious to get in! They think the rations inside are more generous. He says that every once in a while the flock of buzzards in the

Park departs for the fish markets, but there are always a few left sticking around in the hope of being eligible for the cage!"

There was a magnificent jaguar which had killed a man. The Brazilian jaguars seem to have a blacker reputation than those in Central America. Only recently a new home had been built well out of town, but close to one of the travelled highways. It was about done and a decorator was putting a few touches to the walls and ceilings. A little later a man driving by was astonished to see a jaguar backing out of an open window. Hesitating, wild-eyed, the passerby was tragically shocked to see the powerful beast drag a man's body through the window. It was the decorator. The animal was scared off and later trailed by dogs and shot.

A white-lipped peccary in the collection had a particularly sinister reputation. It had killed two keepers. Here was a typical example of the rather small-sized wild swine that roam parts of the American tropics in little herds. They are occasionally dangerous when wild, if cornered and stirred to anger. This wild pig did not weigh more than seventy-five pounds. It was, in fact,

rather an insignificant looking thing, high-backed, slab-sided and covered with stiff black hair. At first sight, its tusks did not look dangerous owing to the hairy lips covering these members. On close examination upper and lower tusks could be seen to rub, each sharpening the other. They were flat, like broad knife points and about two inches long.

The first keeper attacked had been knocked down and horribly torn. He had been cautioned to shift the pig into another corral before cleaning its quarters. The second man had rashly decided he could master the animal. He was jerked from his feet by the creature grasping his ankle, then his thigh was so mutilated that he had bled to death.

There are two kinds of peccaries in South America, the collared and the white-lipped peccary. The latter is about half again larger than the collared peccary and restricted to the tropics. The smaller kind ranges northward through Mexico and into southern Texas.

The Rio zoo was overrun with orchids—native ones. I counted a dozen kinds. They were even growing on the telephone wires. There were gor-

geous ferns and butterflies with wings that sparkled like broken glass. And this brings out an interesting point. Brazil is the only country in the world with butterfly conservation. The authorities are protecting the gorgeous *morpho* butterflies which have peacock blue wings that flash in remarkable brilliance. You first see them along the *Avenida Rio Branco*, dead ones, displayed in the shop windows, where there are trays with decorative patterns made of butterflies' wings under glass. There are even little pictures with iridescent blue backgrounds made of skilfully arranged fragments of these wings, blue-lined bowls and the like. These *morphos* are the most gorgeous insects in Brazil. Even the children joined in the search for them. They are purchased by the souvenir-makers for the equivalent of about ten cents apiece. Finally they were becoming so rare the government stopped the slaughter. Their capture is now prohibited except in the interior.

I thought I'd like to play golf in Brazil and made inquiries of a couple of Americans staying at the inland town where I was. They replied that the course was near a branch of the Institute where serums were distributed for snake bites.

The caddies carried a tube in case they met something devilish when a ball went into the rough! The fairways were good, with rather a wild tangle on the sides. One of the partners sliced from the third tee and watched the ball land among some vines about ten feet from the edge. The caddy was looking at something else so the player walked to where the ball went in and gingerly stepped into the vegetation. He felt pretty safe as the growth was low, but was keyed for a quick jump. Just as he was sure the leaves could be kicked aside to disclose the ball there was a rustle and a greenish reptile slid around behind him. His partner said he had never seen such a dance—that the man's motions were like a squirrel in a revolving wheel! He had unconsciously hurled his club fifty feet behind him. The caddy started in to hunt the ball but was grasped by the trouser's band and hauled back.

They played another ball from the edge and were following it up when both caddies started to run. They shinned up a tree and pointed to another tree for the players. The latter, however, took one which was closer. One partner boosted the other, who hauled the second after him. It

was a very inhospitable tree. The trunk and branches were covered with little spikes which stuck them all over and made it absolutely necessary to stand on the branches. They afterwards learned that the name of this tree was "the monkey teaser." But they soon decided they were glad to be in it. There was a thumping of hoofs and a wild bull charged down the fairway, stopping near them to demonstrate that he could paw divots of his own! He did this with great pride his tail standing straight up. Then a horseman appeared. He cleverly lassoed the beast and the bull appeared to call this a fair checkmate, galloping off ahead of the rider.

The players painfully fell out of the spikey tree and were joined by the caddies who told them they had climbed the wrong kind. Heaving a sigh one of them prepared for a long shot. Stepping back for position he suddenly dipped to the right at an astonishing angle. One leg had gone into a hole covered with a shell of turf. There was a single second's hesitation. Then the dance he performed was a thousand per cent more vigorous than that of the man who had seen the green reptile. He slapped both legs, jumped up and

down, made squealing sounds—and started to run. The caddies were streaking up the fairway ahead of him. Bewildered for an instant the other player was provided with convincing explanation by something stinging him on the leg so hard that he leaped into the air, then joined the race.

Half an hour later at the club house they decided that three such hazards on two fairways made a sporty course. An entomologist explained that the insects in that hole were *marabundi* wasps, which will chase a person a mile. And all this was in the face of specific advice given the golfer in Brazil to play a calm, easy-going game on account of the heat!

I hadn't met any *marabundi* wasps, but had learned something about tropical spiders. They appeared to be the stars of all spiders I had ever heard of. There was an almost unbelievable spider on exhibition at the museum of the serum institute at São Paulo. I thought that the tarantulas occasionally coming north in bunches of fruit were the largest of tropical spiders, but this one seemed to be about twice that size. It was about nine inches in spread of limbs and said to be not uncommon.

There were several smaller kinds, some of them larger than those hiding in the bunches of bananas from the Central American tropics. The bite is not deadly, but may be extremely dangerous as it often produces a sore which will not heal. It becomes slowly larger, month after month, until an arm or leg is painful and useless. Bites from these creatures are rare except among native workers on plantations where heaps of vegetable trash, like stems and leaves, must frequently be removed. These big spiders hide in such places and bite if they are touched or trodden on by bare feet. They have big fangs, like hooks, beneath the body. These prongs are hollow and have openings at the end like the fangs of serpents.

The local authorities were having enough of these bites and very terrible chronic sores to warrant experimenting with a serum, which is now produced. A native woman had been suffering for a long time and could barely walk. The doctors thought she would ultimately lose the limb; but in two months' treatment with the serum the great sore was nearly healed and it was estimated she would soon be completely cured.

These great spiders spin no web, but stalk their

prey. They are like wolves on the ground. They live upon mice and lizards, even stalk and capture small birds and rob the nests. They have homes in which they rest or take shelter during the rains, and which may be a hole in the ground or the hollow of a tree. Whatever the situation is, it is lined with lustrous silk as they have spinning glands for such purposes. Then, again, the female spins a great bag of silk for her eggs. This egg bag may be as big as an apple and so tough that it is difficult to tear it open. The eggs come tumbling out like a handful of pearls, gleaming with a soft iridescence. Left alone the mother watches this egg case and when the young spiders are ready to hatch tears it open with her fangs. It is said she watches over her young for weeks until they can care for themselves.

I heard one story that impressed me as the most sinister yarn picked up in the tropics. It was told by a man who had been prospecting for mica. He had investigated some wild country and was a couple of weeks' distance from the railroad. The country was rather high and flat, the ground dry and open. One day one of his men came to him trembling, with a tale that he had seen a young

rabbit crossing an open patch when a flap in the ground opened and a great spider appeared. The rabbit screamed and struggled and both creatures rolled over and over. Suddenly the rabbit's struggles ceased; it was dragged to a round hole and the flap in the earth dropped back. The man cautiously walked forward to investigate the spot, but couldn't find a trace of anything except pebbled ground! It was magic: there was no hole, no flap. As he walked away wondering if he had dreamed it he was startled to see another flap open, without warning, from apparently undisturbed ground and a great spider peered out at him, its eyes shining like red jewels. Turning to run he noted another slowly rising door at his other side and with frantic leaps he cleared the infernal spot and rejoined the party. The prospector said his nerves were on the jump, expecting to come across such a patch, but hadn't found it.

The curious thing about the story was its checking against a mere miniature to what the man described. There is such a creature—a few inches in diameter—in the arid portion of the southwestern United States and Mexico. It is called

the trap-door spider. It lives in an upright tunnel it digs in the soil. It lines this with silk and covers the top with a door which is bevelled at the edge and fits like a stove plate, only it is hinged at one side. This door is made of grains of sand, lined with silk on the inside and having a tough silken hinge. It fits so perfectly on the outside and is so skilfully plastered with sand one can't detect it unless the fairly large spider on the inside pops it open to look out. The tunnel is the size of one's finger. This kind of spider has keen hearing and when some unsuspecting creature wanders near, not seeing anything disturbing, the spider hears the tread, waits until the victim is close by, then comes from the trap-door, digs the unfortunate with the poison fangs and carries the prey inside.

While the tale of the gigantic trap-door spider seemed preposterous, it gave me a shiver; but there were some astonishing things about Brazilian spiders that could be visually checked. There is a rather common kind that spins a very strong web, a big, wheel-like affair high in the air between trees. The body of the web is suspended by not more than four or five tough silk threads

much like the hanging of a banner. One or two of these long threads may come close to the ground. If one walks against them and rubs them across face or arm they will cut the flesh like strong-rubbing thread or thin wire. I was nicked by these strong spider threads and yet they did not break, seeming only to stretch. In the big web itself the spokes are not sticky, but of the same strong thread. It is the spirally winding part of the web that entangles the prey. This is of a different silk which clings to whatever it touches. It is declared that small birds sometimes fall victims in the web of this big aerial spider. Experiments are being made in the commercial utilization of the silk of such spiders.

There is another spider which accurately tells of rains in the mountain ranges by tapping the telegraph lines and stealing the signals at such times. It lives in colonies in trees and wherever a telegraph line goes through appropriates the new structure as being ideal for its web-spinning activities. Its numerous webs are attached one to another in a great sheet like lace curtains with spider-web patterns. The attachment from the telegraph wires to the ground form a fine open space

to spread one of the colony nets for flying forms of insect life, and the insulators holding the wires are perfect retiring shelters during the heavy rains.

These insulators are large porcelain affairs shaped somewhat like an inverted bowl to keep the central stem carrying the wire from becoming wet and thus "grounding" the electric current of the telegraph against the wet pole. An insulator evidently appeals to the spiders as an ideal house with a domed roof far more commodious and quiet than the underside of a leaf beaten by the rain. Moreover, when the rain is over and it is time to take to the webs again, there is the wire promenade leading from the house. This also serves as a fine path for visiting neighbours some distance away.

When it rains in the mountains the telegraphers know it, because signals coming from inland portions are weak. The webs of the spiders on the wires have torn into long, wet streamers which touch the ground and thus tap or dilute the current carrying the signals. In rains during the wet season there is much trouble. Electricians are studying the problem. Radio may solve the diffi-

culties, but, if it does, the spiders will lose their fine boulevards.

The trail of tropical spiders often leads to the Zoological Park. The Central American fruit steamers often bring tarantulas to the North in bunches of bananas. Most of the banana piers have swatters hung here and there for killing these spiders. I have seen such spiders with a four-inch spread of limbs.

There was a dominating person on one of the piers by the name of Mike Noonan. He was of keen intelligence with a hatred for tarantulas and was a firm believer in quick use of the swatter. Noonan decided that the prevailing type of swatter was not much good and he designed one for his private use. It was a death dealer for tarantulas, a combination of several devices. The handle was composed of a couple of feet of the flexible material forming the stem of a desk lamp that may be bent to various slants. The end was wound with black sticky tape for a handle. The effective, or slapping end, was composed of a sawed-off palm of a carpet beater. Here was a device to positively halt and so flatten a tarantula it would look like something painted on the floor.

One day Noonan saw a particularly hairy tarantula, unlimbered and raised his new swatter shoulder high on powerful arm. There was a swish, with full Irish vim behind it—but the blow of the spatulate end landed full on the head of an Italian stevedore who had popped around a corner. The demise of the spider was never recorded. Instead, Noonan fled a mile down the water front with the victim after him brandishing a knife.

I had one of these tarantulas on exhibition at the Park and put a special lock on the case. The keeper and I carried the only keys. One morning the keeper came to me and said that two spiders were in the case. He asked me if I had opened it to put the second spider in. I told him I hadn't been near the case and there wasn't any other spider unless he had put it in. He said he hadn't done anything of the kind. Then I told him he had seen a reflection in the glass. He came back and said there were positively two spiders. Then I went over to the case and was taken back myself. There *were* two spiders.

On investigation we found the original inmate had shed its skin! This is a remarkable process:

as the shell or outer covering splits beneath, the spider crawls or writhes out; then, as we later found by observation, it pulls forth each leg and leaves an exact replica of itself, in life-like position.

## Chapter XIV

# Tropic Lore

THERE is one lure that is always pulling me: my love for the tropics. Each trip to the neighbourhood of the equator seems to strengthen my passion for the jungle and its denizens. I can never think without a thrill of the tropic rain forest of Costa Rica, rising to impressive heights in smothering verdure, graduating from palms like gigantic ferns to trees which rise into the sky with their horizontal branches. Draped over the whole mass like pendent tinsel on a Christmas tree are the lianas, suspended in long cables that appear to form contact with the ground. South of latitude fifteen the tropic sky of the night has a curious glow as if the sun had heated the vast canopy red hot and it was cooling. Over this expanse the stars are in perspective, like floating sparks. Scattered clouds are pitchy black against the glow. There is depth in such a sky. The clouds look like smoke from an oil fire and are free in space, quite different from up north where one sees pale clouds rubbing a black sky.

One year I stopped at Honduras on my way further south. I was assigned a neat little house, well-screened against mosquitoes. This was just outside the domain of the fruit company, with its officers' quarters, commissary, railroad yards and research hospital. Radiating from the area were the narrow-gauge banana railroads, each a gateway to a naturalist's paradise. The open road-beds were kept clear of growth by steam sprayed like a fan across them.

Douglas March was with me. He had the devilish position of extracting poison from the snakes in the populous pits at the serum station. He agreed to accompany me on a junket inland. A few days after my arrival we got away at three-thirty in the morning in a Ford shod with railroad wheels for a two hour run over a line clear of banana trains. Instructions were to run to a siding and follow a trail to the Uloa River where we would find a little power boat waiting.

It was as black as pitch when we started. We lit the searchlights and it was surprising to see the animal and insect life frequenting the road-bed at night. The eyes that glowed at us were like embers fanning into brilliancy as we approached and

suddenly "going out" as the owners turned their heads and leaped or glided to safety. The predominating things were big whip-poor-wills and several kinds of opossums. We could tell the birds from the mammals away ahead of us because the eyes of the former glowed red, while the eyes of the opossums had a greenish tinge. Several larger things moved off the track well in advance and we couldn't make them out. A good part of the road was through jungle, or banana plantation on one side and jungle on the other.

March cheered us by telling stories about accidents on similar runs at night. When we scooted around curves he told about a car coming on a boa constrictor stretched across the rails, which derailed the car and sent the whole party into a brushy tangle, with nothing worse happening than picking up a collection of ticks and walking back to a telephone box. He hastened to assure us that these rides could be more exciting; that one of the cars had run into a five hundred pound tapir, which turned a somersault and mauled the riders. When we laughed heartily he opened the accelerator a bit wider as if the faster we went the sooner we would see some really interesting things.

One of the fruit men who was with us talked about a recent murder mystery, which had called forth all the detective talent in the neighbourhood. Two Honduranians in a small cantina had quarrelled. There were loud words leading close to physical violence, but friends had interfered and the men started home. Rumour had preceded them and the two families anxiously waited. One man failed to appear. He was found dead the next morning midway to his home. The other was arrested, charged with murder. The remarkable thing about the case was the absence of wounds or bruises. The victim had been strong and healthy. Heart disease or ordinary cause of death were out of the question.

A minute examination was about over when two bluish spots were noted at the ankle. Working on these as a clue, and with recently acquired knowledge of tropical reptiles and their venoms, the investigator discovered that the victim had been bitten by a poisonous serpent, the fangs directly penetrating a blood vessel. An intravenous injection of this kind will cause death in a few minutes. The investigation, of course, cleared an entirely innocent man.

My inquiry brought out the fact that both men had been barefooted, as the unconsciously reckless native usually travels at night. This habit has steadily maintained the high mortality from snake-bite in India. A campaign against this and other careless practices is slowly taking hold in the Central American tropics. We arrived at the siding and in waist-high mist went into single-file down to the Uloa. There are few mosquitoes along the river, of which the current is swift and the water silty. We spotted a little boat with a solitary figure huddled in its bow. We boarded it and soon turned into a natural canal toward Sampana, on our way. All we saw along this water were a few young caimans sprawled on logs. The sun was well up when we reached Sampana where a train was to stop.

There was a shed and a little commissary which was a congregating spot for the sports of the little settlement. About twenty young and middle-aged Honduranians loafed about, all barefooted and in cotton trousers; a few were stripped to the waist. Possibly wishing to entertain us, they soon started to sharpen their machetes and the cheery occupation spread all along the line. To the

worker, or *mozo*, the machete seems to be a part of life; he works with it, sleeps with it and occasionally murders with it.

The method of sharpening a machete is simple. The owner stands in front of a tree, sticks the point of the sabre-like knife in the wood, leans on the handle enough to curve the blade, then rubs the business end with a pocket stone. It's a bit sinister, the weathered steel, with margin kept bright and keen.

After finishing, the owners took swishes at branches which dropped at a stroke. Deep moans were coming from behind the shed and to satisfy myself I endeavoured to very casually step around and see what it meant. I found two young howler monkeys on cords. They looked healthy and were doubtless conducting what would be designated as a subdued conversation in a howling monkey troop.

I have more of a sympathetic interest in American monkeys. They are not so really devilish, or rough and clownish in disposition as the Old World monkeys. There is a certain wistfulness, something pathetic in their demeanour. They are mentally different from Indian and African types.

I mentally reviewed what I knew about these strange little people and wondered why the American monkeys were so different from the Old World kinds. Monkeys are such distinct types it is curious there is not a similarity all around the world as among humans and lower types, like cat animals and canines.

Prehensile tails are limited to the New World species. While about three quarters of the five hundred known kinds of monkeys inhabit Africa, Asia and the Malayan region the thought occurred to me there wasn't one among them with a prehensile tail. Possibly the high forests of the American tropics are much older and the kinds of monkeys before me had had more time to develop a useful tail. It seems curious, however, that there is no beginning, no hint of use among the tails of the several hundred long-tailed monkeys of Africa and Asia. There isn't one that could even coil the tail around a branch! Yet there are many on this side with the tail so dextrous it is as useful as a fifth limb. The degree of perfection is carried so far that the underportion of the last quarter of the tail is bare and has a skin texture like the inside of a finger, to prevent slipping.

These American monkeys which I had studied and filmed might be gifted with a prehensile tail, but they had lost out in a number of other ways. They lacked elastic cheek pouches. That was a characteristic of Old World monkeys. New World monkeys also lacked facial mobility and variety of expression. With the exception of the howlers, the spider monkeys and the woolly monkeys they were inferior in size. Their hands were rather clumsy as the thumbs were not opposable to the fingers and even the howlers were far eclipsed in size by the Old World baboons. By facial movements, lip motions, eye-lid flashing and variety of vocal expressions, it was safe to say many of the Old World monkeys had developed fairly definite methods of communication. It seemed that they were superior in development and intelligence to the kinds imprinted on my film rolls even though they didn't have prehensile tails.

There was another point of credit. The monkeys of the other side carried cushions around with them to sit on. These are large patches of naked skin on the buttocks, thickened and called callosities. With some species they are unobtrusive and blend with the body hue; with others they are

prominent and bold in colouration. Simply speaking these callosities are no more nor less than cushions to afford a comfortable rest when the animal is in a sitting position. The dignity of some of the large species, more luxuriantly provided, suffers from this development.

There has been little progress among scientists in classifying facial and vocal expressions. Mobility of face points to a possibility of psychological research. The African mangabeys are good examples. Different kinds of monkeys display various methods of facial expression. These might not be clearly apparent on gross observation, but present possibilities of definite separation if critically observed. The mangabeys have blackish faces and their white eyelids are in strong contrast. That these eyelids are so marked for a definite purpose seems clear, with the common trait among such monkeys of what animal men call "flirting." The eyebrows may be quickly elevated, bringing the white eyelids in vivid contrast —a character to be noted at a considerable distance.

Some of the baboons have white eyelids and use them the same way. They also have several

lip movements which seem to denote something. The Indo-Malayan macaques have the greatest mobility of face, rapidly working the lips with a smattering sound, protruding the lips as if they were going to whistle or grimacing, or showing the teeth. These are not idle expressions. They are too frequently used. Such monkeys are also extremely noisy in chattering, uttering crooning sounds and shrill calls. Not much had been done in studying these things when Garner took it up. At the time of his death he was getting somewhere in classifying facial expressions and sounds. He declared that a number of writers had grossly misquoted him, calling down a lot of ridicule on his work, but he did more along these lines than any other investigator. We had worked together and he had given me many helpful notes. We made a number of phonograph records of monkey sounds, and played them off for the monkeys with some interesting and humorous reactions. One little Javanese macaque dove straight into a horn in answer to his own voice. We obtained some reactions which seemed quite positive in separating sounds indicating curiosity, warning, and fear.

Expressive sounds among the tropical American

monkeys are rather monotonous; a few plaintive mewings; an occasional chatter. Many of them of course, scream loudly when angry. I have heard plenty of roaring from the howling monkeys. That type seems to me to have the most extensive "vocabulary"—should I call it?—of any of these tropics in uttering grunts, barks, purring and rumbling sounds besides its nightly roars, but it shows no marked facial mobility, no smattering of lips, and lacked the head tilting of the sapajou.

With a batch of caged macaques and African grivets insolent impishness flashes from the cages and when such latter types are turned loose in the enclosures at the zoo they soon take possession as if they owned the place and engage in vigorous play. Such types even try tricks among companions.

I remember giving our monkeys in New York access to the outdoor cages during the winter. But in order to prevent a cold draft blowing in, swinging doors were constructed and hung in the openings leading outside. These doors were hinged at the top and swung back and forth. All a monkey had to do to get out was to push the

door forward and run through; it swung into place behind him.

They were familiar with the operation of the doors within a half day's time. In two or three days the macaques were playing tricks with the doors. A monkey would pester another and dash away for the door, hold it open and wait for his adversary to come dashing through. At the critical moment the first monkey would release the door, which banged the pursuer on the head. This developed into a favourite sport. It did no harm to the husky members, but they also played the tricks on the smaller monkeys, which were nearly knocked out. I had to dispense with the doors. Such deviltry was not prompted by "instinct." They had reasoned the thing out.

But to get back to our Honduranian trip: At San Pedro Sula we were joined by Dr. S. M. Waller, a keen naturalist, formerly of Memphis, who has settled down to live in the tropics and is doing much good in his study of tropical diseases. The place was a gateway to a wonderful valley inhabited by jaguars, tapirs, peccaries, troops of monkeys, extremely varied bird life, and poisonous snakes. The first trip Waller arranged was

over the trail leading to Santa Rosa. I should add that one journey all the way through would murder any automobile. We went as far as the Chamelecon River in a car with huge tires. Several *cayucas* or heavy canoes were waiting for us. These were of the type Roosevelt used in descending the River of Doubt. One of them was twenty feet long and quite roomy. It had been hollowed from a single mahogany log. We decided on fish for dinner and I never saw a mess so quickly got together. Waller climbed a slope to look down into a quiet pool. Then it was *bang*, *bang*, *bang* with his repeating rifle. Our Honduranian boys dove like seals. Some of the fish were actually hit, others stunned by close contact. The thing was so skilfully and quickly done we gasped when two fine strings of large, perch-like fish were laid on the bank.

We retraced our way for a trip to the Ticamaya Lagoon. This was eighteen miles from the base with a trail leading through. Waller said the going was bad and nothing but Fords could make it. We took two of them and started at dawn so as to get out again before darkness and mosquitoes arrived. We were five to a car and generally

armed except myself. I had troubles enough with the movie apparatus.

Right at the start a bit of colour was added to the country we were about to penetrate by the experience of a party prospecting for mahogany areas and arranging for a way to get the timber out. The party had been camping on the trail we were to go over, the men sleeping in hammocks. The overseer was a seasoned type and believed in putting everybody to bed at dark in order to start work in the cool air soon after dawn. Each man had a mosquito net to drape over his hammock. They had all been in their hammocks when the chief felt a tug at his net. He dreamed he was back in the States in a Pullman and a porter was waking him. Then he woke up and realized that the net was being tugged. Slowly reaching for his flashlight with the dual idea of discovering the perpetrator of this tomfoolery and banging him on the head, he pushed the netting outward and flashed the lamp. The sight confronting him kept his finger on the switch; froze him into immobility.

A magnificent body of yellow with black rosettes lay on its side. Stretching upward was

a big paw and sharp talons hooked in the net. Most hypnotizing was the *jaguar's* bulky head not four feet from him, the eyes staring with an intensity never to be appreciated except by the observer in such a predicament. The big cat had been playing with the dangling net. It had now decided that something was very wrong with the white veil its keen eyes had seen fluttering in the night breeze.

Probably one second went by. The boss said he had no idea how long he stared at the thing. He distinctly remembered three things that followed. He uttered a yell that woke his companions to bounds and aerial acrobatics. Simultaneously, the cat exploded a snarl that rent the air and sent the waking men into other leaps of fright. With the jaguar's impassioned outburst the mosquito net was whisked off and shot across the clearing like a ghost, disappearing in the jungle growth. The big cat had not waited to disengage its claws from the canopy.

There is no doubt that an occasional jaguar is a bad actor. How about these jaguars in comparison with the Old World cats? Each of the great continental tropical areas has two species of

big cats. There are the puma and jaguar in the New World tropics, the tiger and the leopard in India, and the lion and leopard in Africa. The tiger and the lion are the leaders in size, with odds in favour of the tiger. Large Indian specimens reach a length of eleven feet and a weight of five hundred pounds, but it is said the northern or Siberian tiger attains a length of twelve feet and a weight of eight hundred pounds. A big lion would be about ten feet from nose to tip of tail, with a weight of about five hundred pounds. The maximum length of the leopard is about eight feet with a weight of about three hundred pounds. America's big spotted cat, the jaguar, has about the same weight as the leopard, if anything is slightly heavier, but is about a foot shorter, owing to its proportionately shorter tail. But it is a more massive and powerful animal than the leopard. The puma is a long-tailed, slender type with a maximum length of about eight feet and weight of two hundred and fifty pounds. It is far less insolent than the jaguar.

It is possible that one jaguar in ten might attack a human. From what I have heard—and deducted—it is also possible that one in ten

travelling groups of peccaries, particularly the larger, white-lipped peccary, might attack humans. These about constitute the danger from "savage wild beasts" in the American tropics unless one is foolish enough to go swimming, without advice, in inland waters where caimans, crocodiles and blood-thirsty fish may be common. However, these latter kinds do not pursue you through the jungle. And there appear to be less poisonous snakes in the tropics than rattlers and copperheads in our well-populated northeastern states. The poisonous snakes of the warm latitudes appear to prefer the semi-cultivated areas where human habitation has produced an abundance of their favourite food in the form of rats. An excess number of poisonous snakes in the tropics is simply an automatic provision of Nature to strike a balance against an excess of the creatures which form their natural food. All things considered in figuring the "dangers" of the tropics, I would first check my supplies of mosquito dope and provisions of protection against noxious insects. Here is a real danger, both from disease and from near torture.

We started and I have never seen such driving. There was a river with quite steep banks. I

looked for a bridge, but we charged straight for a bank and went over! The momentum shot us about twenty feet into the water which was only about eighteen inches deep. The car zig-zagged this way and that, sinking and teetering, but the driver, adding the smoke of his cigarette to clouds of steam, told us he knew the sandy bottom. We emerged on a sand bar. The driver had a way of wiggling his steering wheel which he said opened a channel for the rear wheels.

We wove along for about a mile when a huge black mud hole blocked the way. Into this we made another charge. The engine grunted and died. The driver lit another cigarette and said we would wait for the second car. While waiting, I had a chance to use my camera. The hanging lianas formed perfect jungle setting. These are elongated roots of great aerial vines. They drop as straight and pendent as loose cables from massive branches seventy-five feet overhead, some hanging free, others falling into the lower tangle. There were many magnificent coroza palms, the leaves sprouting almost from the ground. They look like restorations of prehistoric ferns and some of the leaves are thirty feet long.

I filmed a parade of leaf-cutting ants, looking like little sailboats as each carried a large fragment of leaf balanced upward in its jaws. I was cautioned that if I took two steps backward I should be mobbed by their soldiers, which would boil all over me with acid-saturated jaws. Their idea in carrying the pieces of leaves is to build a circular mound in their home. This mound is as beautifully formed as a birthday cake. It is impregnated with fungus collected by the ants, which moulds the leaves into an edible solid—the food of the ants. It is the silo method that up-to-date farmers are using, only the ants had the idea from the dim ages.

Just after filming the leaf-cutters I was scolded for hurdling a zig-zag wave of army ants and told I had missed a lively time by sheer good luck. It seems that some of the ants in the tropics come right at you. I was after an innocent kind of snake which looked exactly like a slim green vine. It ran along the tops of the leaves and when it stopped made you blink, as it instantly blended with the stems.

I heard a sound like blowing a New Year's horn and discovered a nonchalant, squatty bird of

dingy black, about the size of a crow, with a beak like a full-sized ripe banana. It turned its head in a silly gaze on one side to get a look at us. It was a toucan, a species which we had never expected to see so close except in a zoo. A minute later a pair of scarlet macaws a yard from head to tip of tail flamed by. Their flight was graceful and easy, in contrast to the parrots, also flying in pairs, with laboured flutter.

When we went on we struck a brake of thin bamboo and with clattering of rushes against fenders broke through to a grassy shore. Ticamaya Lagoon with distant shore of jungle and little islands of trees smothered with vines was stretched before us. We had made the eighteen miles in three hours. My attention was attracted to the number of dead trees protruding from the water, many of them serving as roosting places for big iguanas—lizards four to six feet long with a row of high red spikes along their backs like an Indian in war regalia. They flopped into the water and dove as we glided nearer—for we had borrowed a cayuca from some natives hunting caimans. There was another lizard about eighteen inches long, the basilisk. It was a pretty

thing with long tail and slender limbs, brown with bright yellow bands. This attractive creature gave remarkable demonstrations of jumping off the logs and with rapid scamper of hind limbs rose on these slender members and in reared position ran over the surface of the water until it gained another log around which it ducked like a squirrel. The Honduranian doing the paddling told me very seriously it was called the Jesus Christ lizard because it walked upon the water.

Bird life was astonishing. Flocks of white egrets and roseate spoonbills flew ahead of us. The latter are coral pink with broad bill expanding at the end as wide as a tablespoon. Big herons waded knee-deep their dagger-like bills ready to dart for fish. Sharing the dead trees with the iguanas were spectral snake-necked birds and cormorants. The former are unpleasant-looking things of dingy blackish feathers, with excessively long, writhing necks. There were as many as two dozen in a tree—and there were dozens of dead trees. Some of these birds were diving like seals, going under the water for fish and coming up quite a distance away. They were popping in and out of various places, but avoiding some spots. Over

one of these spots we shot a couple out of a tree. They floated for a minute when there was a ripple and soggy splash. That meant dinner for watching caimans.

We were paddling toward a savannah of water lettuce when a swirl and barely discernible something caught our attention. It was a manatee. We were looking for them but did not really see one. These huge aquatic mammals are something like mammoth seals only stouter and much slower in motion. They weigh up to a thousand pounds and have a habit of rearing from the water with a youngster grasped with the flipper-like limb at the breast. At such moments they appear like gigantic, dark-skinned humans. It is possible that the mermaid myth originated from fleeting, excited observations of manatees.

The beds of water lettuce were the parading grounds of flocks of handsome birds, the size of starlings, hunting for aquatic insects. Wandering among them were long-legged birds with incongruously big feet adapted for strolling over the pad-like leaves. A large hawk watched this gathering from a dead tree with a single, horizontal arm. He appeared out of place, sinister

and motionless as bronze. We glided through this realm of teeming life for several hours and returned to find the balance of the party had been after a boa constrictor on one of the little islands. It had hid in impenetrable vegetation and everybody was brushing off ticks with which the island swarmed.

With the late afternoon the howling monkeys started to roar across the lagoon. A troop started to roar close by, a big male not fifty feet from us. One of the men started to investigate, but we called him back, hailed other straying members and filled the radiators. We keenly remembered the experiences of the morning. It would be dark in a little over three hours.

We navigated the tilting gulley and corduroyed several bad spots. At a place that didn't look so bad the forward car dropped into a hole and tore off a front tire. Waller and I walked on ahead. Waller said to go quietly, that the area was notorious for jaguars and we might see one.

After we had walked for about two miles I wondered why the cars had not come up. The sun was setting in a sultry calm. The fact that they had not caught up gave me a bit of anxiety.

It would be dark in an hour, with a formidable stretch ahead. We turned back and had walked a mile before we met them. One had hit a big root and knocked a spring out of line.

We were a third way out when one of the cars slid into a hole. It took real engineering to rescue it. The short tropical twilight had settled when we started again. The native drivers had come out with not a worry about night driving. One of the cars had no searchlight bulbs and the other had one. This meant we had about twelve miles of jungle trail with two cars depending on a single lamp bulb! As it grew dark we put the one-eyed car in the lead and made a couple of miles when the lamp bulb burned out. We had not realized how much it meant to us. The inky darkness seemed to envelop us. There was a crash. The car struck another root and bent the steering rod. This was discovered with match-light.

I was worried. We were in thick mosquito terrain and unprepared, having no nets. The mosquitoes in that area have a bad reputation. They transmit severe tropical fevers. At San Pedro Sula we slept under tent-like canopies. I

was learning something about forethought in the tropics. There was an ominous hum around each of us.

The mosquitoes closed in and to protect our faces we smeared on grease got out of the hub caps. There was a screened Carib house about three miles ahead.

We reached it an hour later by lighting our way with a torch soaked in gasoline. Here we found a room lit by two wicks burning in palm oil. We were told about a jaguar killing a donkey nearby several days before, and were presented with the skin of a boa constrictor. We ate native bread and canned frankfurters, and heaven only knew how long the latter had been embalmed. But we all ate them, ate everything in the cabin. And as the shining eyes of awakened children were peeking from protuberances built around the house I gave the host ten dollars for the party, which so pleased him that he gave us more skins.

Thus ended the brief tropical adventure. Later on a friend asked me what I considered to be the most dangerous part of an experience like that.

"The canned frankfurters in that Carib house," was the first thought that flashed to mind.

## Chapter XV

# Outdoor Sleuthing

MANY people in the more prosaic walks of life envy the explorer and naturalist. They feel that the joy and thrill of any true intimacy with mother Nature is forever denied them. But this is not a well-founded jealousy. There are few roads on the fringes of a town or not far outside the cities that are not replete with enthralling facts of natural science if one only knows how to discern them. Study the ways of the animals of the woods and fields nearest your home and you will not be disappointed; your envy of the explorer will be replaced by a feeling that you have open to you the same avenues of romance that he has. Moreover, you will not risk the torments of insects nor the fear of fever that would assail you in the less temperate zones of the globe. Keen observation will in time make you a sort of outdoor detective, unravelling the lives of all sorts of queer creatures. It is a fascinating sport, and I am speaking from years of experience.

When I use the term "animals" I mean every-

thing from deer, muskrats, weasels and black-snakes, through toads and frogs to crickets and Katy-dids, and literally hundreds of other forms of God's creatures.

Suppose you find a deer's antlers in the woods. You seldom find a pair—just a single antler. What does this mean? There is a strange story about that discarded weapon. Every male member of the deer family—and only the males of those we call deer have antlers*—sheds its head weapons every year in the early spring. The antlers become spongy at their base and a slight blow will knock off one or the other. A pair of bony disks is all that remains to show where the antlers were attached. About a month later a soft growth appears around these disks, pushing them up from the head. The growth becomes larger and lumpy. It is soft and filled with blood, and covered with furry skin. Its rate of growth is very rapid, sometimes as much as half an inch a day. Within a couple of weeks it is branching. The soft skin covering the growing antlers is called "velvet," which explains the woodsman's term of a "deer in velvet."

* Except the moose and caribou.

In August the antlers keep on growing and branching, while the deer is careful not to hit them against branches as they are easily wounded. During late summer the blood that has been flowing through the growing antlers slows down in circulation, stops and they turn into bone. The hardening is rapid and the deer rubs them against a tree stripping off the velvet which for a few days hangs in long shreds. He is now ready to sally forth and engage in duels with his rivals.

That is what you have to think about when you find a shed antler. You will probably find it during the spring or early summer. Fragments will add to your story, for it is curious how many things happen to make an antler disappear. In the north woods the porcupines or the wild mice or squirrels soon gnaw it to pieces. Rodents seem to be keen in cutting up antlers with their sharp incisor teeth, while the larvae of different kinds of boring insects attack antlers until they are riddled with holes and crumble into the soil.

Did you ever see a flying squirrel, and can it really fly? Here is the way to solve the mystery: Watch for the trunk of a dead tree a foot or more in diameter that still stands upright. It should be

hollow, with the top broken away. Pound on the trunk with a stout stick and watch for flying squirrels, and look sharp. A silvery gray creature or several of them may dart out of a hole, rush to the very top of the trunk, then jump. Keenly watch that jump. The squirrel will be seen to flatten until it is almost a square in outline. It goes gliding downward and outward like a paper dart. It may actually soar to the limb of another tree without touching the ground. It does this by spreading the limbs outward from the body, which action widely stretches elastic folds of skin connecting front and rear limbs. Here is a thing that has long occurred in Nature while man has only recently started to experiment with the gliding idea.

The flying squirrel is a rodent, that is, one of the gnawing animals. It is among creatures of this kind that we are likely to make our most frequent observations in the woods. The rabbit is a rodent and a very timid one, yet many of us have probably passed within a few feet of a rabbit without knowing it, for the animal is smart enough to realize that if it snugs into a hollow of the ground among dead grass, twigs or leaves, it

will be almost invisible. The big varying hare of the northern United States and Canada is particularly fortunate both in summer and winter in thus hiding himself. He is brown in summer to match the ground, and white in winter to match the snow. Many who have travelled the woods have never seen him, owing to his habit of darting among twigs when in his brown coat, or slyly watching you from under the curling ridge of a snow-drift when wearing his white coat.

The groundhog or woodchuck is another rodent. The next time you see a woodchuck hole stop and figure what the simple looking burrow really means. He is the first cousin of the prairie "dog," although living in solitary state instead of in large colonies. The burrow is dug downward for a way, then horizontally, finally taking a bit of a sweep upward. The idea is to prevent its being flooded by rains. At the end is a snug nest of dry grass. This is the woodchuck's bed during the long winter sleep. This animal becomes very fat during the autumn and with the first freezing weather crawls into its nest, fluffs the grass around in cozy fashion, then curls up and dozes for a full three months.

The thaws of February and penetration of the warm sun may wake the woodchuck. He peeks out. The drab landscape, however, is anything but to his liking, so he promptly goes back to sleep again for another month or so to emerge thinner than at the time of the fall retirement. His fat has been absorbed as nourishment during the long winter sleep.

Now let us figure how we are going to find the woodchuck. After you have located the hole you can stalk it from a distance, watching sharply and keeping yourself well under cover. You must advance slowly like a skirmisher. You may see him stretched out flat on his stomach taking a sun bath, or sitting up and looking like a little bear. And how he will rush for cover when he sees you. Then again he may not be out and you will have to try it once more.

Now for another thing that may happen when you are stalking the woodchuck: A bird runs along in front of you dragging a wing and seems to be hurt. You feel that all you have to do is to reach forward and pick up the little creature to see what has happened to it. Try it! Just as you are about to grasp it the bird flutters out of

your reach, only to drag its wing again, luring you forward. The bird is luring you away from her nest as she does with her natural enemies, cats and weasels and possibly a prowling blacksnake, which, while normally hunting for small rodents, would consider a nestful of young birds a fair delicacy.

You may even come across the prowling blacksnake. He gives you a start as his long slim body with lustre like a gun-barrel glides swiftly through the grass with that scraping rustle characteristic of a snake. Where is his home and what is he doing? He has been travelling about a quarter of a mile a day for the past four days, having left his hibernating den, and he will keep it up about half a mile more until he reaches an overgrown meadow where there are plenty of wild mice. He will stay there for the summer making his home in a tumble-down stone wall.

The den where the blacksnake hibernated for the winter in company with about fifty others of his kind was a rocky ledge, seamed with great fissures and situated on the south side of a wooded hill. Hibernating in those same fissures, which extend well into the rock beyond penetration of

frost, were also a number of rattlesnakes. There is a common idea that these two are enemies. And yet, if you had been on that ledge, with your legs safely encased in leather leggings, keeping your hands off the rock in climbing, you would have seen rattlers and blacksnakes emerging from the same crevices to bask in the spring sun, the poisonous and the harmless, in perfect harmony!

As autumn comes on there is a tendency for the nights to become very still. There is not a breath of wind but a chill penetrates the woods. It may be warm again in a few days, very warm, but the still cool nights have warned the blacksnake. He starts back for the ledge. He may have wandered a full two miles away during the summer, but he finds the same crevice he had before and the other members of his clan are arriving. The rattlers are already there; they are always the first to get back to the den.

I am sometimes asked why different kinds of frogs gather around pools in the spring, where their piping or tremulous calls are heard, and disappear from these pools as soon as the weather becomes warm. The frogs go there to lay their eggs because they begin life as tadpoles, later

grow legs, absorb their tails as nourishment as the mouth parts are changing and then leave the water by the thousands as tiny froglets.

The next time you hear the frogs piping or trilling at a pool don't be satisfied to say "listen to the frogs"; go and have a look at them. If it is a colony of "peepers" singing, miniature tree frogs which are not any larger than a joint of your little finger, you are going to have a surprise. They will all stop singing as you approach the pool, but start again if you remain motionless at the water's edge. You may hear one right in front of you. But try to locate him. Ten to one he has ducked around the opposite side of a little tuft of grass protruding from the water. If you are patient enough you will locate the creature and note that in singing its throat swells up like a bubble pretty nearly as big as its body and stretches so thin the light shines through it.

There is a lot of history among these amphibians. The common toad, for instance, lays many hundreds of eggs which seems to be an heroic provision to maintain the clan in fair numbers against their enemies that are everywhere. These eggs are in long strings and thus can be told from frogs'

eggs, which are in masses. The tadpoles are eaten by fish and water beetles and when the little toads emerge from the water, barely a quarter of an inch long, they are gobbled up by other enemies, even some of the birds finding them attractive. Barely five per cent ever reach maturity.

If you want to follow up habits of the toad stroll out on a country road at night where widely separated electric lights are burning. When you see a toad sitting beneath a light sit down yourself and watch him. He is waiting for insects to hit the light and fall to the ground, and his antics in hopping around and inspecting a fallen beetle by a twist of the head from side to side are amusing. He never pops out his sticky tongue unless the insect moves, but may dance impatiently around it until satisfied. Then there is a pink flash and the prey disappears.

I think an outdoor observer can have a lot of fun by studying the different kinds of singing insects, bringing some of them home and hearing their songs within doors. The whole thing is very simple, but there is a lot of fun in the stalking and locating of the singers. The kinds of insects I mean are the crickets, the meadow locusts (which

are like grasshoppers with leaf-like wings) and the Katy-did. The latter is the prize. It is easily heard but hard to get and can make about as much noise as a parrot!

All of these insects "sing" by rubbing the forward portion of their wings together. That is, the males do this; the females are always silent. There are stiff patches on the forward edges of the male's wings, which when closely examined look like mica. They are the resonating or stridulating organs. The volume of sound produced by these small creatures is astonishing.

A Japanese professor gave me my first lessons in stalking and capturing singing insects. He told me that many people in Japan kept singing crickets and used them like watch-dogs, only the warning of the cricket is directly opposite to that of the dog. The small country houses of Japan are largely built of bamboo. The walls are bamboo and the floors are laid on bamboo poles. When anybody walks the floor moves and shakes, and so do the walls. The cricket cases are decorative things like miniature bird cages. They sit on a little pedestal or bamboo tripod. The crickets begin to sing late in the day and all through

the night—unless somebody walks across the floor. Vibration frightens the crickets and they stop singing. Then everybody wakes up—from the silence! It is the same effect as being on a steamer for a week or two. One gets so accustomed to the engines that one wakes up with a start if they are stopped during the night.

The Japanese professor taught me to listen to different kinds of insect songs in the woods and fields. I was surprised to find how many there were and how I had never really separated them before. I have never forgotten those lessons and now, when going to different parts from my home area, immediately distinguish differences in the insect tones and cadence.

Let us consider how many kinds of singing insects may be heard and easily found in what one might call the "home area." There are three kinds of crickets, each with a distinctly different kind of song. The common field cricket which may be found under loose, flat stones is as long as the joint of one's finger. Its song is a series of very short trills produced by elevating and rubbing the wings together. It is loud enough to be heard a couple of hundred feet if the night is

still. Then there is a very small cricket barely three eighths of an inch long. It also hides under stones and its song may be heard about twenty-five feet. It sounds like continuous tapping of a silver coin loosely resting on a tip of the finger, that is tapped with another coin.

The sweetest singer of the three is the tree cricket. This is a milk-white insect with flattened wings and body and slender limbs. It is about an inch in length, a beautiful and very delicate thing, but its song is louder and more penetrating than the field cricket, being a series of prolonged trills of curiously melodic, almost minor strain. It may often be heard among vines and as it is solitary and its white body so conspicuous it may be easily stalked. There is a tree cricket in the pine barrens of New Jersey which sounds like sweetly blended sleigh bells on a distant trotting horse.

There is a variety of singing among the grasshopper allies. Some squeak, some chatter and others buzz; a few buzz so loudly that they may be heard a fair fraction of a mile. Some sing altogether by day and others by night.

The red-eyed locust (all the grasshoppers belong to the locust family) is a daylight songster.

It is about an inch and a half long, with body and wings of pale green and fiery red eyes. Its habit is to stand upright on a vertical stem in the sunlight and produce its buzzing song, which is a continuous process broken only by a series of ticking sounds about five seconds apart. One has to look very sharply to see him among the green stems which he closely matches and the first sight of him may be his hair-like antennae which are about twice as long as himself.

Most of his allies sing at night. It's real sport to stalk them with a flashlight, keeping it directed towards the ground to avoid falling into a hole. On approach to the insect it will probably stop singing, at which one must turn off the light and wait for it to begin again. When one is right upon it the singing stops altogether.

Some of the meadow locusts are longer than one's finger with wings three quarters of an inch in vertical breadth and of vivid green. The big cone-headed locust of the sand-dunes near the seashore produces an intense and continuous buzz that almost approaches a whistle. It may be heard a full half mile on a calm night.

The object in stalking these insects, is, of

course, to capture a few, take them home, care for them and hear them sing. They become quite tame after a few days and will sing when you are standing immediately beside them. Your friends will be keenly interested. All of these species can be kept in a case preferably two feet square, constructed of light frame-work which is covered with ordinary wire window screen. If you have some crickets in the case the bottom should have several bark slabs under which they may hide. There should be some twigs for the locust species to climb on. The netting should be lightly sprinkled with water twice the day, as the inmates will drink the hanging drops. This matches the dew, which is their ordinary fluid nourishment. Crickets will eat tiny bits of raw or cooked meat and pieces of apple or other fruit. Nearly all of the locusts are fond of corn silk.

With the exception of the crickets the night songsters do not start their chorus until the summer is well advanced. They are then mature. Their life cycle starts from eggs which are laid in the fall, when the parents die. The eggs are snugly hidden to resist the winter cold, hatch in the spring and the youngsters rapidly grow, and

shed their outer coats. With each moult the wings are larger. The final moult uncovers the perfect, singing wings.

The star of all singing insects in the home area is the Katy-did, which ordinarily sings in the tops of trees, of birch, willow, maple or oak, and largely the latter. They are therefore extremely hard to catch, but sometimes a lower tree harbours a talkative specimen and by merely touching the branch with a pole the insect will suspect danger and drop. The flashlamp must be ready. The creature looks like a small, falling green bird—for the Katy-did is a big insect. Moreover, if there are leaves on the ground it usually falls with a "plop." One characteristic of the Katy-did is that it will eat nothing but the leaves from the kind of tree upon which it is found. This does not make its care difficult as a small branch of half a dozen leaves can be placed in the singing cage every day and kept fresh by setting it in a can of damp sand. The Katy-did needs to have a leafy bower of the kind in order to feel snug and content.

Unless your house is well separated from the neighbours, it is well to leave the Katy-dids alone,

as well as the big cone-headed locust of the salt meadows. Their songs are so loud that some people, not inclined to be naturalists, are apt to object.

I had an extremely embarrassing experience one time in being presented with a large batch of Katy-dids—which had been collected among the scrub oaks in the mountains. I left them outside in a pasteboard box with the anticipation that I should find them, but as I was away until after midnight and there was a heavy shower, the box collapsed and fell apart liberating about two dozen songsters. They crawled into various near-by trees and produced an autumn chorus that made some of the neighbours almost desperate. Knowing that I had various live things about my place they properly blamed the noise on me and insisted that I do everything from shooting to poisoning the disturbers. I captured a few, but the trees were so high that the greater number kept right on singing until there was a frost. Frost terminates the Katy-did's natural life.

As the idea of outdoor sleuthing develops there is another thing to be investigated: the mystery of mimicry and camouflage. We never heard

much about camouflage until the past Great War was on and men were seeking to hide or disguise their boats, supply buildings and shelters from a keen and numerous enemy. But Nature has been doing that very thing for ages; for there is constant war among the wild creatures, large and small, one seeking another as natural prey with no truce or cessation in the struggle. But camouflage is not the only thing man has adopted as protection in hiding from his fellows and thus unconsciously aping the animals. Mimicry, methods of hiding by deception, smoke screens and the like were all ingeniously developed by large numbers of wild creatures before modern man ever turned them to his own account.

In the great masquerade among animals we can name three kinds of protective disguises. One can be called mimicry and relates to creatures blending with the hues of soil or rocks and looking like leaves and sticks. Mimicry is particularly common among insects and the smaller sea creatures. It may also be noted among reptiles and amphibians, to a more moderate extent among birds and rather rarely among the four-footed animals. Camouflage is often confused with mim-

icry, but is really a different idea. It relates to the breaking up of outlines so that a form is deceiving or difficult to detect. A third type of deception relates to the building of curious structures for concealment, which may be stationary, or carried around, also assuming motionless and grotesque postures when frightened or, most remarkable of all, in "imitating" by form and colouration really dangerous things that are avoided. The latter is illustrated by the harmless coral snakes, which are astonishing in their similarity to deadly reptiles of the southern states and American tropics.

There is an insect in Ceylon called the walking leaf. I know this celebrity well enough to call him by his first name, as a number of the clan have lived in my own laboratory. The walking leaf warrants the title of the world's star example of protective resemblance. It is a fairly large insect, half as long as one's hand, flat, like a leaf and an inch and a half broad. It is the shape of a leaf, veined like a leaf, of vivid green and even its limbs are flattened and leaf-like, ragged at the edges as if they had been gnawed by tiny insects. It becomes motionless when frightened, or if there

is a slight breeze stirring deliberately sways the body like a leaf in gentle agitation.

Another creature nearly as remarkable is a small and thin green tree snake of the Central American tropics. It mimics a vine. Its head is long and sharply pointed like the end of a stem. Even the pupils of the eyes are developed as horizontal slits in carrying out the lines of the head. It rests among the leaves in nearly a straight position causing its head and neck to waver slightly as the breeze moves nearby tendrils.

Taking up camouflage, we can pick some examples among the larger animals. The stripes of the tiger break his bulky outline among the sun slashes and reeds of the jungle and thus he may wait motionless while the prey unsuspectedly wanders by. And thus the form of the vividly marked zebra mixes with the lights and shadows of vegetation. Some of the camouflage of ships during the war was remarkably like the striping of zebras. The most common camouflage among four-footed animals, however, is the white stomach. Nobody seemed to realize this, it seems, until Thayer pointed it out quite recently. The

white portion, being beneath the animal or on the darker portion, and in shadow, tends to form a neutral and blending outline.

A fine combination of camouflage and mimicry is seen with the Brazilian tree boa. It lops its green body on each side of a bough, not coiling around it, and, while rather large, blends with the vegetation. Owing to its size, however, Nature has decided to break up its outlines by irregularly splashing it with white. It is extremely difficult to detect when in a tree, for the white markings deceive the eye into associating them with patches of light shining through the leaves or spots of sun on the foliage.

As to actually performed disguise or tricks of deception among creatures not naturally gifted with mimicry or camouflage, the rock crab is a good example. It never fails to carry a dead sponge with a concave surface jammed tightly over its back or shell, and when it sees an enemy coming folds the feet beneath it and looks like anything but a meal for the most hungry foe. The little cuttlefish has a sac in the body secreting sepia, an ink-like fluid. When frightened it ejects this into the water forming a dense black cloud into which

it swims to hide. It is far ahead of the human in utilizing the smoke-screen.

What can we find in the home woods and fields to enable us to see similar animal disguises? There are many of them. Some of them are very remarkable. For instance, suppose you happened to be glancing among some leaves of a low bough and saw what appeared to be the head of an extremely savage looking snake. It isn't a big snake, but it makes up for lack of size in sinister appearance. It is no thicker than your thumb, but its fierce eyes with greatly dilated pupils glare directly forward. The head weaves slowly in menacing fashion. Suddenly a yellow forked appendage darts forward. You naturally recoil.

Let us investigate this thing with a long stick, part the leaves and see what it is. Examination shows nothing but a thick-bodied, hairless caterpillar, less than three inches long. But now he is turning towards us and we see the answer to the puzzle. Back of the small head are two staring eye-like *spots*. As we watch him he thrusts from a fold just above the head a yellow appendage like the forked tongue of a serpent. Here is an insect masquerading as a serpent which may be

found right in the backyard! It is the caterpillar of the common swallow-tail butterfly.

For other fine cases of mimicry you won't have to go further than some scrub oaks in your vicinity. Take along an old umbrella and hold it under a small oak. Then hit the branches with a stick. Various insects you have never seen before will fall into the umbrella. Some may look like little brown or green seeds, but the kind we are looking for is a big one, as long or longer than a finger. It is the "Walking Stick" insect and even if one tumbles into the umbrella you may not detect it for a moment, it looks so much like a twig.

There are several kinds of Walking Sticks. One is dull brown—just like a dead twig; its body is barely a quarter of an inch in diameter and of the same thickness from end to end, to match the outlines of a twig. The legs are long, like slender stems. Another kind has a green body and green limbs. If you take this creature home in a small pasteboard box and keep it in a little screen cage it will feed upon oak leaves and live contentedly. Then you will have a chance to watch some of its queer antics. It will remain stiff and motionless

upon a stem at times. Watch for those motions I described with the Ceylonese walking leaf and the serpent that mimics a vine, for this home insect does the same thing, causing the body to quiver like a stem agitated in a breeze.

A point about mimicry of leaves, sticks, vines and the like is this: It has been bestowed as a natural gift all over the world and among wholly unrelated types. Why some are thus gifted and others are not, is one of the puzzles that man may never solve. There is another phase, near home, quite as remarkable as the stick insect of small oaks. This is the "Water Stick," belonging to an entirely different order of insects. Designed to blend with the débris of stagnant ponds it is dark, dull brown, like a water-soaked stem that has sunk to the bottom.

Many caterpillars are green enough to blend with living leaves, but there is one found in the eastern states which is blackish brown with edges of its body flattened and curled upward like a dead and withered leaf. It crawls out to the end of a stem to rest and then strengthens the deception by rearing each end of the body. An observer not familiar with it could look at it closely, right

under his nose and not know what it was. Quail and partridge also blend with the fallen leaves and you might pass within six feet of them without noting their huddling forms. You have probably passed within a few feet of a whippoorwill resting on a flat stone and looking like a smaller stone.

A common tree frog has the habit of squatting on the rough bark of a tree. Its gray, mottled skin, with speckling of dull green is a fine match for bark that has patches of lichen.

There is a legion of creatures which cannot fade out but have to use various sly tactics for safety. As is usual, we must stay among the smaller kinds to note the most remarkable habits. The higher we go in the development of brains among wild creatures the less tendency there is to seek disguises. The more intelligent and higher types seek or construct secure shelters, slyly hide or depend upon flight.

Sometimes when the water is low among the rock tide pools watch for hermit crabs. The name is not altogether appropriate as they are common enough to be easily found. What you watch for is a good-sized snail shell moving along much

faster than a snail would carry it. Pick it up and you will find the limbs of a crab tightly jammed together and blocking the opening of the shell. The hermit crab wouldn't last long unless he thus armour-plated his body, which is long and soft, an ideal meal for strong-jawed fish. He must change the shell at frequent intervals. He is growing and the old shell becomes tight and uncomfortable. So he strolls around looking for another.

The job of changing shells may be decided in a moment. Strolling around like a human looking in shop windows he sees an empty shell which looks like a good fit. It is now a case of using his goggle eyes on stalks to see if the coast is clear, that there is nothing which may be dangerous. With everything quiet he slips out of the old shell and backs into the new one. There is a moment of trying it on, like one with a new overcoat, wriggling shoulders to see how it fits and feels. No, this new shell won't do. It is too large. His limbs barely close the opening. There would be danger of being yanked out. He slips back into the old shell and strolls around looking for another. And you may watch this performance if you are patient enough, by finding a vantage point

on a jutting ledge over a pool and remaining very quiet.

The hermit crab's travelling house is similar to that of the tortoise, only the latter is born with it and it grows with him. The tortoise is lucky in being naturally provided; he wears most of his skeleton on the outside, arched over him like the girders of a domed building, a bony sheathing stretched across the framework and this again shingled with tough plates.

There is no more remarkable tortoise in the world than one commonly found over a broad area of the United States. This is the box tortoise. It is provided for fooling the enemy without stirring a step. The lower shell, which is as strong as an armoured plate, is divided and hinged across its centre. The tortoise draws in it legs, head and tail and tightly closes both halves. They fit so perfectly at all points of the margin it is impossible to insert a broom straw at any portion.

Tortoises are, of course, very fortunate, but other creatures are undaunted in their labours to build their own travelling shelters. The grub of the caddice fly makes a little cylinder of silk and plasters it with coarse sand grains on the outside

to render it inconspicuous. It keeps part of the bag over its back, carrying the protective covering wherever it goes. The bag worm, a caterpillar living on pine trees, makes a similar cloak plastered on the outside with fragments of dead pine-needles. It never thrusts more than its head and shoulders out of the bag, sleeping with the deceptive covering hanging straight down.

An ingenious deception is followed by a common type of caterpillar living in colonies. When a group decides to rest the members crawl upward on a tall stalk and bunch in symmetrical fashion, one crawling upon another until they form a long, pointed cone—several hundred of them. Regularly placed, all in perfect alignment, they look like a large seed pod or exaggerated bud. If you want to astonish an uninitiated friend, get acquainted with these caterpillars, find a resting colony and stir them up with a stick.

Spiders practice a number of deceptions in luring their prey and hiding from enemies, but the most remarkable of them all is the trap-door spider which I mentioned in a previous chapter. Readers of this story who live in the Southwest should watch for these creatures. They dig an

almost upright tunnel in the soil and line this with silk; they then build a trap-door of silk and sand at the mouth of the tunnel. The little door fits over the opening as snugly as a stove plate. It has a silken hinge at one side. The most important thing about the construction is the perfect fitting of the door and its *disguise.*

When it is closed there is no sign of the door's outline, but the spider is not satisfied. If there are tiny pebbles scattered around the surrounding soil the spider plasters one or two of these on the door. If there is dead grass or bits of débris a few little chips or shreds are fastened to the door to make it exactly match the surrounding soil. The most ingenious touch of this deception I have seen was on the lid of a trap-door spider's home in southern California. The soil was irregularly mottled with tiny clumps of greenish moss. I noted a spider pull down a trap-door a few feet in front of me and keeping my eyes riveted to the spot found the door and opened it with my pen-knife. It had a clump of moss about the size of one's little finger-nail fastened to the top of the door.

I have already suggested that you watch for

types which pretend they are dangerous by "imitating" the colours and actions of the really dangerous kinds. This is frequent among insects. There are flies with bodies banded like hornets that move their bodies in threatening fashion as if they carried a sting. And there is the bee fly commonly buzzing around windows in the late fall. It is a wonderful imitation of the common honey bee, but closely examined will be seen to have only two wings, while bees have four wings. Nevertheless, if this fly is picked up it buzzes like a bee and deliberately presses the body against the fingers as if it were going to sting. I have shown the creature to many friends, but never get over a shrinking feeling when it makes that "stinging" move with the body, and I've dropped several of them in spite of my assurance.

Snakes are particularly inclined to bluff when cornered and imitate the action of their poisonous allies. It seems as if they keenly realized they can make you jump during such performances and thus gain time to safely glide away. Many of them vibrate the tail and in this way imitate the rattlesnake. A buzz in the leaves and the sight of a serpent's body is enough to cause most ob-

servers to turn and run. Some snakes go farther, flatten the body and strike, all in bluff.

There is one snake which has frightened more people than rattlers and copperheads. This is the hog-nosed snake, flat-headed "adder" or hissing "adder." I have more letters of inquiry about this reptile than any other serpent of the eastern states. People insist it must be poisonous on account of its awesome performance. It is thick-bodied, too stubby to get away by flight. When met it raises its head and neck, flattens the anterior portion to twice the normal size, weaves the body back and forth and hisses loudly. The separated scales on its neck, disclosing the brightly hued skin, cause the colour pattern to become more vivid and "poisonous" in appearance. It never attempts to bite. It doesn't need to. The observer either flees or picks up a club and dispatches the actually harmless creature on the spot. Slain specimens are sent to the Park for identification.

It is amusing to read some of the letters we get about this kind of snake or note some of the telephone inquiries. I remember one specimen killed in a rock garden in Westchester County. The chauffeur had been called upon to dispatch the

reptile and used a very long stick. He then picked it up with the fire tongs, very carefully dropped it into a wooden box and drove to my office at the Park for information as to just how deadly it was.

I told him it was perfectly harmless and as he looked extremely dubious, went to the cages and took out a living specimen. Placing this on my desk I teased it a little until it flattened, hissed and duplicated the performance he described. He left with a look of intense relief upon his face.

A couple of hours later I had a telephone call from the owner of the place. The actions of the serpent had caused a profound sensation. There was fear that its mate might be nearby. The children had not been allowed to leave the house and go to school, the dog was shut in and the gardener had put on a pair of high rubber boots. This tension was relieved when the chauffeur returned.

## Chapter XVI

# The Fight to Live

A SMOOTH-GLIDING Pullman lulled me as I lay back to think things over. It was the opening of the lecture season. I had had a long task in the editing of my latest lecture which was made up of six reels of motion pictures and called "The Fight to Live."

My theme started far back in remote time with scenes of swimming cells to indicate that the ocean has long mothered the simplest and most primitive forms; and in ages past the sea, dashing against the rocks of sterile shores, cast inland the débris of the ocean floor, forming slimy tidepools along the coasts. Here life came ashore—and thus the land was opened to the spirit of pioneering which man and animals continue today.

My scenes stepped along to a point where methods of locomotion became definitely established. Fins and other steering devices appeared. It is possible to pick present forms to show this, "living fossils" to hint of what took place in the try-out of devices for locomotion. This appears

to have been a slow and natural process, taking infinite time, but similar to the trend of man in developing propellers for his vessels and wings for his aeroplanes.

The shallow tidepools and the glint of sunshine lured many forms to explore that mystical point where air and water converged. There was a mixture of gills and limbs. The life cycle of the common frog forms a sort of living memory of the processes by which life came up from the waters.

In the later and bolder pioneering of life and development of the ancient races of reptiles Nature staged the greatest show on earth. It will probably never again be equalled on this earth. There were reptiles with bodies weighing more than an elephant but with heads not much larger than a dog's. There were forms that looked as if they were attired in overlapping tiles and others with decorative spikes like Indian war regalia. There were tyrant types with enormous teeth. The defenceless were slain. The flesh-eating kinds had little left for food. This phase of life passed on leaving remnants better to carry on the struggle. Rocks and caves are graveyards for

those uncouth monsters and the only survivors are the fossils in our museums.

The jungle writhed its way from the soil into the reeking air. It steadily dropped its leaves and dead branches to form a thick floor, which was pressed deeper and deeper into the earth. The coal we burn is the remains of past jungles, demonstrating that animal life has had a long time for its schooling.

Present-day actors among the mammals, many of strange makeup, may be drawn upon as a cast to indicate what took place. In the broad expanse of ancient jungles and plains life was built from survivors of types which failed to fit. Life lived where it could live. Nature tried everything to get by. Life sought opportunities like water seeking a crevice. Small warm-blooded creatures and primitive birds battled for existence. They were storing up intelligence, another development.

Then, as warm-blooded life developed, the mammals put on a big show of their own, and a few of the veterans survive today. The tapir, hippopotamus, elephant and rhinoceros are among the world's greatest show-pieces representing far

more ancient relics than King Tut's tomb or Mayan ruins.

Swinging along to the loris and the potto, tailless remnants of what may have been the ancestors of the monkeys, my subject came up to date and dealt with the trends of modern life. The great apes marched by in a surly film procession. There was the struggle of the beaver to master its engineering problems of building a dam to raise water to cover and hide the entrance of its house; the work of the prairie dog in building mounds or craters around its burrows to keep rain from flooding the nest; the toiling of the honey bee; and the prodigious and endless work of ants. In looking upon the work of the latter it was simply a question of perspective, of getting far enough away and gazing upon human-built piles to note a parallelism—great structures with a maze of rooms and galleries; within and without the stream of life toiling and flowing along as among the structures of the insects.

Weapons and tools! They have also been slowly evolved by natural processes among the animals, as man has mentally and quickly developed them. Various kinds of armour are

favourites in Nature and among these a bristling array of spines has been a broad provision, world-wide and among wholly unrelated forms. Thus the porcupine flashes a wicked coat, as do some species of the mice, the hedgehogs and Madagascan tenrecs, and even the echidna, an egg-laying mammal of Australia. Some are coated in leathery armour like the armadillo, and others with great overlapping bony plates like the pangolins. The tortoises stole an early march on man's inventions and are like walking tanks. Weapons are varied: there are teeth, claws and horns; the highly perfected hypodermic, poison-injecting fangs of the serpents; the stings of insects, mandibles that ooze burning acids; tentacles of sea creatures that paralyze at a touch.

Associated with this use of actual weapons are other devices for protection in the fight to live. The polecat is a good example of effective provision, but the use of noxious fumes is common. Many insects throw jets of irritating fluid or highly noxious fumes at an enemy and a number of the sea creatures have glands carrying poison "gas" which they release in the direction of an intruder. The cuttlefish in discharging clouds of

sepia forms a thick smoke screen into which it darts to hide. Powerful electric shocks are hurled by a number of fishes. Nature believes in preparedness. With mimicry existing in elaborate detail long before cave men had sense enough to fashion a bludgeon, the art of make-believe dates back to a try-out in the dim ages.

The development of animal working utensils has been equally great. The mole has shovels for digging, the ant-eater enormously long claws like jimmies for prying open logs and the rough nests of termites. The beaver has teeth that do work as fine as that of the human adz. Among insects there are a variety of jaws among the wood-tunnelling types that are as elaborate in assortment as a series of selected tools in the human mechanic's kit. A number are provided with flash-lights to attract the sexes—something that man has not been able to match—voluntarily produced light, intense light, without heat.

Mother love, a guiding force in life is everywhere, among the highest to the lowly; among mammals fighting with teeth and claws to protect their progeny; among the birds building wonderful nest-structures with nothing but a beak as

a working utensil; among plated crocodiles scraping up great mounds of débris from the cypress swamp and deeply embedding their eggs to hatch by the generated heat of the disintegrating mass. It continues among fish, some building nests of bubbles and standing by to drive intruders fiercely away; insects which toil to embed the eggs in safe and snug places; spiders which spin silken cradles for their eggs and soon die from exhaustion of the task. Thus runs the story of Life's struggles.

Parallelism crept in. The ways of man were pitted against all this. Human development has been rapid, but astonishingly like the slow provisions accorded Nature's wild creatures.

The fight to live is rapidly changing from Nature's original plan over a large portion of the earth. This comes from the rapid increase of the human race and its domination. Man is becoming a highly presumptuous type and seeks to improve on natural conditions.

There are pamphlets issued by the United States government suggesting a campaign of extermination of "predatory" animals, an elimination of "vermin" which is designated as foxes

oyotes, the puma or mountain lion, weasels, ıawks and owls, which prey upon game birds—ome of the latter introduced for sport in shooting. There is also a warranted antagonism against 'man-eating" tigers, the big cats of Africa, charging rhinos, crocodiles, devastation by elephants ınd need of their destruction, menace from poisonous serpents, obnoxious English sparrows, too nany starlings. But there is also a bounty for bears and eagles in Alaska, accusations about sea-lions harming the salmon industry and suggestions for their extermination. There are other alleged objectionable animals, enough to form quite an army of the wild creatures against which the forces of man have mobilized with traps, poison and guns.

Then there is another attack, like the enveloping advance against a harassed army. This is slow and invincible, and nothing can stop it. It is the invasion of civilization into the wilds, the creeping edge of cultivation and man-claimed areas for improvement. In advance moves a cloud of skirmishers, the hunters.

The animals are falling. Nature is giving way. Principal lines of defence are in the hot

and steamy tropics where the tangled jungle, biting insect hordes and man-attacking fevers cause civilization to halt. . . .

I put a closing scene in my lecture, a pretty shot in a slant of light, on tinted film. It showed a church with buttressed sides, steeple pointing to the heavens, great windows and imposing expanse of pale stone. It bespoke great cost and spaciousness. Its subdued interior was one of soft lighting and deep-toned organ. It was a temple for veneration—but did this include reverence for the array of natural life upon the earth? The text for the average sermon related to the welfare of man. Had there ever been a sermon within those walls founded on the thought expressed in the story of Noah and the Ark? There were surely many parishoners in that church who might ask if the giraffe was of any earthly use, or what was the excuse for such ridiculous animals as the kangaroo and hippopotamus.

There had been intoned within those walls the hymn that God had created the heavens and the earth and all the beasts of the field. But the beasts of the earth were getting none of the reverence. My claim went with that scene that the

intensive scientist—though he might fail to go to church—had, in his profound respect for the life he studied, a religion all his own.

THE END